Deloitte.

Ārohaṇa (आरोहण)

Growth with Impact

A Coalesce-affiliated initiative

19–20 September 2024

Table of contents

01. Foreword

Romal Shetty
CEO
Deloitte South Asia

Envision India in 2047 as a self-sufficient global leader where digital and green innovations uplift every community.

As we enter a transformative era, the vision of *Viksit Bharat 2047* ignites hope and ambition across the nation. It envisions a future where India emerges as a global economic powerhouse and a model of inclusivity, sustainability and innovation. This vision is not a distant aspiration but an attainable reality, steadily being built on the pillars of self-reliance, digital transformation and green growth. This is exemplified in India's current GDP of US$3.9 trillion, projected to grow 7 percent in FY25, well above the global average. This growth reflects a decade of focused efforts and policies to secure a robust economy by 2047.[1]

Agriculture forms the backbone of India's resilience, employing 40 percent of the population and playing a key role in the economy. By boosting food production by 2–5 percent, India could produce 25 percent of the world's food.

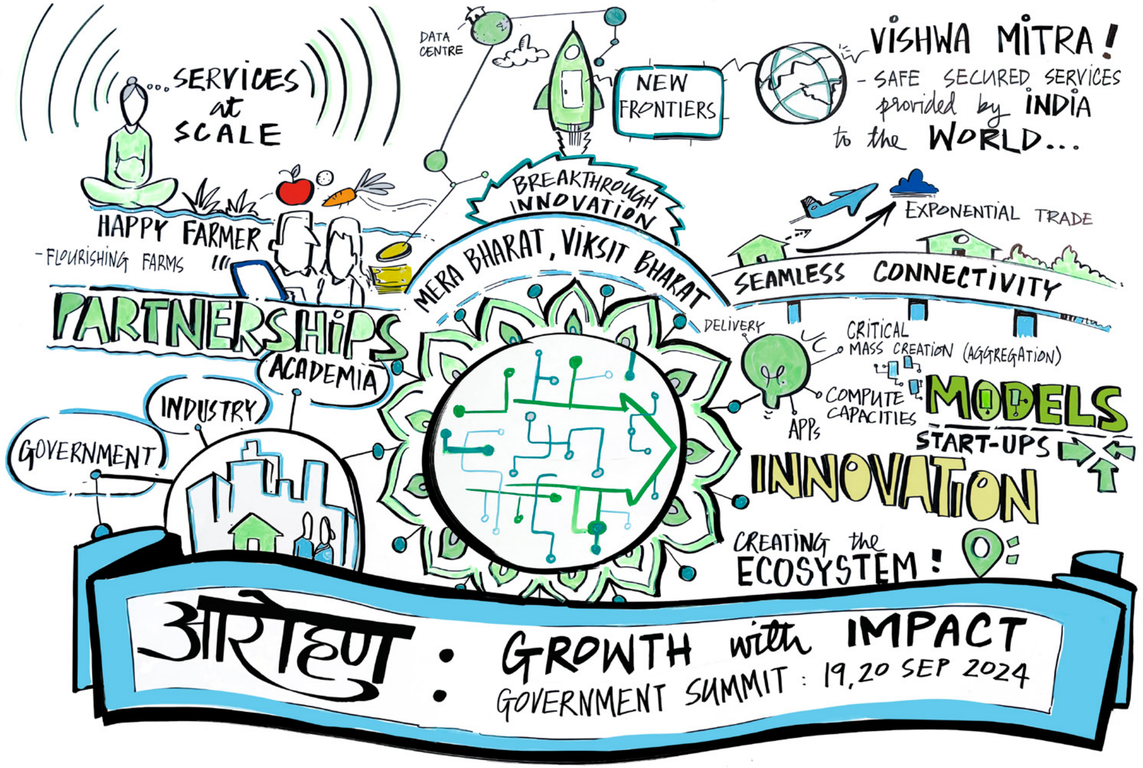
Enhanced irrigation, precision farming and satellite data can optimise yields, while innovations such as drones and AI promise to triple productivity, positioning India as a global food hub.

This is just a small part of what 2047 could bring. From what was once considered science fiction to achievable reality, India aspires to lead in asteroid mining, a new frontier with vast reserves of essential materials, such as lithium and nickel. This venture showcases India's innovative, future-forward spirit and strengthens its position as a leader supporting sustainable energy goals within the global supply chain. Through these advancements, India aims to foster a prosperous future for its citizens and share its vision of growth and resilience with the world.

India is committed to reaching net-zero emissions by 2070, showcasing its leadership in tackling climate change. Environmentally conscious initiatives such as renewable energy projects, carbon trading and developing sustainable aviation fuel are already paving the way for a greener future. Alongside, massive strides in infrastructure and digital governance are helping India lay the groundwork for its march towards *Viksit Bharat 2047,* one brick at a time.

Ārohaṇa: Growth with Impact is not about what has already happened, but it is really about the art of the possible.

[1] https://www.moneycontrol.com/news/business/economy/india-s-nominal-gdp-at-3-9-trillion-poised-to-cross-4-trillion-by-fy25-cea-nageswaran-12953504.html



02. Framing the future: An introduction to Ārohaṇa: Growth with Impact

NSN Murty
Partner and Leader, Government and Public Services, Technology and Transformation
Deloitte India

India is on the verge of transformation, with a future centred on innovation, sustainability, inclusive growth and a growing role as a global leader. As the world undergoes rapid transformation driven by advancements in AI and the pressing need to tackle climate change, India is poised to adapt and lead the way forward.

At this crucial juncture, *Ārohaṇa: Growth with Impact,* organised by Deloitte, aims to be a flagship platform dedicated to shaping the country's growth trajectory. Titled *Ārohaṇa*, a Sanskrit word that translates to "ascension" or "rising," this summit symbolises India's rise to becoming a global leader. The theme, Growth with Impact, reflects the core of this gathering, emphasizing a commitment to sustainable development, where every action leads to transformative, lasting change for communities, the environment and future generations.

> *As India approaches 2047, it has a unique opportunity to shape a promising future through careful decisions, actions and priorities.*

Ārohaṇa: Growth with Impact is a forum that brings together leaders from government, industry, the public sector, think tanks and start-ups to discuss and define India's future in key areas such as infrastructure, security, digital transformation and green growth. The summit facilitates collaboration among policymakers, business leaders and innovators to create a roadmap that ensures India's swift, sustainable and inclusive growth.

Conducted on 19–20 September, Ārohaṇa: Growth with Impact delved into various topics spread across several panel discussions, leader talk sessions, fireside chats and workshops. The key focus areas were:

- **Government digital transformation:** The summit explored how emerging technologies can reshape public services, emphasizing their role in enhancing governance efficiency and making it more citizen-centric.
- **Economic development:** Discussions revolved around key drivers for sustaining India's economic rise, focusing on fostering inclusive growth.
- **Trust and security:** India must defend its physical and digital frontiers as security risks grow. Various strategies were discussed to address traditional and non-traditional security threats in an ever-evolving digital ecosystem.
- **Service delivery excellence:** Ensuring high-quality, context-driven public service delivery is essential for citizens and businesses. Service delivery directly impacts individuals, making it a crucial focus area. Discussions centred on using technology, such as the Digital Public Infrastructure (DPI), to bridge the gap between government and citizens, enhancing the effectiveness and accessibility of public services.
- **Green growth:** India is already a leader in renewable energy and aims to expand its endeavours globally. Discussions explored how to further this transition with green policies to help India spearhead a sustainable and just energy shift.

Ārohaṇa*: Growth with Impact* is more than just an event; it is a call to action. It focuses on shaping the future through bold ideas, strategic decisions and impactful collaborations. With policy and people at the forefront, concepts are refined and transformed into tangible outcomes.

Ārohaṇa (आरोहण) | Growth with impact

03 | The pulse of progress: A summary of Ārohaṇa: Growth with Impact

The summit's core purpose is to provide a comprehensive roadmap guiding India's transformative journey towards *Viksit Bharat 2047.* With this objective in mind, the event focused on shaping India's future through a series of panel discussions and *Manthans* that explored pressing national priorities, emphasizing collaboration and forward-thinking strategies. From political dignitaries and government officials to senior officers of the armed forces, thought leaders and technology experts across multiple sectors shared their insights during this two-day summit and illuminated the path towards India's position on the global stage.

This book captures insights from visionary panel discussions, fireside talks and specialised workshops *(Manthans)* focused on defining future policies and strategies. Six key developmental pillars serve as the foundation for the vision of *Viksit Bharat 2047.* Each pillar, explored through a series of riveting discussions with some of India's best and brightest minds, helps shape the vision of a nation built on the tenets of inclusivity, sustainability, security and inspiration on a global scale.

Transforming governance: A digital-first mindset

Bringing Viksit Bharat 2047 to life means harnessing technology as a tool for greater and more holistic governance.

The digitisation of governance is the linchpin that holds India's developmental endeavours together. The Honourable Minister, Nitin J Gadkari, a visionary leader and an esteemed minister of the Government of India, captured this best in the keynote address, setting the tone for Government Summit 2.0. His message was straightforward, emphasizing that technology can shape and accelerate the country's development agenda, especially regarding governance.

What followed were several more panels that highlighted this ethos. The Tech4Good initiative was given prominence in a panel discussion showcasing the power of technological initiatives to solve developmental challenges across various sectors, thus fortifying the link between public services and governance. Other vital discussions centred around building a Digital Bharat, i.e., strengthening the digital infrastructure one technological pillar at a time. This was showcased through innovations in public sector digitisation, focusing on efficient citizen services, and discussed in sessions exploring the global potential of a digital Bharat as a leader in technology and innovation, limited only by imagination.

Adding to this, a *Manthan* on Urban Platform for Delivery of Online Governance (UPYOG) fostered spirited discussions on creativity and technological advancements in urban areas, setting a positive precedent for smarter cities. Another *Manthan* brought forth the value of tangible metrics when measuring the success of government initiatives, with several expert speakers stressing the importance of measuring progress to ensure that India stays on track with its 2047 targets.

Developing the digital economy

India's digital economic growth involves scaling technology and ensuring that every business, especially MSMEs, has the tools to succeed.

Another key aspect of India's *Viksit Bharat 2047* initiative is the digital transformation of the economy. To drive this point home, attendees were presented with the success stories of Karnataka and Telangana, two model states that led the charge on rapid digital transformation and served as beacons of development for the rest of the country.

The Make in India initiative also received significant attention, with a special Powerbytes panel discussion highlighting the critical value of Digital Public Goods (DPGs) in today's economy. Other related panels further explored how digital solutions are the new building blocks for physical infrastructure, especially in sectors such as manufacturing and logistics. Therefore, empowering Indian organisations through digital solutions was presented as imperative for future-ready growth.

This was further underscored in an engaging *Manthan,* which emphasized the need to empower MSMEs, the backbone of India's economy, with cutting-edge digital tools and incentives. Experts at another insightful *Manthan* on future-ready policies emphasized the need for regulations that could keep pace with technological innovations to support digital economic growth.

National security and justice: An evolving digital imperative

Without trust, there can be no digital future. Cybersecurity and fairness must go hand in hand with growth.

Trust and security are the foundation of successful digital transformation, whether at a personal or national level. In today's rapidly evolving cyber landscape, securing India's cyber defence has become an urgent priority, driving crucial discussions on how to protect our digital future. As India continues to advance globally, fortifying the nation's cyber defences is critical for a secure and resilient Bharat. Discussions at the *Manthans* centred on building trust in sovereign cloud-based infrastructure and exploring the innovative defensive capabilities of modern Security Operations Centres (SOCs) to protect India's digital networks.

Another vital takeaway from the overarching theme of India's digital security was the need to ensure fair and timely justice for its citizens, emphasizing technology that can speed up judicial processes and make justice accessible and timely.

Digital pathways to service delivery excellence

Technology is the great equaliser; its use must ensure that no citizen is left behind and every citizen is provided for.

Excellence in service delivery is paramount to realise the vision of *Viksit Bharat 2047.* Several panels focused on how digital technologies can optimise public service delivery, making government services more efficient and accessible. Among many cutting-edge technologies improving services across various sectors, Generative AI (GenAI) was highlighted as a key driver of efficiency, revolutionising and automating tasks from administrative to public service delivery.

Particularly notable was an eye-opening session on digital solutions to bridge the rural divide, which discussed how technology can connect rural India to essential services. A supplementary discussion on the value of digital cooperatives further emphasized this point. Healthcare services also took centre stage at the summit, with the Ayushman Bharat Digital Mission (ABDM) and its transformative scope for innovation for both HealthTech users and providers.

Ārohaṇa (आरोहण) | Growth with impact

Advancing equity through inclusive development

Education is the cornerstone of a developed nation. By making it accessible, the foundation for an inclusive India will remain resolute.

India's unity lies in its diversity, and without inclusivity, which ensures every citizen benefits from the country's progress, there cannot be a *Viksit Bharat.* Thus, discussions on advancing India's equity through inclusive growth strategies were pivotal in the summit's proceedings.

India's cultural and social diversity is a strength that drives transformative change, and accessible education is another key to achieving social inclusion on a grand scale. Special sessions delved into the digital tools used to democratise education, ensuring that quality learning reaches even the most remote parts of the country. The final message made it clear that technology, combined with inclusive policies, can help bridge the education gap and empower future generations nationwide.

Green growth: Sustainable development in energy and farming

Green growth is not merely a policy; it is a way of life India dutifully abides by to nurture its future.

The ongoing climate crisis demands a direct response, making sustainable development the central focus at the summit. Therefore, every meaningful discussion on combating the climate crisis was anchored to the critical role of green technology. As a result, with its commitment to green growth, India is more determined than ever to achieve its Sustainable Development Goals (SDGs) promptly and holistically.

Sessions spotlighting initiatives such as Open AgriNet and VISTAAR showcased innovations in AgriTech, demonstrating how technology can transform Indian agriculture by improving efficiency and sustainability. These advancements in farming were further heightened by nature-first conservation initiatives, ensuring that India's economic development will never come at the cost of its precious natural resources.

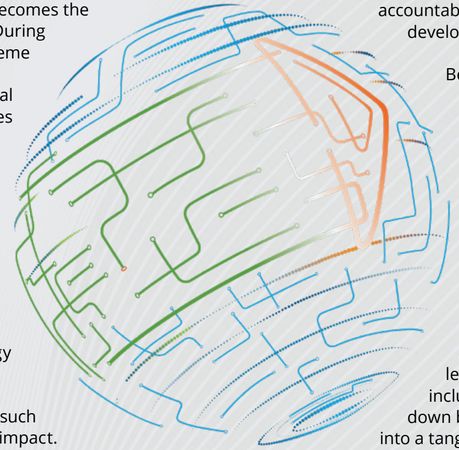
Discussions on energy efficiency in utilities and infrastructure further emphasized this commitment to preserving the country's natural resources for future generations. Industry experts highlighted how India can promote the use of renewable energy while ensuring energy security for its citizens.

04 | Government digital transformation: The blueprint for Viksit Bharat

Harnessing the power of technology, India's vision for 2047 is to create a governance ecosystem that is faster, smarter and more inclusive than ever.

The goal of *Viksit Bharat* is to reorient governance using a digital-first mindset, where technology becomes the axis of India's developmental roadmap. During *Ārohaṇa: Growth with Impact,* the focal theme was holistic digitisation as the best way towards the swift development of national governance. This transformation promises to make governance more inclusive, efficient and innovative, connecting citizens to key services and unlocking India's full global potential.

India's ambitious *Digital Bharat* mission lays the foundation for a technology-driven future, empowering citizens and transforming governance. Speaking on this vision, the Secretary of the Ministry of Electronics and Information Technology (MeitY) emphasized key initiatives such as the IndiaAI Mission and the National Supercomputing Mission, while sessions such as Tech4Good also made an exceptional impact.



These initiatives bolster the country's digital infrastructure, collectively driving innovation, fostering smarter cities and improving public services through digital transformation. Discussions at *Ārohaṇa: Growth with Impact* further underscored the importance of measuring the success of digitisation initiatives, ensuring transparency, efficiency and accountability as India progresses towards its holistic developmental targets.

Beyond governance, India's digital evolution is driven by a broader DPI strategy encompassing Open Networks, cybersecurity, cloud computing and GenAI. These elements foster innovation and enable scalable, inclusive and secure solutions. Platforms such as the UPYOG offer a glimpse into how digital tools can streamline urban governance. However, the impact extends further. DPI-based frameworks are transforming industries, enabling interoperability and empowering businesses and individuals.

As India positions itself as a global technology leader, the focus remains on designing accessible, inclusive and sustainable digital ecosystems that break down barriers and turn the vision of *Viksit Bharat 2047* into a tangible reality.

4a. Laying the foundation for Mission 2047

Nitin J Gadkari
Minister of Road Transport and Highways, Government of India

Technological advancement, economic growth and strategic leadership are the core pillars that will strengthen the foundation of India's *Viksit Bharat Vision 2047.* In his keynote address, the Honourable Minister, Nitin J Gadkari, emphasized the goal of making India one of the world's leading economies. Sustainability, entrepreneurship and innovation in the urban and rural sectors are essential for inclusive growth and success. Additionally, uplifting India to a global leadership role depends on the country's ability to use technology and financial resources to drive innovation.

Economic growth through technological innovation

Technology is a key driver of India's sustained development. Industry leaders and entrepreneurs are vital contributors to this development if they focus on economically viable projects that emphasize the innovative use of technology to advance various sectors. The Honourable Minister also provided examples from the agriculture sector, such as the use of embryo transplant technology, aquatic agriculture and natural farming methods. These innovative technologies are receiving the necessary support to boost productivity and socio-economic growth.

> *We are making smart cities, but why not make smart villages? There is a potential for economic viability and growth in rural areas.*
>
> **Nitin J Gadkari**
> Minister of Road Transport and Highways, Government of India

Entrepreneurship and leadership in policy implementation

Entrepreneurship and leadership hold the key to this nation's progress. Although technology and financial resources are essential, the Honourable Minister emphasized that strong leadership with a clear vision makes all the difference. He urged policymakers to lead initiatives that foster growth in urban and rural areas. He also iterated the value of fast-track decision-making, transparency and a corruption-free system, which would be necessary to achieve the Viksit Bharat target.

Rural development as a pillar of growth

Speaking further on rural development as one of the essential pillars of India's future, the Honourable Minister, Nitin J Gadkari highlighted the importance of developing the agriculture sector to new heights. Farming is a primary income source for a large part of India's population. Modernising this sector through initiatives such as "smart villages," improved water management infrastructure and a wide range of new AgriTech innovations is crucial. As established before, the goal is to foster economic equalisation between urban and rural spaces to boost the larger economy and job market.

Sustainability and environmental responsibility

The Honourable Minister, Nitin J Gadkari emphasized the importance of sustainability by urging India to adopt "green energy solutions." He highlighted the benefits of biofuels, hydrogen generation and other renewable energy sources in reducing the nation's dependence on fossil fuels. Projects such as bio-hydrogen cars and biomass fuel demonstrate the success of green technology in decreasing pollution and paving the way for a sustainable future in India.

> **Hydrogen is the potential holy grail for India's renewable resource development. That is precisely why the country is investing in several experiments with biohydrogen, the findings of which can establish India as the leading expert in this burgeoning scientific area.**

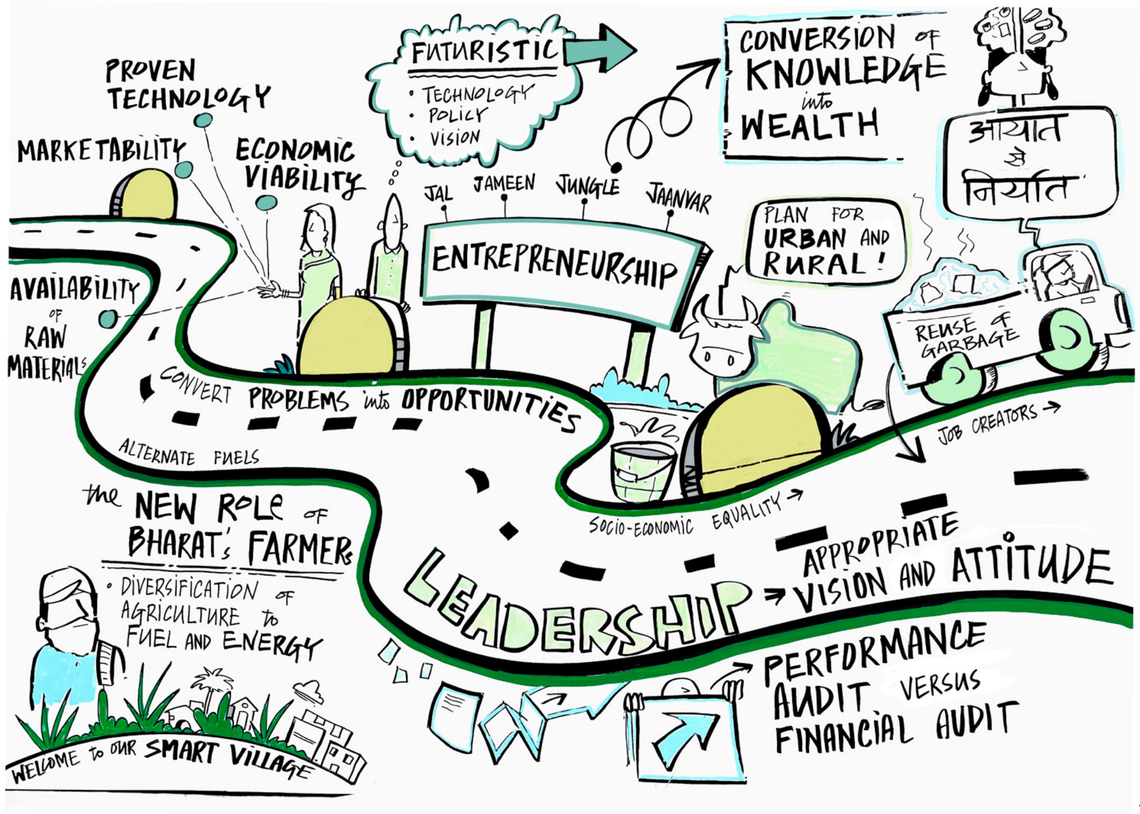
Integrated development across sectors

Finally, the Honourable Minister strongly advocated for **integrated development** across sectors that linked **infrastructure, industry and agriculture** through modern-tech solutions. He stated that these would be the building blocks for the country's smart cities and smart villages, fostering employment, addressing socioeconomic disparities and accelerating India's path towards global leadership.

> *Technology is important. Financial resources are very important, but the most important thing is entrepreneurship and leadership with an appropriate vision. We can make a lot of things out of that.*
>
> **Nitin J Gadkari**
> Minister of Road Transport and Highways, Government of India

Key takeaways

- **Technology as a growth driver:** Embrace technological innovations, particularly in agriculture and renewable energy, to drive India's economic growth and sustainability efforts.
- **Leadership and entrepreneurship:** Focus on transparent governance and fast-track decision-making, as strong leadership and entrepreneurial vision are essential to realise the *Viksit Bharat Vision 2047.*
- **Rural development:** Uplift rural sectors through "smart villages," water management and AgriTech solutions to ensure balanced, inclusive growth.
- **Sustainability:** Prioritise sustainable technologies, such as biofuels and hydrogen, to reduce dependence on fossil fuels and lower environmental degradation.
- **Integrated development:** Foster an integrated development model that links infrastructure, industry and agriculture with cutting-edge technology to create a robust and diverse economy.



4b. Viksit Bharat: Bringing the vision to life

Jayant Chaudhury
Minister of State (Independent Charge) for Skill Development and Entrepreneurship, Minister of State in the Education Department, Government of India

S Krishnan
Secretary, Ministry of Electronics and Information Technology

The vision of Viksit Bharat is a roadmap towards a self-reliant and developed India by 2047. The collaborative efforts of government bodies, private enterprises and academia drive this mission. Technological innovation and skill development are key focus areas in this developmental journey. Bringing the fruits of technological advancements to the grassroots levels is crucial for inclusive development. This chapter highlights the initiatives shaping India's future, with key leaders discussing the technological, educational and sustainability efforts necessary to achieve the goal of Viksit Bharat.

Leaders Speak: A Vision for Viksit Bharat
Speaker:
S Krishnan, Secretary, Ministry of Electronics and Information Technology (MeitY), Government of India

Moderator:
Deepti Sagar, Chief People and Experience Officer, Deloitte South Asia

Ease of doing business is something that has to be established at the state government level in terms of providing the infrastructure, power, water and land, which are essential for all industries, especially so in the case of semiconductors.

S Krishnan
Secretary, Ministry of Electronics and Information Technology (MeitY), Government of India

In an engaging and insightful discussion, S Krishnan shared his vision for *Viksit Bharat* through the lens of technological innovation and adoption. He discussed various steps his ministry is taking to ensure the country is at the forefront of this technological revolution and that Indian citizens enjoy its benefits.

Public-Private Partnerships (PPPs) are vital to advancing technological innovation at the grassroots level and pursuing an Atmanirbhar and Viksit Bharat. This requires a cooperative effort involving the Government of India, the Ministry of Electronics and Information Technology (MeitY), private corporations, academia and state governments, with the government working to secure industry support for success.

MeitY has made significant strides in developing the foundational framework, referred to as the DPI. This infrastructure serves as a platform upon which the private sector and academia can innovate, developing applications that reach and influence the lives of citizens across the nation.

We work with various institutions to create a platform and then allow the genius of innovators who want to use this to provide services.

S Krishnan
Secretary, Ministry of Electronics and Information Technology (MeitY), Government of India

National Supercomputing Mission and India AI Mission
The National Supercomputing Mission (NSM) and the India AI Mission are instrumental in realising the vision of *Viksit Bharat 2047.* The NSM is being repurposed to enhance computing capacity, particularly for AI-related applications. The India AI Mission has been allocated over INR10,372 crore. Of this amount, INR4,500 crore is designated to enhance AI computing capacity through a PPP model.[2] This model is structured in two ways: first, using existing AI computing infrastructure by making it accessible to innovators, start-ups and academic institutions at subsidised rates, and second, potentially supporting the creation of new computing capacity, depending on market needs. These initiatives ensure that India's AI capabilities are robust, accessible and geared towards innovation.

[2] https://pib.gov.in/PressReleasePage.aspx?PRID=2012375

India Semiconductor Mission
Closely related to the NSM and India AI mission, the India Semiconductor Mission is another cornerstone of India's technological future. India is finally seeing progress after six years of consistent efforts, with five semiconductor manufacturing facilities under construction and is focusing on certain viable mature nodes. The focus is also on ensuring the supply chain's resilience for various applications where these chips will be used and on export manufacturing. These initiatives aim to enhance the country's competitiveness as a global semiconductor hub. The inaugural Semicon India 2024 global summit marked a turning point, establishing India's credibility in the global semiconductor market. While fabrication and manufacturing provide job opportunities, the real employment boost will come from building a whole ecosystem, encompassing everything from design to end-product development. Collaboration among the central government, state governments and private companies is crucial, with state governments playing a significant role in providing infrastructure and subsidies and enhancing the ease of doing business.

With the success of the Semicon India 2024 global summit, India's credibility as a destination for manufacturing semiconductors has been decisively established.

However, the real challenge is ensuring these innovations penetrate deeply into rural areas and remote regions, bringing digital services and opportunities to those who need them most.

Bringing these technological advancements to rural, tier-3 and tier-4 areas remains challenging. MeitY's efforts in the country's Northeastern region, where start-up ecosystems are flourishing, demonstrate that innovation is possible even in remote areas. However, for these start-ups to scale, they need more than just government grants. Collaborations with venture capitalists and private companies are essential for sustainable growth. MeitY and other government ministries are working on aggregating start-ups and venture capitalists, fostering connections that can fuel growth in rural and underserved areas.

Various interventions by the government are focused on building systemic capabilities within India in the near term. Alongside that, there's a strong push to expand the boundaries of innovation, ensuring we are future-ready for what lies ahead.

Deepti Sagar

In conclusion, the journey towards Viksit Bharat involves creating cutting-edge technology and ensuring that it is accessible, inclusive and transformative for citizens, from urban centres to the most remote villages. The confluence of public and private efforts will determine the success of India's mission to become a global leader in technology and innovation. The following key undertakings across these missions and projects will be key to achieving the long-term vision for *Viksit Bharat*:

- Electronics manufacturing must grow significantly to reduce imports and create a robust domestic industry.
- India must focus on design and product development, creating technology that is made for India by India.
- Access to devices is vital for the spread of digital services; without affordable, widespread device availability, technological progress will remain out of reach for many.
- Enhancing the productivity of government departments and civil servants is crucial to ensure that the backend operations supporting these innovations are efficient and scalable.

Leaders Speak: A Vision for Viksit Bharat

Speaker:
Jayant Chaudhury, Minister of State (Independent Charge) for Skill Development and Entrepreneurship, Minister of State in the Education Department, Government of India

Moderator:
Nitin Razdan, Partner, Deloitte India

In an insightful one-on-one session, the Honourable Minister, Jayant Chaudhury provided a compelling vision for India's future under the National Education Policy (NEP) 2020 and its emphasis on aligning education with skill development. As India steps into its growth trajectory, the minister outlined the critical role education, sustainability and industry collaboration will play in shaping a developed India by 2047.

NEP 2020

The NEP 2020 is a forward-looking and progressive policy that will guide the transformation of India's education system in the digital era. India's youthful population, with a median age of 28, positions the nation as a demographic leader. However, the country's diversity, which is its strength, presents unique challenges in scaling education and skill development to meet diverse regional needs. NEP's focus on localisation and contextualisation is a solution, allowing each state to adapt educational practices to suit their unique cultural and social contexts. Thus, NEP can bridge the gap between traditional education and modern skills.

Tech-driven education and skilling

Technology will be a key enabler of transformation in education and skill development. Virtual Reality (VR), Augmented Reality (AR) and smart classrooms gradually make hands-on learning accessible even in remote regions. Adding 25 new national skill university courses and integrating innovative subjects, such as AI and green technology, into the school curriculum is considered a vital move in preparing students for the future.

The capability of our young minds to grasp something quickly is our great power.

Jayant Chaudhury
Minister of State (Independent Charge) for Skill Development and Entrepreneurship, Minister of State in the Education Department, Government of India

Sustainability and circular economy

Embedding sustainability into the education system, with a focus on creating a clean and green economy, is of paramount importance. Initiatives under Samagra Shiksha promote student engagement in eco-clubs and projects such as vegetable gardening to raise awareness about climate change and sustainable development.

Agriculture, technology and skilling

Technology can transform the agricultural sector, a key part of India's economy. Modern technologies, such as AI, drones and the Internet of Things (IoT), are key to improving yields and farmer incomes. The government facilitates this transformation by creating cooperatives, organising farmers and fostering collaborations between the private sector and smallholder farms. Taking a fresh look at the market structures is crucial. The corporate sector needs to implement more CSR initiatives to engage with farmers in villages.

Farmers don't need prescriptive policies. If a technology makes sense to them, they will adopt it. The government's role is to organise and demonstrate how these innovations can improve their livelihoods.

Jayant Chaudhury
Minister of State (Independent Charge) for Skill Development and Entrepreneurship, Minister of State in the Education Department, Government of India

Corporate collaboration in skilling

India is set to become one of the largest workforces in the world. By 2047, we're talking about 40 percent of the global workforce—over a billion people, give or take. In this context, skilling and education are key to preparing this workforce for future opportunities.

Nitin Razdan

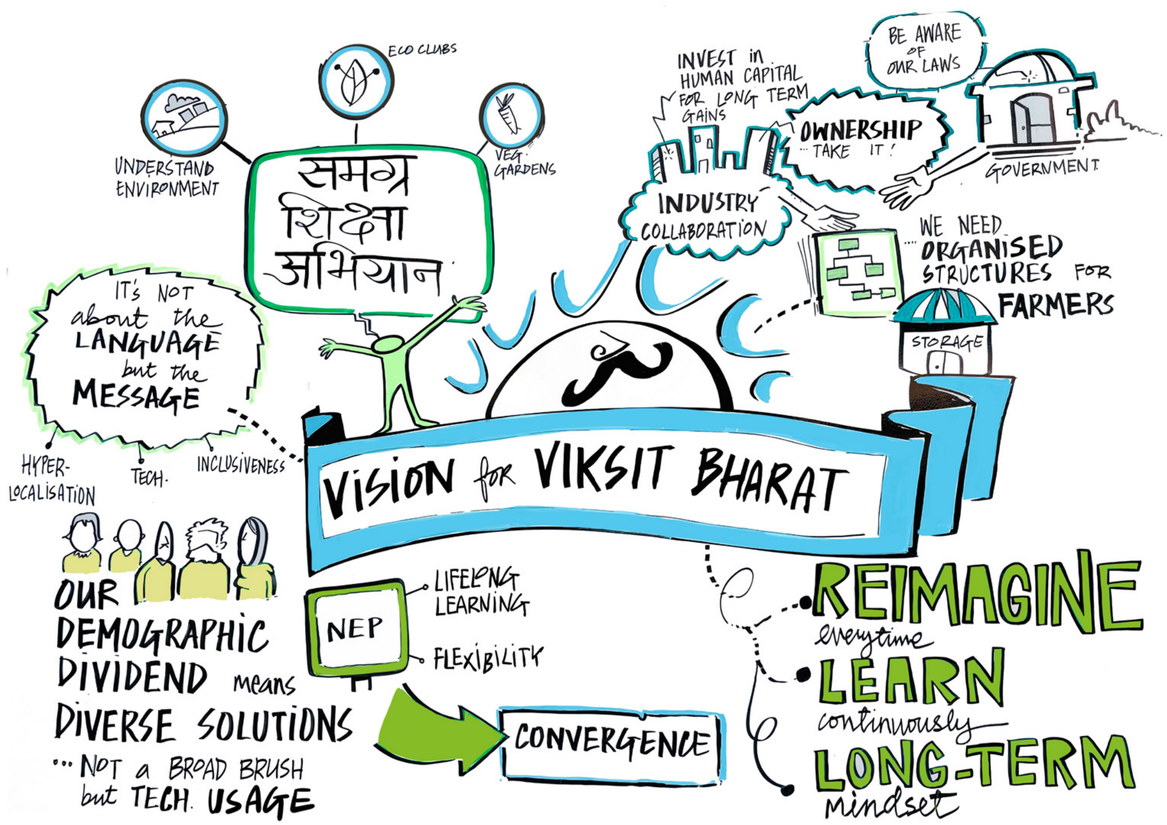
In a large and diverse country such as India, the government cannot be the sole agency to upskill the workforce. Corporate India plays a crucial role in skilling the workforce and the government. Various CSR initiatives to train the workforce in the logistics and service sectors have been implemented to enhance the skilling programmes across the country. However, a strong need exists for more private-sector involvement. Companies must take responsibility for investing in human capital, as innovation and skills are the currency of competitiveness in the digital age.

Corporate India must understand that investing in human capital is not a short-term game. To remain competitive, companies need to invest in the future workforce through apprenticeships, internships and collaborations.

In conclusion, India's education and skilling efforts are converging to build a more resilient and future-ready country. The vision for *Viksit Bharat* revolves around the seamless convergence of education, technology, sustainability and industry collaboration. With strategic planning and concerted efforts by the government in synergy with the private sector, India is on its way to becoming a global leader in education and economic development.

Key takeaways

- **PPP for technological growth:** Collaboration between the government and the private sector is crucial for advancing innovation and delivering the benefits of technological transformation to grassroots levels. MeitY's DPI allows private and academic innovators to build impactful solutions for citizens.
- **National Supercomputing and AI Missions:** The NSM and India AI Mission are pivotal to enhancing India's computing and AI capabilities. These initiatives, structured around PPPs, aim to complement each other in building the computing capacity required to expand AI infrastructure.
- **Semiconductor manufacturing hub:** India is making significant strides in semiconductor manufacturing, with five facilities under construction. The India Semiconductor Mission focuses on creating resilient supply chains and fostering a complete ecosystem for semiconductor design, fabrication and product development.
- **Rural accessibility of technology:** Bringing technological advancements to rural and underserved areas remains challenging. Initiatives in Northeastern India show promise, but scaling them requires collaborations among start-ups, venture capitalists and private companies.
- **NEP 2020 and skilling:** NEP 2020 aims to bridge traditional education with modern skills, emphasizing localisation and context-based learning. Technology-driven education, such as smart classrooms empowered with AI and VR, prepares students for future challenges.
- **Sustainability and circular economy in education:** Embedding sustainability into the education system is crucial to creating a green economy. Initiatives under *Samagra Shiksha* promote climate awareness and eco-friendly practices among students to align with the SDGs.



4c. Building Digital Bharat: One technological pillar at a time

Vipin Kumar
Additional Secretary,
Department of School
Education and Literacy,
Ministry of Education

Lav Agarwal
Resident Commissioner,
Government of
Andhra Pradesh

Building a Digital Bharat is crucial to ensure India's success in the digital era. Education, healthcare, financial inclusion and public service delivery are the major pillars of Digital Bharat. Technology plays a foundational role in ensuring affordability, accessibility and equity across these sectors. Initiatives such as the NEP 2020 and PM e-Vidya are transforming education by integrating digital solutions to reach and empower over 250 million students. In healthcare, platforms such as eSanjeevani facilitate telemedicine, making health services accessible to even the remotest parts of the country. Financial inclusion initiatives, such as Prime Minister Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi), are digitising micro-credit services for street vendors. As India advances towards a fully digital economy, it is essential to design inclusive, interoperable and scalable digital solutions that address the needs of the country's diverse population.

Panel: Tech4Good – Building for Bharat
Participants:
Vipin Kumar, Additional Secretary, Department of School Education and Literacy, Ministry of Education; Lav Agarwal, Resident Commissioner, Government of Andhra Pradesh; Rahul Kapoor, Joint Secretary, Housing and Urban Affairs; Shankar Maruwada, CEO, EkStep; and Vineet Kshirsagar, Country Director, Public Sector, Palo Alto Networks

Moderator:
S Anjani Kumar, Partner, Deloitte India

Streamlining learning

Skilling and reskilling human resources play a crucial role in driving growth and success in the digital era, especially for a nation as vast and diverse as India. The NEP 2020 strongly emphasizes integrating information and communication technology into the school education system. With over 250 million students in India's school system, ensuring equitable and accessible education for everyone is crucial. PM e-Vidya is a significant step in this direction, encompassing multiple digital education initiatives under a single framework. It gives students nationwide access to quality digital/online education. Technology has enabled children to engage with a broader range of learning content, allowing them to learn at their own pace and according to their interests. Strategic PPPs can help bridge the resource gap and strengthen digital initiatives. Another key area where technology is a key enabler is teacher training. Advanced digital tools can help assess teachers' competencies and learning needs and offer customised training programmes.

Initiatives such as NEP 2020 and PM e-Vidya emphasize the importance of integrating digital tools in education, paving the way for a more inclusive and effective learning ecosystem in India.

Accessible and equitable service delivery

During COVID-19, technology was efficiently used at an unprecedented scale. This was an excellent example of what can be achieved strategically using technology. It acts as an equaliser, ensuring efficient service delivery across both urban and remote areas. India successfully administered billions of vaccine doses across thousands of inoculation centres, using digital platforms and applications to track and monitor service delivery and logistics. This ensured real-time accessibility and equitable distribution of resources.

By using technology, healthcare services can now penetrate even the most isolated regions, advancing digital health equity and accelerating progress towards achieving Universal Health Coverage (UHC).

The Aarogya Setu app, which became India's most downloaded application during the pandemic, simplified contact tracing across the country. Other applications helped healthcare specialists manage control groups and get real-time data about the available infrastructure from every healthcare facility. These data-driven interventions empowered teams to respond effectively and make timely decisions. eSanjeevani, India's National Telemedicine Service, represents a major step towards achieving digital health equity. It offers quick and seamless access to doctors and medical specialists through smartphones, significantly improving healthcare access.

Without the use of technology, you cannot ensure accessibility.

Lav Agarwal
Resident Commissioner, Government of Andhra Pradesh

Credit cycle for street vendors

PM SVANidhi exemplifies the effective use of technology to ensure financial assistance to the underprivileged. PM SVANidhi is a dedicated micro-credit facility that enables street vendors to access financial assistance digitally. It is a digital platform where the entire credit cycle, from loan application to assessment and disbursal of loans, can be managed online. Vendors can register on the portal and submit their applications along with the required documentation.

One of the platform's key features is its integration with multiple financial services. More than 400 public and regional banks have been integrated into the PM SVANidhi digital ecosystem. Vendors who register on this platform can also access other government programmes, such as the PM Mudra Yojana.

To date, INR12,000 crore has been disbursed through the PM SVANidhi programme, benefiting over 65 lakh vendors. Technology continues to drive the success of this initiative, uplifting marginalised sections by enabling access to formal credit systems.[3]

Equitable digital solutions for a diverse audience

Despite significant advancements in digital initiatives for service delivery, India's vast social, cultural and linguistic diversity presents a major challenge. This diversity requires customised digital solutions that effectively address various user needs. In this context, how do we build equitable digital solutions to address such a wide range of expectations? What principles should guide the design of widely accessible digital platforms?

This calls for an inclusive and human-centric design approach. For example, when Aadhaar was designed, special provisions were made

[3] https://www.financialexpress.com/business/sme/pm-svanidhi-micro-credit-scheme-for-street-vendors-crosses-rs-12000-crore-in-loans-disbursed/3599215/

for vulnerable and marginalised groups, such as orphans, individuals facing challenges with biometric registration due to disabilities and members of the third gender. Even if these groups represent just 1 percent of India's population, this still equates to 14 million people, comparable to an entire country's population.

To ensure accessibility, digital design must be multimodal, considering multiple languages, literacy levels and technological access points. This is achieved by establishing minimum standards across these considerations and ensuring effective exception handling that is strong and accountable.

India's diverse social, cultural and linguistic landscape demands carefully crafted, multimodal solutions that accommodate varying literacy levels, access and resources.

Inclusive design also necessitates extensive stakeholder engagement. For instance, when the Diksha portal was launched for digital learning content, local NGOs were involved in creating region-specific content, ensuring linguistic and cultural relevance. Thus, using the existing service providers and including them in the design process is key to successful exception handling.

Some key considerations to ensure that the design process is equitable for all sections:

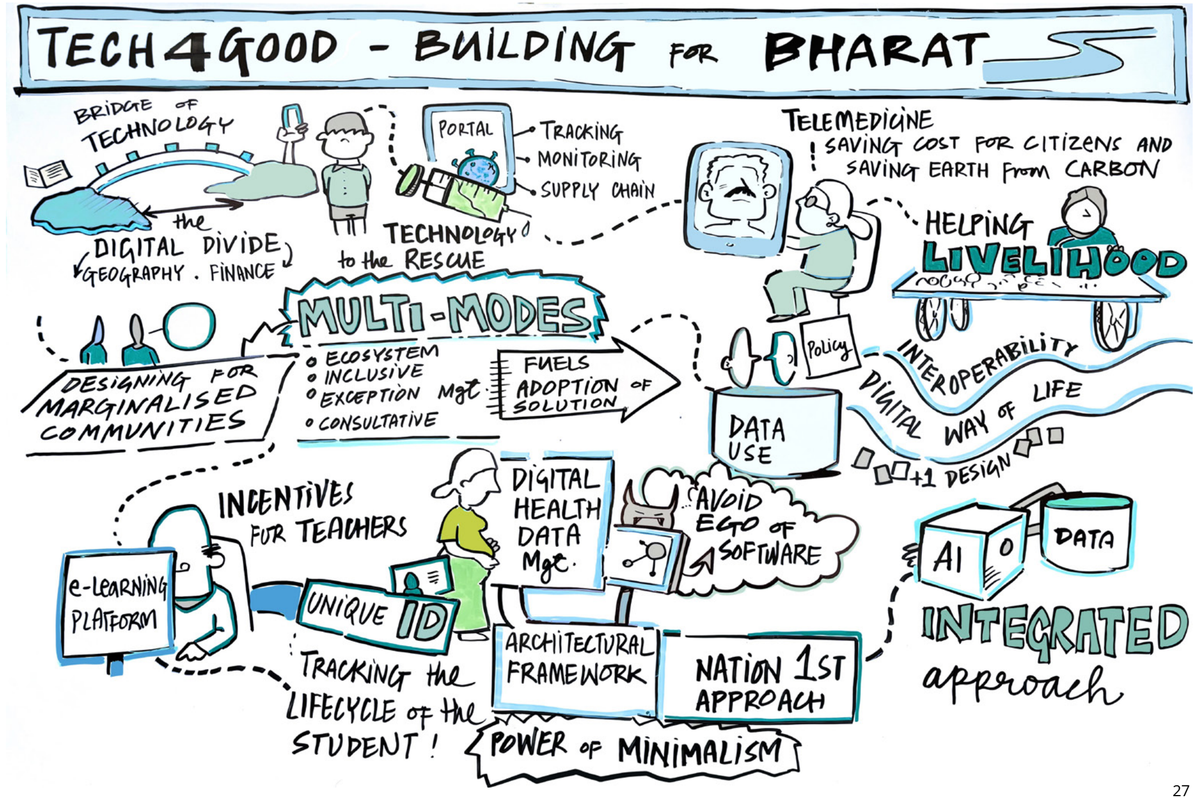
- **Minimal design:** Simplicity enables scalability. GPS is a great example because it provides basic location data, allowing multiple layers of services to be built on top of it.
- **Design for infrastructure:** Thinking of something as an infrastructure rather than a solution allows solving it on a much larger scale.
- **Plus 1 design:** A series of small, iterative enhancements leads to substantial progress over time.
- **Interoperability:** Ensuring interoperability during the design process helps in interconnecting the silos that exist between systems. Interoperability is a way for systems to talk to each other. It enables combined innovation.
- **Ecosystem-based design:** Taking the ecosystem-based design approach helps improve inclusivity. Using the existing ecosystem of experts adds value to the solution by absorbing authentic ideas into the design.

Nobody knows what a good design is. Nothing is a good design if it is not adopted.

Shankar Maruwada
CEO, EkStep

Key takeaways

- **Digital education transformation:** Initiatives such as the NEP 2020 and PM e-Vidya are essential to creating a Digital Bharat by providing accessible education through technology.
- **Empowering teachers:** Digital tools assess and support teachers' training needs, enhancing education quality and expanding digital literacy nationwide.
- **Equitable healthcare access:** Platforms such as eSanjeevani bring healthcare to the remotest regions, helping build a more inclusive Bharat with equitable health services.
- **Financial inclusion:** PM SVANidhi exemplifies how digitising financial services can empower underprivileged communities, particularly street vendors, with easier access to loans and resources.
- **Inclusive digital design:** Building a Digital Bharat requires designing solutions that are accessible to everyone, regardless of region, language or literacy level.
- **Interoperable systems for scalability:** Interoperability in digital systems fosters innovation and scalability.



4d. A Bharat beyond borders: The global development dream

Dr Pramod Varma
Former Chief of Aadhaar,
UPI and India Stack,
CTO EkStep Foundation

India's digital transformation is paving the way for global scalability, demonstrating that if it works for Bharat, it can work for the world.

India's digital transformation journey has set a global standard, with Aadhaar and UPI showing how technology can reshape governance and public services. This future of governance is expected to be human-centric and driven by AI, big data and new technologies. This shift aims to increase productivity, promote digital equity and strengthen cybersecurity resilience.

Addressing local challenges while promoting the principle of *"Building Bharat"* for a global impact is essential to ensuring India's progress. India's digital infrastructure serves as a practical model for other countries in the Global South, demonstrating how to achieve scalability and inclusivity through open-source solutions. India's democratisation of digital access for millions has brought a sharp focus on small, decentralised projects and the adoption of innovations for global markets.

The following chapter explores how governments harness technology to improve efficiency and inclusiveness and examines the influence of India's digital transformation on local and global landscapes.

Talk: Building for Bharat and Taking it Global
Speaker:
Dr Pramod Varma, Former Chief of Aadhaar, UPI and India Stack, CTO EkStep Foundation

India is a powerful example of how technology can address large-scale, complex challenges in an ever-evolving digital society. Aadhaar and UPI have already disrupted the very nature of how services are being delivered and the way citizens engage with financial transactions. Dr Pramod Varma states that this is just the beginning of what digitisation can achieve in India, which has only begun to tap into its full potential.

The next step is to introduce these homegrown innovations to the global market, especially in the Global South. This involves addressing local problems, such as language and literacy barriers in India, while building scalable, long-lasting solutions. In an increasingly digitised world, India's innovations are maturing fast and have immense potential to inspire and even drive global digitisation with a strong focus on inclusivity and accessibility.

India's digital growth and global potential

We run 500 million UPI transactions a day, but we have sized it for a billion. India's digital infrastructure is built to scale.[4]

Dr Pramod Varma
Former Chief of Aadhaar, UPI and India Stack, CTO EkStep Foundation

Aadhaar for identity verification and UPI for payments are pillars of India's DPI. They process over 17 million daily authentications and 500 million daily transactions, proving their effectiveness. However, Dr Pramod Varma notes that India is only halfway on its journey. The tricky part now is getting the next 500 million people online. This can be achieved by prioritising transport and digital literacy first and foremost.

The potential for global expansion is clear. India's open-source solutions, which already account for scalability, can be adapted to similar challenges in other countries, especially the Global South, where digitisation is still ongoing. India's success might just be the blueprint for other countries seeking to build their digital economies.

The role of small projects in the next digital wave

Digital transformation in India is gaining momentum, moving beyond a narrow focus on large, government-driven initiatives to embrace innovation across various sectors. The emphasis is now also on smaller, more decentralised efforts. These initiatives, which are all about digitising everything from school certificates to salary slips via a platform such as DigiLocker, are crucial for pulling more citizens into the digital fold.

As Dr Pramod Varma stressed, the real future of digitisation lies in thousands of small but impactful projects.

No other country has set up something as large as that—to convert data, as it's rightly said, not as oil—data as soil for people to actually build their life upon.

Dr Pramod Varma
Former Chief of Aadhaar, UPI and India Stack, CTO EkStep Foundation

The emergence of the Account Aggregator (AA) framework has introduced digital wallets. This transformation allows individuals and enterprises to monetise their data into an economic asset that can promote financial inclusion. By decentralising projects, India is democratising access to digital services, paving the way for the global adoption of these systems.

Global South's digitisation and India's leadership

With its current DPI, India is well-positioned to help global markets scale quickly and efficiently. As countries in the Global South digitise, India's open-source, cloud-based solutions are proving to be effective implementation models that can be followed. The Open Network for Digital Commerce (ONDC), an open, interoperable network powered by the Beckn Protocol to democratise e-commerce, exemplifies how India is pioneering digital ecosystems that can be replicated in other regions.

[4] https://www.business-standard.com/finance/news/upi-crosses-500-million-daily-transactions-value-falls-flat-in-september-124100100627_1.html

India has definitely shown the playbook of non-linear changes that can be done to the economy.

Dr Pramod Varma
Former Chief of Aadhaar, UPI and India Stack, CTO EkStep Foundation

With the rise of global digital technology, India's leadership can drive transformation by ensuring small and medium enterprises worldwide gain equitable digital access.

Fireside Chat: The Future of Government
Speakers:
Srini Subramanian, Global GPS Consulting Leader, Deloitte; Adithi Pandit, Partner, Deloitte New Zealand

Moderator:
Nitin Kini, Chief Operating Officer, Deloitte South Asia

At its core, government is about people, making sure no one is left behind and that every citizen can access basic services.

Governments worldwide are undergoing a rapid transformation fuelled by digital technology. Initiatives such as Aadhaar and the rural broadband programme have set global benchmarks for how governments can use technology to streamline services, promote inclusivity and build greater trust among the people. Adopting these new technologies alone is not enough. Human-centric governance, where digital tools enhance efficiency and ensure that no individual is left behind, defines the true future of governance.

In the forthcoming decades, governments worldwide will encounter challenges and opportunities that were unimaginable just a few years ago. From integrating quantum computing AI to addressing digital equity and cybersecurity, these applications will be the blueprint for using technology to improve lives and build a resilient, inclusive and future-ready public sector.

Digital identification and hyper-personalisation in governance

The world's most extensive digital identification programme, Aadhaar, has enabled more than a billion people to access services easily. For governments, this means everything from property rights to education can be streamlined into the massive scale of digitisation. However, the future of governance must go beyond just accessibility. The discussion focused on the next step in governance, which is hyper-personalisation. Governments should use data to create personalised experiences, drawing inspiration from how digital platforms tailor content based on user preferences. This can enhance engagement and services by meeting the population's specific needs.

Creating a government that works for one person in a billion involves using big data to offer services that anticipate individual needs. It is especially relevant in India, where huge and diverse populations need specific answers. For instance, creating personalised digital platforms that suggest specific government programmes or benefits based on a citizen's profile can boost efficiency and trust in public services. It also enhances the capacity of public service providers to serve their customers.

AI's role in enhancing government productivity

AI has vast potential to improve worker productivity, automate routine processes and improve government services. The technology can assist architects of regulatory policies in conveying complex rules to workers and delivering services to citizens. Often, government officials need to make decisions about providing services based on the nuances of varying policies. In this regard, AI can standardise this process to ensure every citizen receives relevant services based on the same criteria.

Government services can also be scaled by using AI. The technology automates manual tasks more effectively, allowing workers to focus on higher-priority tasks. When governments integrate AI into their operations, citizen satisfaction and efficiency will increase.

Cybersecurity and resilience

Cybersecurity serves as a foundation for building trust in a digitally powered government.

Srini Subramanian

In today's interconnected world, providing services is not enough; governments are also responsible for protecting the vast amounts of sensitive data available to them. Cybersecurity has become critical, as any data breach could cause catastrophic damage to public trust and even disrupt essential services.

During the fireside chat, it was reiterated that governments should prioritise cybersecurity via a proactive approach rather than a reactive one, with a strong focus on vigilance, resilience and protection. While governments must protect their systems from cyberattacks, they must also remain vigilant to detect them early and build resilient systems that can bounce back quickly from cybersecurity incidents. As cyberthreats become more sophisticated, governments must keep pushing the boundaries of innovation to face their potential adversaries.

Quantum computing: The next frontier

Quantum computing could transform government operations where large amounts of data are processed, and security is paramount. While this technology is in its infancy, it has the potential to transform encryption and render current security protocols obsolete. As quantum computing evolves, its seismic impact on data security is coming into focus, and governments must prepare for a whole new era of cybersecurity measures.

Beyond cybersecurity, quantum computing will enable governments to process data like never before, make and implement real-time decisions, and improve services such as healthcare, defence and disaster response. The technology will also address sophisticated issues that today's computers cannot solve, such as optimising traffic flows in megacities or predicting economic trends with greater accuracy.

Digital equity: Ensuring inclusivity in a digital world

Digital inclusion isn't just about connectivity; it's about empowering rural communities to drive their own digital transformation.

Adithi Pandit

One of the major challenges for future governments will be digital equity, which will ensure that citizens, including those from different

geographical and socioeconomic strata, have access to digital services. In the session, it was pointed out that rural broadband programmes have seen significant success in bridging the digital divide in India. However, such programmes fall short if the connectivity is not accompanied by policy measures addressing imbalances in technology access. The government should bring accessibility and support systems to encourage marginalised communities to embrace digital platforms.

Family-based digital inclusion, where children are provided with laptops or tablets for school, is already showing promising results. By allowing children to take these devices home, entire families, especially women, are becoming more digitally literate. Additionally, neurodiversity is vital, and government services should reflect this by making it more accessible to citizens with diverse capabilities and needs.

The future of government is being shaped by technology that serves people, creating systems that are inclusive, responsive and built on trust. It is about humanising governance through innovation, shifting from process-driven to people-centric.

Nitin Kini

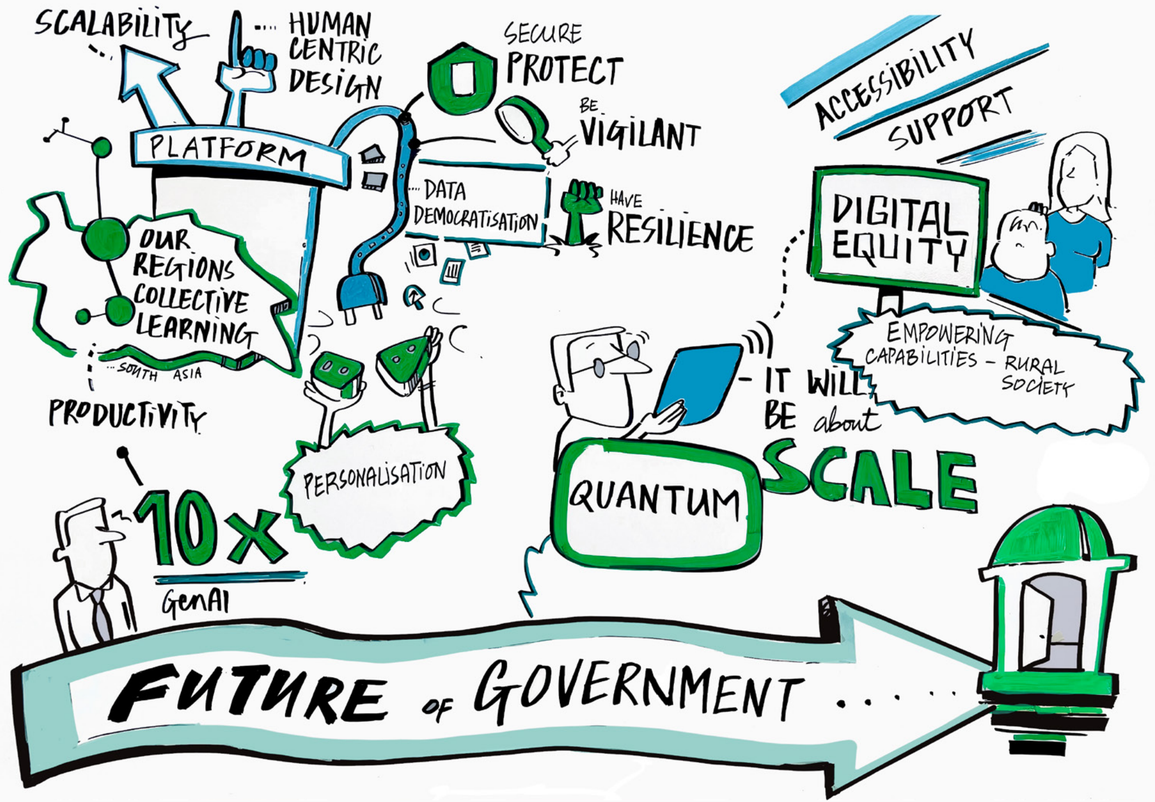
Human-centric governance: Prioritising people in a digital world

The very essence of governance is serving people. The ever-evolving power of technology must be used to enhance human lives. As governments adopt emerging tech such as AI and big data, they must also ensure that these tools improve everyone's quality of life.

Human-centric governance is defined by policies and services that are empathetic, inclusive and responsive to individual needs. Governments cannot push technology while ignoring the social implications. They must design policies that leave no one behind, especially vulnerable populations, such as older adults, low-income families and remote communities.

Key takeaways

- **Scalability for global reach:** India's scalable digital infrastructure, such as Aadhaar and UPI, can serve as models for countries looking to digitalise large populations efficiently.
- **Global South's digital future:** India's leadership in creating inclusive, open-source digital solutions can help accelerate digitisation in underserved regions across the Global South.
- **Small projects, big impacts:** The future of India's digitisation lies in small, decentralised projects that democratise access to services, from government certifications to salary slips.
- **Human-centric governance:** Technology should always serve people, and governments should focus on designing empathetic, inclusive and human-centred policies and services.
- **Digital identification and personalisation:** Governments must use digital identification systems, such as Aadhaar, to offer personalised, citizen-centric services that anticipate individual needs.
- **AI in government productivity:** AI has the potential to improve government worker productivity by automating routine processes and assisting in policy implementation.
- **Cybersecurity:** Protecting sensitive citizen data is crucial, and governments must adopt a three-pronged approach that includes protection, vigilance and resilience against cyberthreats.
- **Quantum computing:** As quantum computing evolves, it will transform data processing and security. Governments must prepare for quantum-safe encryption to safeguard critical data.
- **Digital equity:** Access to digital services is vital for citizens, particularly in rural and underserved areas, to ensure an inclusive digital future.



4e. Establishing an urban innovation hub

Urban Platform for Delivery of Online Governance (UPYOG) digitises urban governance across India, connecting 3300+ local bodies through a unified platform that streamlines essential services and citizen engagement.

India's aspiration for a *Viksit Bharat* by 2047 is an ambitious vision rooted in digital transformation within its urban governance structures. The success of this mission relies on how effectively Indian cities adopt cutting-edge technologies to improve service delivery and engage with their citizens.

At the heart of this transformation is the UPYOG, a key DPI designed to modernise the core functions of Urban Local Bodies (ULBs) across the country.

Manthan: Urban Platform for Delivery of Online Governance (UPYOG)

Participants:

H. Deleep Singh, IAS (Retired), Chairman, Manipur Municipality Board
Abhi Ray, Partner, Deloitte India, and the Deloitte Technology team;
Pankaj Sharma, Lead, NIUA, and NIUA technical team and AWS technical team

Guru:

Abhi Ray, Partner, Deloitte India

The power of UPYOG lies in its technology and in its ability to unify and standardise urban service delivery across India.

Abhi Ray

UPYOG was launched under the broader Digital India campaign and provides authorities with a means for better urban governance. It is reshaping how cities operate, bringing transparency, efficiency and innovation to areas traditionally bogged down by manual, paper-based processes. This transformation was critical for India's urban centres and serves as a blueprint for how technology can drive sustainable development and inclusive growth.

With over 31 states and 3300+ urban local bodies already adopting this platform, UPYOG is a cornerstone of India's urban digital mission. This session provided a deep dive into its current achievements, challenges and the future roadmap for scaling digital governance across Indian cities.

In the context of *Ārohaṇa: Growth with Impact,* leaders and experts explored how UPYOG is setting the stage for the future of urban governance. By bringing together key stakeholders, the session explored how a unified platform such as UPYOG can streamline urban governance, making it more transparent, efficient and citizen-centric.

Challenges in urban governance

The primary challenge is ensuring that UPYOG stays ahead of the technological curve while remaining accessible and adaptable to the needs of different states. Regular updates and continuous innovation are crucial for the platform's long-term success.

Despite its successes, scaling UPYOG across India's diverse urban landscape presents several challenges. One of them is the integration of legacy systems, which vary greatly among states. Many ULBs continue to rely on vendor-specific software, making it challenging to adopt a unified, open-source platform such as UPYOG. However, this challenge is also an opportunity for innovation and collaboration.

The speakers also highlighted the traditional challenges urban governance systems face. These challenges include fragmented service delivery and inefficiencies in managing urban resources, which can create inefficient service delivery bottlenecks. Lack of coordination among multiple projects and departments can lead to delays, inefficiencies and increased citizen complaints.

An integrated digital solution, such as UPYOG, can address these challenges. The platform's main strength lies in integrating more services as and when needed, covering the entire service delivery ecosystem and making governance easy for citizens and officials.

The role of technology in driving urban innovation

UPYOG is ready with a bouquet of service modules that different ULBs can use to increase the efficiency of their service delivery.

UPYOG is a good example of adopting a digital-first approach to create a more agile governance system with real-time data. It helps address issues related to service delivery effectiveness within cities and ensures urban management is more efficient, given society's prevailing needs.

The speakers discussed how such open-source platforms allow continuous improvement and collaboration across states. This collaborative development model keeps the platform aligned with city needs, ensuring it stays relevant and effective over time.

Citizens as central stakeholders

One of the session highlights was the focus on citizens as the core beneficiaries of this transformation. The ability to track service requests, pay taxes online or apply for permits from a single platform empowers citizens to engage with their city administrations more effectively. This shift is crucial for building trust between governments and their citizens. By reducing bureaucratic hurdles and simplifying access to essential services, UPYOG ensures that urban governance delivers efficiency, inclusivity and transparency.

Shaping the future of urban governance

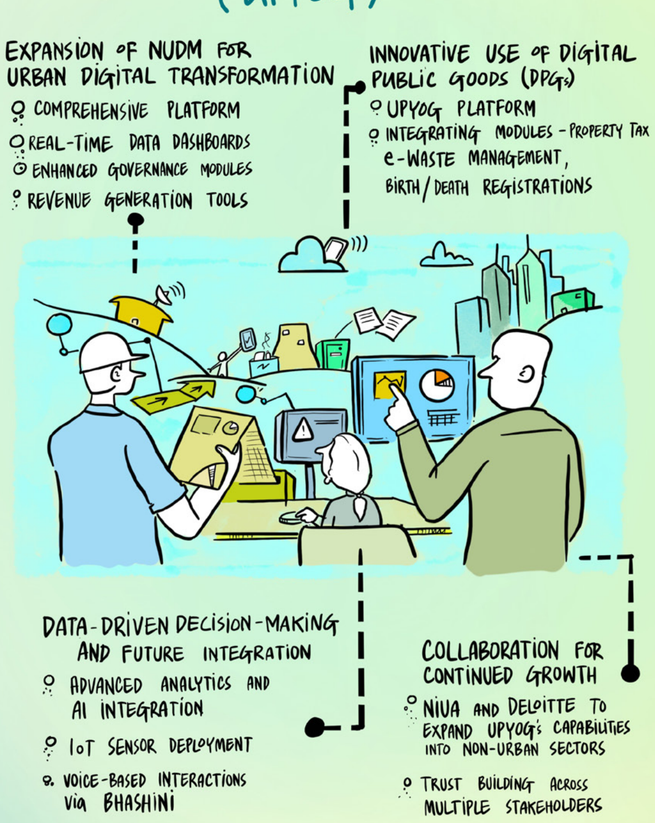
UPYOG is helping to create a framework for delivering urban services efficiently, securely and sustainably, focusing on DPI.

UPYOG is a pioneering initiative in India's urban digital transformation, offering a scalable and adaptable solution for the complex challenges of urban governance. Its ability to provide real-time data, streamline processes and enhance transparency has already begun to revolutionise how cities function. As more ULBs continue to adopt the platform, UPYOG is poised to play a central role in realising India's *Viksit Bharat 2047* vision.

As the nation advances on its Digital India journey, it will continue to develop smart cities that are robust, equitable and sustainable for future generations. Looking ahead, the continued evolution of UPYOG will be critical in shaping the future of urban governance. The success of this platform relies on technological advancements and on the collaboration of ULBs, state governments and various private sector stakeholders. With the right support, the UPYOG programme could become the cornerstone of a new era of smart and sustainable urban planning for Indian citizens.

Key takeaways

- **Unified digital platform for governance:** UPYOG consolidates multiple urban services, making governance more efficient and transparent. Cities can better manage resources and respond to citizens' needs in real time.
- **Collaboration for success:** The session highlighted collaboration among government bodies, private technology collaborators and local urban administrations. UPYOG demonstrates how shared digital infrastructure drives innovation and improves service delivery.
- **Citizen-centric approach:** UPYOG focuses on citizens. By streamlining services and reducing manual intervention, the platform places citizens at the centre of urban governance, ensuring efficient and transparent service delivery.



4f. Defining success metrics

Success in any endeavour hinges on well-defined metrics that distinguish outputs from outcomes. Outputs reflect completed activities, such as constructing a school, while outcomes measure actual impact, such as improved literacy rates. Measuring intangible effects, such as societal well-being, adds complexity and requires quantitative and qualitative assessments. Quantitative metrics capture tangible outcomes, but complete impact evaluation often depends on subjective and qualitative methods. Balancing these approaches is essential for ensuring that efforts lead to effective and sustainable results, as comprehensive metrics provide clearer insights into long-term benefits and success.

Manthan: Measuring the Immeasurable

Participants:

Dr Arun Kumar, Research Officer, Ministry of Sports, India; Rajul Raiwkar, Consultant, Research, National Human Rights Commission; Vinit Kumar, Chief Electrical engineer, Services, Indian Railways; Shweta Verma, Assistant Director, Bharat Serum and Vaccine Limited; and professionals from cybersecurity, sports, research and others.

Gurus:

Shrupti Shah, Managing Director, Deloitte US; Abhinav Vikas, Partner, Deloitte India

Defining success metrics to measure the immeasurable rests on three pillars, which are policy, process and feedback mechanism.

Measuring the success of activities that yield intangible results is tricky, to say the least. Both governments and enterprises need to figure out how to quantify something that is qualitative. Historically, the success of public service initiatives has been determined using input-based metrics, such as what percentage of the allocated budget has been used and how many staff members have been deployed. However, these fail to give a reasonably accurate idea of, for instance, whether the usage of the budget yielded the desired results or whether the staff members fulfilled their roles as expected. In other words, using quantitative metrics to gauge the qualitative impact of an initiative or project on people's lives is futile.

To measure what truly matters, this *Manthan* explored the potential of AI and data-driven approaches to measuring the immeasurable.

The evolution of measurement

Quantitative metrics that governments and non-government organisations have been using to evaluate the success of their initiatives include the number of services delivered and the amount of money spent. These metrics are good for capturing the execution and completion of various initiatives. However, the timely execution and completion of a project do not indicate whether it achieved the upliftment of the masses as intended.

Setting ambitious but carefully designed goals in public policy is crucial, as bold targets can drive innovation and lead to greater progress, even if they are not fully achieved. In the UK, for example, setting high standards in literacy or numeracy led to meaningful changes, while in the US, the fear of political backlash can make it harder to take similar risks. Goals must also be thoughtfully constructed to avoid unintended consequences; measuring inputs such as emergency room wait times rather than outcomes such as patient satisfaction can create incentives for harmful behaviour. Equity plays a crucial role in defining success. In Washington, D.C., rather than focusing on reducing average unemployment, which often benefits already prosperous areas, leaders set a target that no neighbourhood should have an unemployment rate above 10 percent. This approach focuses on the most disadvantaged communities. The way a goal is framed determines who benefits, and actual progress requires aligning strategies and resources to support equitable outcomes. The unemployment rate strategy was designed as a four-year plan, launched in 2019, but the onset of COVID-19 disrupted its implementation, making it difficult to assess its full impact.

If success is measured by no neighbourhood having an unemployment rate of greater than 10 percent, it forces you to ignore the places that look after themselves, and it forces you to focus on the poorest parts.

Shrupti Shah

The role of data and technology

However, there's been a gradual but steady shift in the mindset in recent years. Strategists are increasingly acknowledging the need to move from traditional, input-based metrics to outcome-oriented metrics. Outcome-oriented methods of evaluating success focus on measuring the benefits that people receive collectively. For example, overall health improvement of people, reduced poverty or increased educational attainment. By focusing on outcomes, governments and enterprises will better understand the effectiveness of public programmes and allocate resources accordingly.

Data is being generated at an astronomical rate today, serving as the raw ingredient needed to decide, plan, execute, rectify or optimise any project. At the same time, AI and its subfields, such as ML, have been evolving rapidly. As a result, data is no longer the only resource; technology also facilitates learning from that data to make intelligent, autonomous decisions.

The discussion covers several key points about design thinking, data analysis and the role of AI in decision-making. It starts with an example of how small changes, such as adding mirrors in elevators or timers at traffic lights, can improve outcomes by reducing impatience or anxiety, even though they don't directly impact the system's efficiency. The main idea is that focusing on outcomes (how people feel or behave) is just as important as focusing on output (quantifiable results).

With AI, you can measure the smile, too.

Dr Arun Kumar
Research Officer, Ministry of Sports

For governments, businesses and public welfare institutions, the stage is set for harnessing the power of data to its maximum potential. The discussions in the *Manthan* highlighted several real-world examples of how AI is being used to improve public services in various sectors.

For instance, AI and ML can analyse voluminous datasets generated every second. They can thus identify patterns, predict trends and make recommendations for correcting or optimising future courses of action. For example, AI tools can also analyse social media data to identify public sentiments, anticipate potential crises and much more. This will enable policymakers to take necessary actions proactively and pre-emptively rather than reactively.

Another example is the healthcare sector. AI tools can enable medical professionals to analyse patient records, document treatment procedures accurately, identify patterns in disease outbreaks, chart personalised treatment plans and so on. Opportunities are seemingly endless. Similarly, in the education sector, academics can plan lessons efficiently, personalise learning experiences, conduct exams and generate performance reports faster and drive literacy outcomes and more.

Transportation is another major industry with multiple use cases for data and modern technologies. The data generated through surveillance cameras, IoT, satellites, the weather department, etc., can be analysed collectively to uncover correlations and dependencies. Moreover, this diverse data will enhance AI tools in the transport sector, driving further innovation. With autonomous vehicles inching closer to being a reality, the significance of data and AI cannot be understated.

Challenges and opportunities

Organisations must assess their data analytics capabilities and strive for continuous improvement to harness the full potential of AI.

While the potential of AI and data-driven approaches cannot be overstated, several challenges must be addressed. The major ones are:

- **Data quality and accessibility:** High-quality data is essential for effective AI applications. The American idiom, “garbage in, garbage out”, stands true in this context entirely. Ensuring data accuracy, logical data structuring and ease of data accessibility is crucial to using data as fuel for AI engines.
- **Technical capacity:** To unlock the potential of next-generation technologies, a solid infrastructure foundation is essential. The infrastructural prerequisites include continuous digital transformation, the adoption of "phygital" systems and strategic "cloudification," among other key elements. Besides, a steady supply of skilled workforce is equally critical, which calls for collaboration between academics and professionals.
- **Ethical considerations:** AI systems must be designed and used ethically to avoid bias and discrimination. AI lacks the instinctive subjectivity that human intelligence brings along. In this regard, cinema has done a good job. Numerous films have encapsulated the limitations of AI and the ethical dilemmas related to AI autonomy. Knowing when to switch off autopilot and take manual control is as critical as it is difficult in the heat of the moment. That is why government regulations and industry standards are imperative for AI-fuelled innovations.
- **Public trust:** The application of AI extends to everyday life, from optimising routes in real-time based on crowd-sourced data to OTT platforms tailoring recommendations. However, the discussion also touches on the need for AI governance, particularly regarding autonomous systems, ensuring responsible AI operations and minimising risks such as AI hallucinations. Building public trust in AI-enabled systems is an effort that governments, enterprises and academia must pursue alongside strategising AI use cases. Change management is a make-or-break factor in any technological revolution, especially when the general sentiment is that it will render people jobless.

Importance of the feedback mechanism

The discussion highlights the importance of accurate feedback in policymaking and execution, emphasizing the need to distinguish between outcome and output. Rapid changes in user behaviour in India necessitate efficient data analysis to understand and predict customer needs.

For instance, the UK implemented a strategy to reduce administrative burdens on businesses, saving US$20 billion by streamlining processes and consolidating forms.

A Middle Eastern airline used AI topic modelling to analyse 20,000 customer complaints from social media. They discovered that the primary issue was not leg space, as initially thought, but the temperature of the food served. Addressing the food issue was far more cost-effective than modifying leg space.

Predictive shipping and hyper-personalisation are other examples of AI's capability to anticipate customer orders and manage returns and cancellations based on customer profiles.

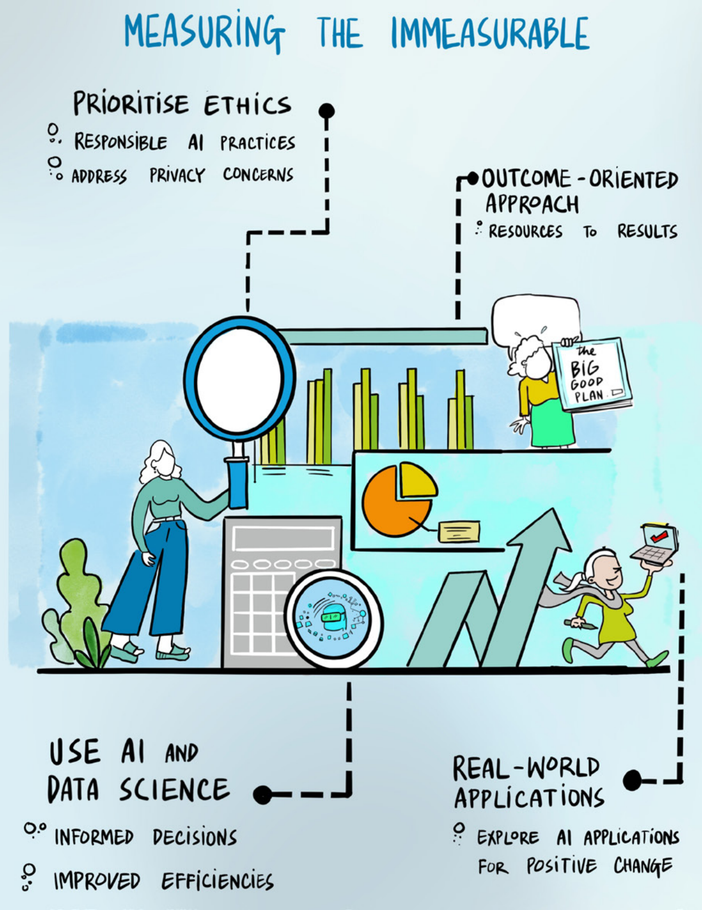
Stakeholder engagement, honest feedback, team alignment and genuine input are crucial for effective implementation.

Collaboration among government, industries and academia is imperative to address these challenges. As AI and other technologies continue to advance, it is crucial to harness their potential to address complex societal challenges while mitigating potential risks. Embracing innovation and ethical considerations is the key to creating a future where public services are more effective, efficient and equitable.

Ārohaṇa (आरोहण) | Growth with impact

Key takeaways

- **Input-based metrics:** Traditional metrics focus on inputs such as budget allocations and staff numbers, which do not accurately reflect the impact of public services.
- **Outcome-based metrics:** Shifting the focus to outcome-based metrics will provide a more accurate picture of public satisfaction.
- **Data-driven decision making:** Using data and technology for decision-making will lead to more effective and efficient execution of initiatives.
- **AI and ML:** These technologies analyse large datasets to identify trends and patterns and generate insights for informed policymaking.
- **Technical capacity:** A skilled workforce and up-to-date technical infrastructure are essential for developing and implementing AI-powered solutions.
- **Ethical considerations:** Addressing the ethical implications of AI, such as privacy, bias and transparency, is critical for the widespread use of the technology.
- **Collaboration:** Coordination among government, industries and academia is key to addressing the challenges and harnessing opportunities pertaining to AI.



5 | Economic development: All eyes on outcomes

Focusing on measurable progress, India drives towards sustainable growth with digital innovation, empowered industries and forward-looking policies.

India's economic development has been inspiring and is marked by strategic initiatives and forward-thinking policies. Economic development charts India's growth journey, focusing on core areas of success, digitisation, infrastructure advancements, empowerment of Micro, Small and Medium Enterprises (MSMEs) and policies for the future. With the country on the verge of attaining mega policymaker status in the global economy, it has moved from mere ambitions to measurable outcomes. This transition has been driven by sound government activities, technological developments and an increasingly dynamic business environment.

In this context, the six chapters under *Economic development: All eyes on outcomes* offer a comprehensive overview of India's economic trajectory. They explore key pillars of progress and provide a holistic look at the road ahead. As the country moves forward, the focus on outcomes, driven by digitisation, policy innovation and empowered organisations, will be key to sustaining growth and building a resilient economy ready for the future.

The chapter, *Setting the standards: Success stories,* features discussions on Telangana's development journey, Karnataka's growth story and the broader vision for Viksit Bharat. These stories are complemented by examples of top-performing industries and companies that have set benchmarks in excellence, innovation and scalability.

The chapter, *Make in India: A digital imperative,* explores how digital technologies, such as Digital Public Goods (DPGs), AI and open platforms, are central to advancing the Make in India initiative. It highlights innovations that streamline trade, reduce coordination costs, personalise services and enable inclusive, scalable growth.

The chapter, *Empowering Indian organisations: Shaping efficient experiences with digital solutions,* focuses on how Indian businesses (large and small) adopt digital tools to drive operational efficiency, create seamless customer experiences and stay ahead in an increasingly competitive global market. It includes the essential takeaways from panel discussions on the *Power of Digital in Creating Experience and Organisational Efficiency.*

The chapter, *Digital solutions: The new building blocks for physical infrastructure development,* explores how digital tools are transforming the landscape of physical infrastructure development. It includes a panel discussion on *Bringing the Power of Digital to Physical & Social Infrastructure Development.*

The chapter, *Empowering MSMEs,* sheds light on how digital solutions and government initiatives empower MSMEs to overcome challenges such as access to finance, technology and skilled labour. It includes a *Manthan, Digital Enablement of MSMEs with the help of ONDC.*

The chapter, *Future-ready policies,* discusses the importance of forward-thinking policies that foster innovation, inclusivity and sustainability. It includes a *Manthan, Innovation in PolicyMaking to Realise Vision of India@2047.*

Together, these chapters provide a roadmap for India's outcome-driven economic development.

5a. Setting the standard: The success stories

Thumalla Nageshwara Rao
Minister for Agriculture, Cooperation and Textiles, Government of Telangana

Priyank Kharge
Minister for Electronics, IT & BT, Rural Development and Panchayati Raj, Government of Karnataka

India is witnessing a remarkable transformation driven by technological advancements, digital innovations and forward-thinking government policies. These factors are now converging to transform different sectors and accelerate development towards its ambitious vision of *Viksit Bharat 2047.* From agricultural productivity and sustainability with drones and digital technologies to the emerging start-up ecosystem, India is embracing innovation rapidly. These technological advancements are enhancing efficiency and transparency while playing a pivotal role in bridging the urban-rural divide.

The digital age has ushered in a transformative era, reshaping industries and societies worldwide. India's vision for a digital future is anchored in the belief that technology can empower its citizens, enhance access to information and promote socioeconomic equality. The government aims to create a more inclusive and sustainable future by integrating technology into various aspects of society. *During Ārohaṇa: Growth with Impact,* ministers and bureaucrats from multiple states shared their success, highlighting the transformative impact of technology in their areas.

Telangana's journey towards agricultural excellence, driven by digital initiatives and policy reforms, is a prime example of how technology can revolutionise traditional sectors. Karnataka, a state renowned for its focus on innovation and skill development, is leading the way in technological advancements and economic prosperity. Meanwhile, the livestock sector is undergoing significant transformations, with technological advancements and policy initiatives paving the way for growth and sustainability.

These stories offer a glimpse into India's bright future. The leaders spoke about the key factors driving these transformations, including the mobilisation of rural communities, technological advancements and the adoption of sustainable practices. They also discussed how India is poised to achieve its ambitious goals and build a prosperous nation for all.

Leaders Speak: Viksit Telangana
Speaker:
Thumalla Nageshwara Rao, Minister for Agriculture, Cooperation and Textiles, Government of Telangana

In recent years, Telangana has emerged as a leader in agricultural transformation, overcoming challenges such as water scarcity and market fluctuations. The state's success is driven by digital innovation, policy reforms and collaborations among the government, private sector and farmers, with a strong emphasis on sustainability and resilience. Below are the key initiatives driving this transformation:

- **Ownership and clarity in landholding:** Telangana has introduced a system that automatically updates land ownership changes, ensuring real-time and accurate updates. This has increased transparency in landholdings and improved resource allocation.
- **Digital initiatives in agriculture:** Telangana is a pioneer in digital crop monitoring and has implemented systems covering both the Kharif and Rabi seasons. These systems track vital crop data, such as crop type and geographic formations, enhancing agricultural productivity and precision farming.
- **Government alignment and future focus:** Telangana aligns with the Government of India's digital accreditation initiatives, creating a comprehensive digital farming database that tracks farming operations. This will improve efficiency and streamline agricultural practices in the state.
- **Sustainability and future of agriculture:** The state's future-facing agricultural policies are centred on sustainability, promoting climate-resilient practices. Telangana aims to safeguard both the environment and farmer welfare while ensuring long-term economic viability for the sector.
- **Farmer welfare initiatives:** Several state schemes have been revamped to support farmers. The ITBAROSA initiative provides INR15,000 per acre annually to promote economic growth. At the same time, the *Pradhan Mantri Prasad Viman Yojana* offers financial protection against crop losses due to extreme weather conditions, ensuring farmer security.[5]
- **Collaboration with the private sector:** The private sector is pivotal in Telangana's agricultural growth, bringing expertise and resources. The state is looking to transition from AI-driven management systems to advanced supply chain solutions to streamline and modernise the sector.
- **AgriTech hub:** Telangana is fast becoming an AgriTech innovation hub, with the iFarm cultivation initiative operating in 31 districts. Nurseries have been set up in factory zones to provide high-quality seedlings to farmers, bolstering productivity.
- **Yield and market strategies:** Farmers in Telangana are achieving yields of 14 tonnes of Fresh Fruit Bunches (FFB) per acre using best farming practices. A recent increase in crude palm oil import duties is expected to raise FFB prices, benefiting local farmers. The state also ensures fair market prices by expanding storage and improving market integration.

Telangana has 2 lakh acres under iFarm cultivation, with 1.56 lakh acres under various farmer empowerment programmes. The government has floated various initiatives to improve agricultural resilience and economic stability for farmers.

- **Food processing and supply chain enhancement:** The state is developing fresh food processing zones across 10,000 acres to boost food production. The *Mahila Kisan Sashaktikaran Pariyojana* (MKSP) empowers women in agriculture by establishing 5,000 micro-food processing enterprises to boost the local economy. Additionally, the state enhances supply chains to connect local farmers directly with industries, maximising their market opportunities.

With the continued collaboration of the government, private sector and farmers, I am confident that we will build an agricultural sector that is sustainable, resilient and future-ready.

Thumalla Nageshwara Rao
Minister for Agriculture, Cooperation and Textiles, Government of Telangana

Leaders Speak: Karnataka Growth Story
Speaker:
Priyank Kharge, Minister for Electronics, IT & BT, Rural Development and Panchayati Raj, Government of Karnataka

Moderator:
Anand Shankar, Chief Transformation Officer, Deloitte India

[5] https://www.thehindu.com/news/national/telangana/telangana-govt-issues-guidelines-for-rythu-bharosa-lands-suitable-for-cultivation-only-will-be-eligible/article69092243.ece

Karnataka is not just growing; it is thriving. The state's commitment to becoming a global hub for knowledge, skill and innovation is evident across sectors. It boasts about 450 engineering colleges, 70 medical institutions and 44 universities. With 1,777 industrial training institutes,[6] Karnataka has solidified its position as a talent powerhouse, generating the highest number of graduates joining the workforce.

Our intent is to portray and anchor ourselves as a knowledge and skill city. That's why we are running so many centres of excellence: to be industry leaders.

Priyank Kharge
Minister for Electronics, IT & BT, Rural Development and Panchayati Raj, Government of Karnataka

This has laid the groundwork for innovation and research, placing Karnataka as the undisputed leader in India's innovation ecosystem, ranking first in the India Innovation Index. The state's start-up culture is booming, with over 1,000 biotechnology start-ups, including 202 new start-ups, registered in 2023 alone.

A global technology hub

Bengaluru is now recognised as the fourth-largest technology cluster in the world, contributing significantly to India's tech revolution. The state accounts for 38 percent of India's Foreign Direct Investment (FDI), 40 percent of electronics design, 52 percent of machine tool manufacturing and 65 percent of aerospace and defence production. Bengaluru ranks fifth globally in the top 50 AI cities, showcasing its AI and deep tech leadership.[7]

Karnataka is also home to over 40 unicorns valued at US$161 billion, while 38 percent of India's 435 soon-to-be unicorns are also based in the state. In 2023 alone, Karnataka saw a significant boost in venture capital, with a funding of US$15.1 billion. The e-commerce and B2B sectors are thriving, with Bengaluru leading with a massive US$40 billion in B2B exports, solidifying its global leadership position.[8]

Inclusivity and empowerment

Karnataka's growth story is not just about economic progress; it is also a story of inclusivity. The state leads in women-led start-ups, with over 1,100 female entrepreneurs founding start-ups that have collectively raised nearly US$10 billion. These initiatives span beyond Bengaluru, with start-up ecosystems thriving in Mysuru and other regions, creating employment opportunities and fostering innovation throughout the state.[9]

We have the highest number of female employment talent in Bangalore. We have 1,100 women-led start-ups that are being founded in Bengaluru. And these women-led start-ups have raised close to 10 billion dollars.

Priyank Kharge
Minister for Electronics, IT & BT, Rural Development and Panchayati Raj, Government of Karnataka

Focus on sustainability and the circular economy

Karnataka focuses on sustainability and social impact through various initiatives and summits, including the Social Innovation Summit, Urban Solutions Summit and Circular Economy Summit. These platforms showcase groundbreaking technologies addressing real-world problems, from water portability to healthcare, with the government of Karnataka adopting these innovations as a first customer.

Karnataka is not just building a future; it is setting the benchmark for inclusive, innovation-led growth, where talent, technology and sustainability converge to shape a global powerhouse.

Anand Shankar

A national and global leader

Karnataka's leadership in technology and innovation extends far beyond India. Karnataka's engineering R&D sector is set to contribute significantly to the global market, with India's share projected to rise from US$44 billion to US$170 billion by 2030.

The state is home to 730 Global Capability Centres (GCCs), accounting for 40 percent of global technology centres. This makes Bengaluru the second-largest hub for AI development in the world.

Bridging the urban-rural divide

Karnataka has emerged as the leading state in India in bridging the gap between rural development and high-tech innovation. With initiatives such as e-governance at the Panchayat level, the state is successfully bridging the digital divide, ensuring that the benefits of innovation and technology reach every corner of Karnataka.

Through significant technological advancements such as AI, geofencing and Natural Language Processing (NLP), the government is enhancing Panchayat-level systems to ensure accountability and foster inclusive growth. The state is positioning itself as an investment hub and a global leader in knowledge and skill development.

Leaders Speak: Vision for Viksit Bharat

Speaker:
Alka Upadhyaya, Secretary, Department of Animal Husbandry & Dairying, Government of India

Moderator:
Sudeep Kumar Sinha, Partner, Deloitte India

India's livestock sector is on a transformative journey with ambitious short-, medium- and long-term goals set for 2047. Often referred to as the "sunrise sector," it plays a pivotal role in the country's agrarian economy. Livestock contributes 30 percent to total agricultural output and has recorded a CAGR of 12 percent.[10]

India has firmly established itself as a global leader in dairy. It is the largest milk producer in the world, contributing 25 percent of global milk production.[11] In addition, the country ranks second in global egg production and fifth in buffalo meat exports. One of the biggest dairy cooperatives exemplifies this success, with an impressive turnover of INR92,000 crore, supported by the White Revolution 2.0 announced on 19 September 2024.[12]

[6] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[7] https://pib.gov.in/PressReleasePage.aspx?PRID=1826946#:~:text=Karnataka%20is%20the%20top%20recipient,%25)%20and%20Delhi%20(14%25).
[8] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[9] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[10] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[11] https://www.wam.ae/en/article/biudnfs-india-dominates-global-milk-market-contributing-25#:~:text=NEW%20DELHI%2C%2025th%20March%2C%202025,said%20in%20a%20parliamentarian%20session.
[12] https://economictimes.indiatimes.com/industry/cons-products/food/amul-brands-fy25-revenue-rises-12-pc-to-rs-90000-cr-gcmmf-turnover-up-11-pc-at-rs-66000-

The livestock sector contributes INR17 lakh crore annually to the agriculture sector, while dairy alone contributes INR16 lakh crore. Investments in this sector have a multiplier effect, offering high returns, particularly to India's rural population.[13]

Our rural society, where 53 percent of the nation's population resides, depends heavily on livestock, fisheries and dairy, with 10 crore farmers relying on the dairy sector alone.

Alka Upadhyaya
Secretary, Department of Animal Husbandry & Dairying, Government of India

Mobilising women and cooperatives: Lessons from the White Revolution

The White Revolution of the 1970s revitalised India's dairy sector. Currently, 1.79 crore farmers, including a significant number of women, have been mobilised by cooperatives such as COMFED, OMFED and KMF.[14] Yet, 62 percent of the sector remains unorganised. Alka Upadhyaya highlighted the need to organise this sector further, improve clean milking practices and expand the cooperative base. She emphasized that the daily cash flow from dairy and poultry goes directly into the hands of women, empowering them economically.

India's milk production, which averages 459 grams per person per day, exceeds the national requirement of 350 grams. However, better organisation and efficient distribution are needed to optimise this surplus.

Tech innovations in livestock

Technological innovations are set to redefine India's livestock sector. Space technology, drones and AI are being used to monitor and enhance road conditions, green cover and animal health. Digitisation efforts have led to the tagging of 25 crore animals, ensuring they are vaccinated and artificially inseminated.

Proper use of data can help prevent diseases and optimise animal husbandry practices.

Alka Upadhyaya
Secretary, Department of Animal Husbandry & Dairying, Government of India

[13] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[14] COMFED (Bihar State Milk Co-operative Federation Ltd.), OMFED (Odisha State Cooperative Milk Producers' Federation Ltd.), and KMF (Karnataka Milk Federation) are state-level dairy cooperatives in India.

The One Health approach and cluster development

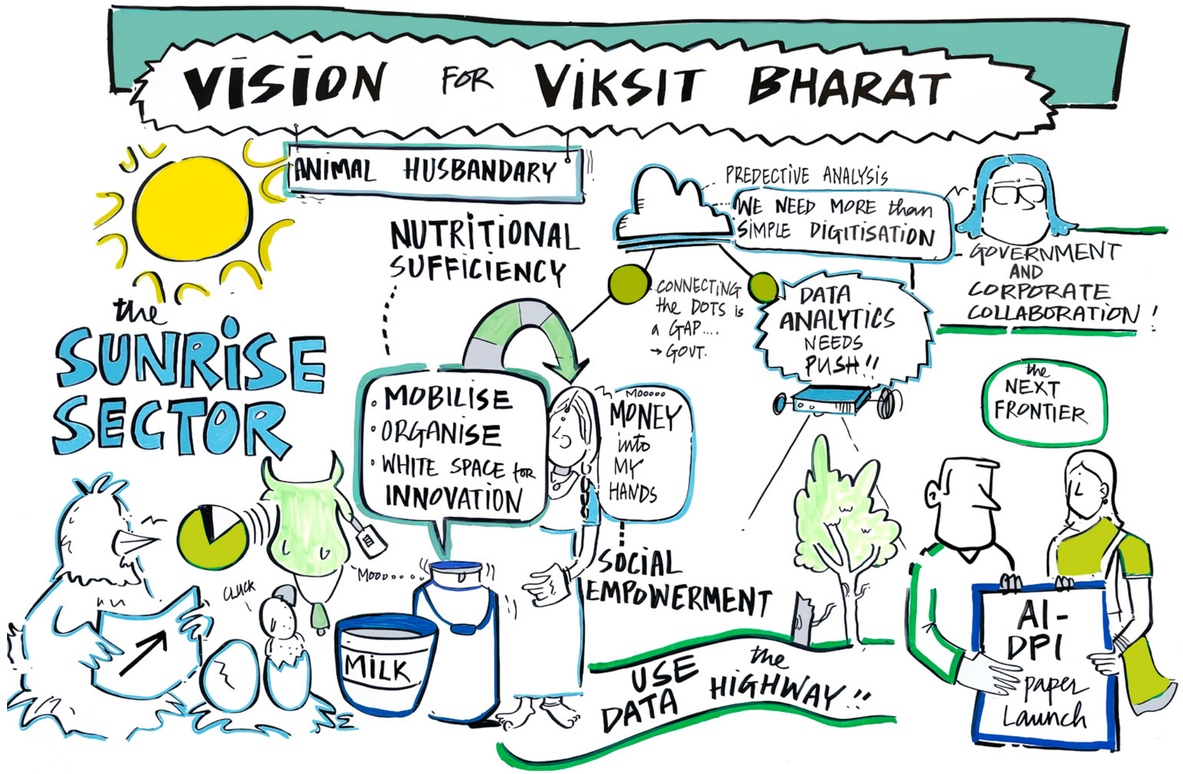
Recognising the interconnectedness of human, animal and environmental health, the "One Health" approach addresses zoonotic diseases, which have tripled in the past decade. India is mitigating the risks associated with such diseases by closely monitoring the interaction among livestock, wildlife and human ecosystems.

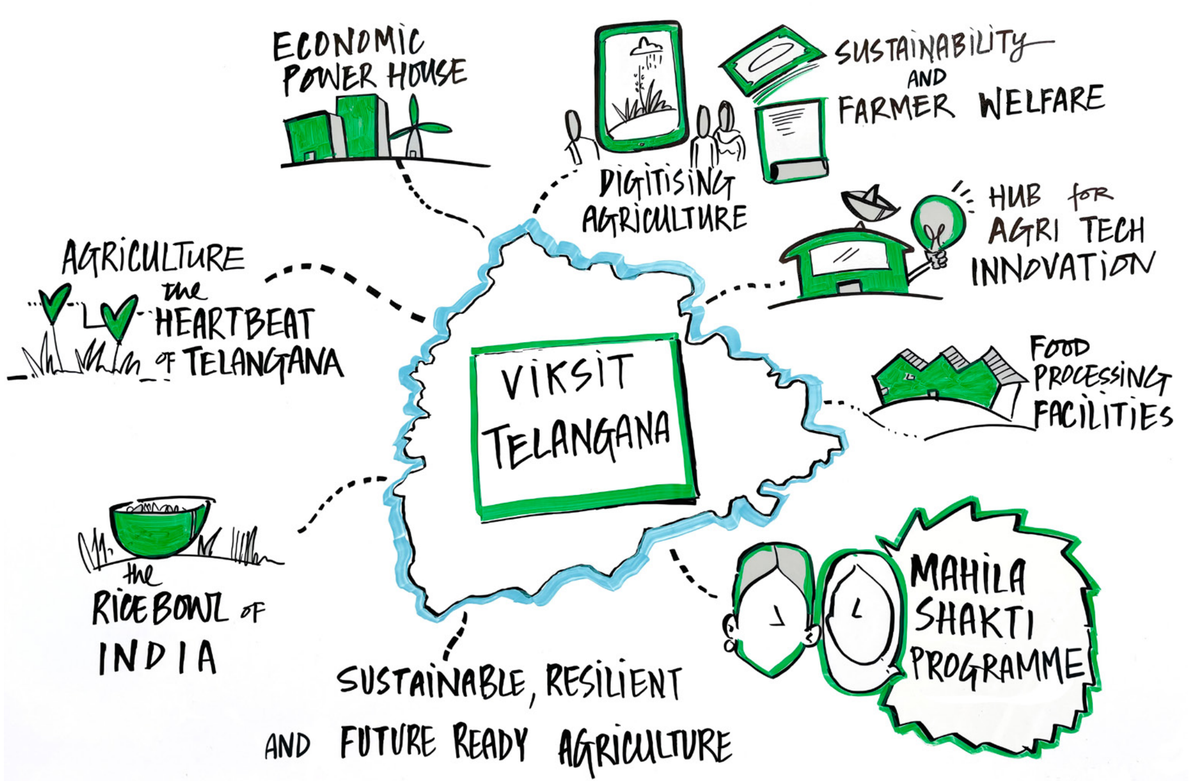
India's innovative cluster approach in rural areas is driving economic growth. For instance, poultry clusters initiated by a few entrepreneurs have led to the growth of integrated models that benefit entire value chains. Investments in logistics, mechanisation and value chain development are critical to further advancing this sector.

As India looks to the future, its livestock industry stands poised to unlock its vast potential, especially in exports. With continued adoption of emerging technologies, better organisational frameworks and deeper rural engagement, the sector is on track to become a global powerhouse, driving economic growth and sustainable development.

Key takeaways

- **Policy reforms for socioeconomic equality:** The Telangana government's collaboration with the private sector and farmers drives agricultural growth and innovation. Meanwhile, Karnataka demonstrates a strong commitment to inclusivity by promoting women-led start-ups and initiatives that reduce the urban-rural gap. On a more nationwide scale, the government's focus on livestock sector organisation and the *"One Health"* approach has also been pivotal to this overall ongoing transformation.
- **Sustainability focus:** Telangana's agricultural policies emphasize sustainability, ensuring long-term economic viability and environmental protection. Similarly, Karnataka prioritises sustainability and social impact through key initiatives such as the Social Innovation Summit, the Circular Economy Summit and the Urban Solutions Summit.
- **Inclusive growth and women empowerment:** Karnataka stands out in promoting inclusivity, empowering women entrepreneurs and reducing rural-urban inequalities. Currently, in India, 1.79 crore farmers, including a significant number of women, are actively engaged in the milk production sector through cooperatives such as COMFED, OMFED and KMF.
- **Education and innovation:** Karnataka's strong educational infrastructure and thriving start-up ecosystem have nurtured a culture of innovation and entrepreneurship, further strengthening its position as a leader in technology and development.
- **Digital innovation and growth:** As digital tools uplift agriculture, the livestock sector is becoming central to India's agrarian growth. Karnataka, particularly Bengaluru, continues to lead in technology, attracting significant investment and talent.
- **A tech-centric approach to livestock management:** Technological innovations and digitisation initiatives are transforming India's livestock sector by improving large-scale tagging and enhanced monitoring of animal health and conditions, leading to better vaccination and disease prevention.


VISION FOR VIKSIT BHARAT
ANIMAL HUSBANDARY
NUTRITIONAL SUFFICIENCY
the SUNRISE SECTOR
MOBILISE
ORGANISE
WHITE SPACE for INNOVATION
MILK
CLICK
MOOO...
MOOOOO
MONEY into MY HANDS
SOCIAL EMPOWERMENT
PREDECTIVE ANALYSIS
WE NEED MORE than SIMPLE DIGITISATION
CONNECTING the DOTS is a GAP.... → GOVT.
DATA ANALYTICS NEEDS PUSH!!
GOVERNMENT AND CORPORATE COLLABORATION!
the NEXT FRONTIER
AI-DPI paper Launch
USE DATA the HIGHWAY!!


ECONOMIC POWER HOUSE
SUSTAINABILITY AND FARMER WELFARE
DIGITISING AGRICULTURE
HUB for AGRI TECH INNOVATION
AGRICULTURE the HEARTBEAT of TELANGANA
VIKSIT TELANGANA
FOOD PROCESSING FACILITIES
the RICE BOWL of INDIA
MAHILA SHAKTI PROGRAMME
SUSTAINABLE, RESILIENT AND FUTURE READY AGRICULTURE

5b. Make in India: A digital imperative

Santosh Sarangi
Additional Secretary,
Ministry of Commerce

Technology is the foundation of modern economies and a powerful enabler of progress. For the Make in India initiative to thrive, the digital imperative is to streamline, simplify and scale through innovation.

India's journey towards becoming a global manufacturing hub has been spearheaded by the Make in India initiative. This approach aims to position India as a centre for manufacturing and innovation. However, to achieve these goals, the country must fully use the potential of the evolving digital economy. DPGs, AI and open platforms are critical components that enhance efficiency, reduce governance friction and promote transparency.

As the nation continues to build its digital infrastructure and align itself with global Industry 4.0 targets, the seamless integration of technology in areas such as trade, logistics, governance and healthcare becomes critical. This chapter, based on insights from an interactive Power Bytes session, explores the role of technology in positioning India as a global manufacturing leader while addressing key innovations, challenges and solutions driving this digital transformation.

Power Bytes: Driving DPGs as a National Agenda
Participants:
Santosh Sarangi, Additional Secretary, Ministry of Commerce;
Viraj Tyagi, CEO, eGov Foundation; and Shalini Kapoor, Chief Technologist APJ, AWS

Moderator: Sreeram Ananthasayanam, Partner, Deloitte India

Enhancing trade efficiency with open digital platforms.
Platforms such as Trade Connect represent a transformative digital framework for India's manufacturing sector, ensuring transparency and efficiency in exports.

One of the most impactful drivers of the Make in India agenda is the use of technology to streamline trade processes. Platforms such as Trade Connect provide exporters with tools to explore global markets, identify relevant export products and even access Free Trade Agreement (FTA) tariff information for over 12,000 Harmonised System (HS) codes. With just a few clicks, exporters can now obtain a certificate of origin, a process that was once tedious, directly through the platform.

Trade Connect's potential to reduce friction in international trade makes it particularly innovative. Through Phase 2 of its development, it aims to incorporate services such as Export-Import (EXIM) finance and insurance, offering a one-stop solution for Indian exporters. This is not merely an evolution in logistics; it represents a new digital framework for India's manufacturing sector, ensuring that the export process is efficient and transparent.

Reducing the cost of coordination

The cost of coordination is very high. What DPIs and DPGs do is create an infrastructure where coordination becomes seamless, reducing friction for both government and citizens.

Viraj Tyagi
CEO, eGov Foundation

Large-scale initiatives such as Make in India involve multiple stakeholders across different levels of governance, leading to high coordination costs.

This complexity arises due to the involvement of multiple departments, geographies and tiers of government. DPI and DPGs address these inefficiencies by automating processes, streamlining approvals and fostering interdepartmental collaboration through built-in interoperability and the ability to integrate seamlessly with multiple systems.

For instance, eGov Foundation's open-source platforms enable real-time compliance checks for building plan approvals, significantly reducing bureaucratic delays.

These platforms automate processes that previously required manual intervention, enabling seamless coordination across departments. This eliminated months of back-and-forth approvals, empowering architects and reducing bureaucratic delays. This digital infrastructure enables faster approvals, access to unified data and real-time visibility into government processes, making governance more efficient and citizen-friendly.

AI and democratising innovation

AI is not just about big, complex models; it is about making technology more usable and secure for everyone.

Shalini Kapoor
Chief Technologist APJ, AWS

AI plays a crucial role in democratising innovation, enabling smaller companies and start-ups to actively participate in the Make in India movement. This is more understandable when we consider how AI-powered platforms, such as the national COVID-19 immunisation platform, demonstrated the capacity for immutable and scalable solutions to process millions of transactions with minimal complexity. In this regard, the cloud service provider helped the platform to scale on demand, and in a country with such a vast population, establishing simple processes like this is key to attaining operational efficiency.

Similarly, advanced AI tools have achieved ground-breaking strides in furthering consumer reach and service penetration. When promoting digital literacy or aiding less tech-savvy segments of society, AI has

become a ray of light for enabling that crucial last-mile delivery for holistic service access. One great way in which AI tools are achieving this is by providing personalised services, thus creating empathetic applications. For example, AI solutions are applied in healthcare to predict diseases based on patient data and logistics, where RFID-tagged containers' movement can be tracked in real time. Furthermore, certain health platforms enable start-ups to build on top of AI solutions, offering virtual patient care. AI applications in healthcare and logistics drive innovation and ensure that India remains competitive globally.

Open-source platforms and DPGs: A scalable model

India's DPG strategy focuses on technology, policy, innovation and localisation. The challenge now is to scale these strategies globally, bringing the benefits of digital transformation to other developing countries.

India's DPG strategy is central to its digital and economic transformation. For example, DigiYatra uses AI and facial recognition to enable contactless air travel through biometric identity verification. Additionally, DigiYatra aims to expand AI integration by incorporating a multilingual chatbot for user assistance and support. These are prime examples of how shared DPGs and AI can be integrated into any new platform, such as DigiYatra, and seamlessly scaled across sectors. By using existing DPI services such as Aadhaar, DPGs reduce government costs, stimulate private-sector innovation and simplify public access to essential services.

The open-source nature of DPGs is crucial to their success. By making technology accessible and free for anyone to use, the government is fostering innovation at scale. DPI initiatives such as ONEST (Open Network for Skilling Transactions) use other DPGs, such as Sunbird building blocks, facilitated by not-for-profit organisations. These initiatives encourage start-ups to develop new models and applications, driving entrepreneurship and enabling job creation. In this way, India positions itself as a global leader in developing and deploying DPGs, setting an example for other countries.

India's success with DPGs is also being noticed globally. Countries in Africa and Southeast Asia are now adopting similar platforms, using India's experience to build their DPIs. The Global South benefits from India's advancements, as these platforms provide a model for how developing countries can leapfrog traditional, expensive infrastructure.

Revolutionising digital logistics

We are moving towards a paperless logistics system where the tracking and tracing of goods, from containers to individual products, will be seamless, secure and efficient.

Logistics plays a critical role in the Make in India vision. The digitisation of logistical systems, such as the previously mentioned RFID tracking for containers, ensures that every step of the manufacturing supply chain is monitored and optimised. IoT-enabled tracking allows real-time visibility of goods in transit, improving efficiency and security. As logistical innovations advance, tracking individual products within containers will soon be possible, further enhancing transparency.

International trade documentation is also going digital. One prominent example of how technology is helping to replace paper-based systems is the electronic transfer of Bills of Lading (B/L), made possible through India's collaboration with South Korea. This transition to a paperless model will accelerate the logistics process and enhance the security, as documents are digitally verified and traceable.

Personalisation and culturally aware AI

Personalisation and cultural awareness in AI will ensure that India's digital transformation reaches every corner of its diverse population.

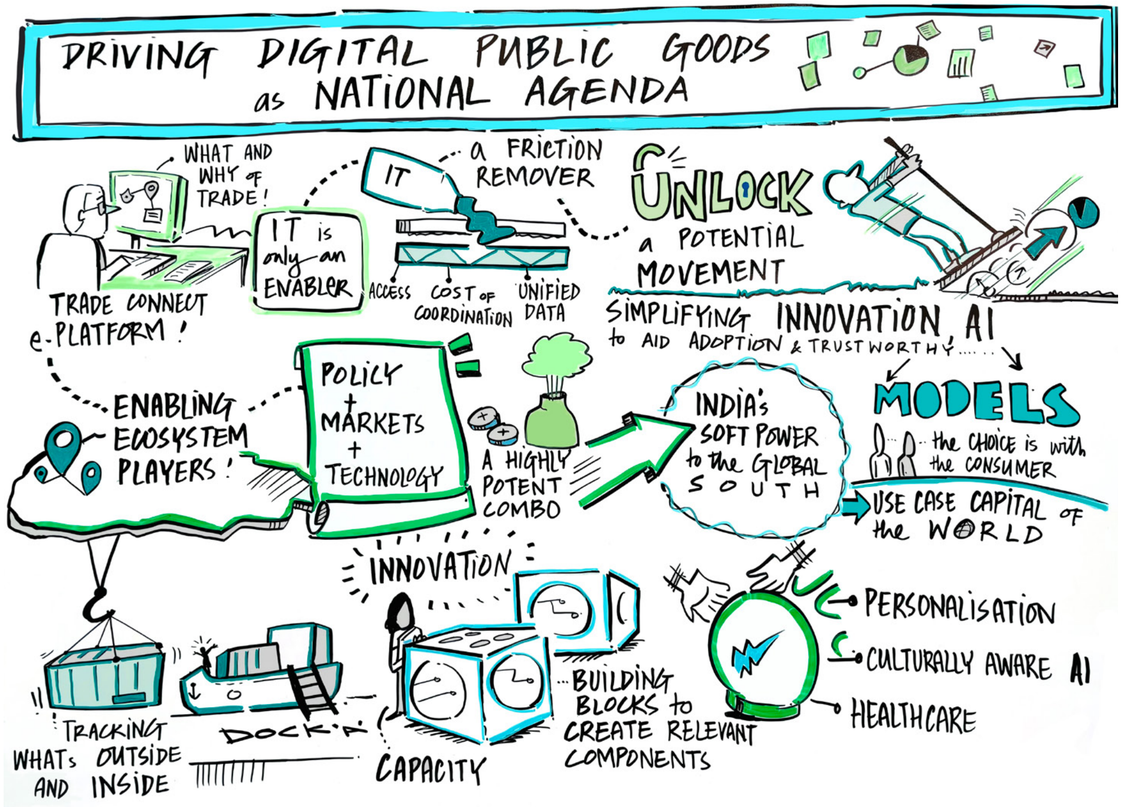
Personalisation is becoming more important as India continues to digitise and focus more on digital inclusivity. As a result, language and cultural adaptation for AI solutions is non-negotiable for sustainable mass adoption. For example, the Bhashini platform uses AI to provide translation services in 22 Indian languages, enabling equitable digital access to millions of Indian citizens.

The future of Make in India lies in this ability to personalise digital experiences. From healthcare applications analysing local dietary patterns to agricultural platforms offering localised weather updates, AI is critical in making technology accessible.

Ārohaṇa (आरोहण) | Growth with impact

Key takeaways

- **Technology as a trade enabler:** Platforms such as Trade Connect streamline export processes, making global markets more accessible for Indian businesses.
- **Reducing coordination costs:** DPGs reduce government overheads, improving service efficiency.
- **Democratising innovation:** AI-powered platforms allow for the personalisation and scaling of services, making technology more accessible and fostering innovation across sectors such as healthcare and logistics.
- **Open digital platforms:** India's success with open DPGs provides a model for other countries, especially in the Global South, to develop scalable and cost-effective digital infrastructure.
- **Digitisation of logistics:** IoT-enabled logistics systems provide real-time tracking of goods, improving efficiency, security and transparency in the supply chain.
- **Culturally aware AI:** Localised AI solutions, such as Bhashini, ensure that digital transformation reaches every corner of India, promoting inclusivity.



5c. Empowering Indian organisations: Shaping efficient experiences with digital solutions

Dheeraj Rastogi
Executive Vice President,
GSTN Network

Lieutenant General Sadhna Saxena Nair
VSM, DGMS (Army)

Telemedicine and AI are reshaping military healthcare, offering advanced care even in the country's most remote areas.

Digital solutions offer innovative ways to address traditional challenges and create new opportunities. Governance in India is undergoing a transformative shift, with the government eager to embrace technology to enhance organisational efficiency. Digital transformation has become a pivotal gateway for improving efficiency and elevating citizen experiences. Landmark achievements have been made in various government sectors, such as healthcare, public administration, aviation and tax management, with the integration of digital technologies.

The focus of this enlightening panel discussion was a deeper exploration of the role of digital tools in shaping the future of organisational efficiency and service delivery. With a strong focus on AI, automation and secure data management, various leaders across diverse sectors came forth to provide their views and insights on holistic digital transformation through innovative solutions.

Panel Discussions: Power of Digital in Creating Experience and Organisational Efficiency

Participants:

Dheeraj Rastogi, Executive Vice President, GSTN Network;
Lieutenant General Sadhna Saxena Nair, VSM, DGMS (Army);
Rajiv Bansal, CEO, NISG; Sanjay K Das, MD, WEBEL; Sandeep Sehgal, Director, India Public Sector and North Enterprise, ServiceNow Yatin Patil, Partner, Deloitte India

Moderator:

Yatin Patil, Partner, Deloitte India

With the adoption of drones, robotics and telemedicine, we are trying to push our medical care as far forward as possible.

Lieutenant General Sadhna S Nair
VSM DGMS (Army)

The Indian armed forces have adopted significant digital transformation initiatives in healthcare management. The COVID-19 pandemic acted as a catalyst, pushing military medical services to adopt new technologies. The armed forces' Secure Indigenous Messaging app enables real-time messaging and secure data sharing across a robust military network. This app allows seamless communication among doctors, medical staff and remote field units.

Significant improvements in telemedicine technology have enabled doctors and healthcare specialists in secondary and tertiary care hospitals to reach soldiers in remote locations. Using telemedicine, doctors can assess patients' conditions and provide consultations without needing physical travel, which is often impossible in extreme conditions our soldiers serve in. Telemedicine ensures that even soldiers stationed in remote areas receive the best technologically aided care.

The Indian Army has set up a fully automated hospital in Jammu and Kashmir. In this hospital, AI-driven machines handle patient care, diagnostics and medicine dispensing with minimal human intervention. The military also enhances its Hospital Information System (HIS) to comply with international standards. This will help them move towards a paperless healthcare environment. Stage 2 of automation has been achieved for electronic medical records, while the goal is to achieve Stage 7.[15]

Integrating AI and robotics into healthcare aims to enhance the patient experience. For example, the military is experimenting with exoskeletons embedded with AI to help paraplegic soldiers regain mobility. They can be instrumental in rehabilitating injured soldiers. They can even enable some to return to active duty. It should be noted that these devices have potential applications in the military and civilian healthcare. AI-powered clinical decision support systems are also being developed for critical care, along with portable intensive care units connected to the Internet of Things (IoT) enabled devices that monitor patients' vitals in real time.

[15] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

AI and automation in the aviation sector

AI-powered insights allow the aviation sector to adapt swiftly to demand fluctuations, optimise routes and ensure an unparalleled travel experience.

Rajiv Bansal
CEO, NISG

The Indian aviation industry's adoption of AI and automation is a remarkable journey towards operational excellence and seamless user experience. Airports operate around the clock and generate vast amounts of data from aircraft movement, maintenance schedules and passenger services. AI and data analytics are critical for processing this data in real time to ensure the safety of passengers and the aircraft's operational efficiency. Maintenance schedules, for instance, are meticulously tracked and managed through AI-driven platforms, which predict and prevent potential issues before they become critical, ensuring both safety and cost-efficiency.

Unmanned Aerial Vehicles (UAVs) and drones are seen as the next game-changers in the aviation sector. These vehicles are becoming essential for managing airspace and conducting operations that previously required significant human intervention. The number of companies operating in the drone and UAV space has grown exponentially, with about 400 businesses now working on these innovations. The next-generation drones will be integral to commercial operations and public services, including emergency medical deliveries.

The launch of the DigiYatra app is a significant milestone in India's aviation sector. DigiYatra is a digital platform that ensures a seamless, paperless airport experience for passengers. Using facial recognition and biometrics, DigiYatra facilitates quick movement of passengers through check-in, security and boarding without physical documentation, thereby saving time. Implementing this at scale in a country as large and diverse as India was a tremendous challenge, but it has greatly enhanced operational efficiency and passenger experience.

Automation and big data in taxation

With GST analytics, taxpayers now have access to crucial compliance information before tax officers, empowering them to stay ahead of the curve.

Dheeraj Rastogi
Executive Vice President, GSTN Network

The rollout of India's Goods and Services Tax (GST) in 2017 marked a transformative milestone, revolutionising the nation's tax infrastructure by streamlining taxpayer compliance.[16] GST has simplified the tax landscape, enabling businesses and individuals to navigate processes easily and transparently. Automation in GST filing and reconciliation has allowed taxpayers to fulfil compliance requirements more independently, reducing manual procedures and paving the way for real-time data access and seamless transactions.

With the advent of automated solutions and big data analytics in this sphere, GST has enhanced both the user experience and organisational efficiency. Advanced tools such as AI-driven predictive analytics offer early insights into compliance trends and growth opportunities, empowering taxpayers while assisting tax administrators in providing timely, proactive support. This digital approach has transformed GST from being merely a tax system into a pillar of India's digital economy, facilitating smoother tax interactions, increasing transparency and fostering trust within the tax ecosystem.

Building digital infrastructure and ensuring data privacy

West Bengal has the greatest number of people with two mobile connections and two distinct internet connections. The state also has a growing number of rural women using the Internet.

Sanjay K Das
MD, WEBEL

With the proliferation of smartphones, internet usage is surging. A cutting-edge digital infrastructure is critical to ensuring safe operations and an efficient user experience. The West Bengal government is building critical digital infrastructure to support its growing population of internet users, particularly rural women and entrepreneurs.[17] As more people come online, robust data centres are needed to store and manage vast amounts of information, making data privacy increasingly crucial. West Bengal has established three data centres that serve government operations and provide secure data services for start-ups, students and professionals.

[16] https://pib.gov.in/PressNoteDetails.aspx?NoteId=151915&ModuleId=3&reg=3&lang=1
[17] https://link.springer.com/chapter/10.1007/978-3-031-28930-9_11

Ārohaṇa (आरोहण) | Growth with impact

With the rise of big data, particularly in public transactions, the need for strict guidelines on data retention and usage grows. Ensuring that data is not skewed and privacy is protected becomes increasingly important. So, anonymising public transactional data before sharing it with third parties such as start-ups is essential. This ensures that personal information is protected while allowing businesses to benefit from valuable data insights. Explicit permission from citizens before using their data, in line with the Supreme Court's guidelines on data privacy, is a crucial requirement.

West Bengal's initiative to create a Facebook page for NGOs and cooperatives aims to enable seamless data sharing among them. By building a collaborative platform, the government empowers different sectors to share information, collaborate and drive social development while maintaining stringent data security protocols.[18]

Streamlining government workflows

Today's citizens expect instant service delivery, and digital workflows are transforming how government agencies respond to these needs.

Sandeep Sehgal
Director, India Public Sector and North Enterprise, ServiceNow

Digital platforms can streamline government workflows to improve citizen services. In India, many government departments have digitised specific processes, but these systems often remain siloed, with little communication or integration between them. For example, various departments have portals where citizens can register complaints and grievances. They can enter their data and raise a ticket. However, transparency regarding the status of the issue resolution is lacking. As a result, citizens are left wondering about the status of their complaints or requests after submitting them online. ServiceNow aims to solve this problem by connecting disparate digital systems in a seamless platform that allows citizens to track the progress of their requests in real time.

ServiceNow's platform integrates various government workflows, making it easier for departments to collaborate and share information. For example, a citizen who submits a complaint about a civic issue can receive regular updates as the request moves through different departments, from logging to resolution. This enhances the citizen experience and improves government accountability and efficiency. By providing transparency into government processes, ServiceNow helps bridge the gap between citizens and government bodies, ensuring faster resolution of issues and improving public trust in digital governance.

Moving forward

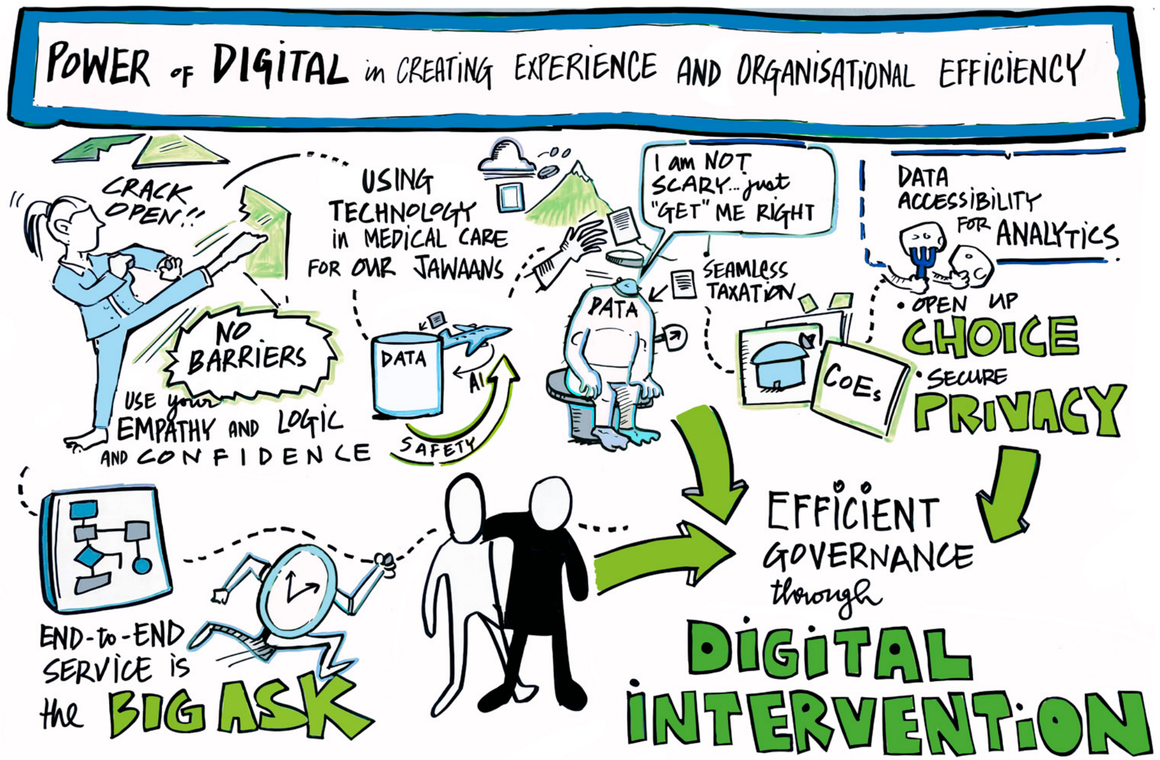
The digital transformation of India's infrastructure promises a resilient and sustainable future. By seamlessly integrating digital tools with physical systems, India creates an ecosystem where real-time data, AI-driven insights and cross-sector collaboration converge to address complex challenges across healthcare, transportation, sports and governance.

These advancements make infrastructure more efficient and adaptive and pave the way for more inclusive, transparent and citizen-centred services. As India continues to harness the power of digital innovation in physical infrastructure, it shapes a modern nation while setting new standards for growth, resilience and sustainability. The journey towards a digitally empowered India is well underway, establishing a foundation for a future that is prepared to meet the demands of tomorrow's world.

[18] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

Key takeaways

- **Telemedicine revolution:** The Indian armed forces have adopted telemedicine and AI-driven healthcare solutions to provide advanced medical care in remote, challenging locations. Telemedicine and automated systems enable soldiers in extreme conditions to receive expert consultations and real-time care.
- **AI in healthcare:** AI-driven exoskeletons and portable ICU units with IoT connectivity are revolutionising rehabilitation for injured soldiers, helping them regain mobility and even rejoin the armed forces.
- **AI and automation in aviation:** AI and big data analytics are transforming aviation by streamlining aircraft maintenance, improving safety protocols and enabling new technologies such as drones and UAVs.
- **GST automation and AI analytics:** Automation in GST has streamlined tax filing for taxpayers, enhancing efficiency and independence in compliance, while AI-driven analytics provide insights into sector trends, growth opportunities and proactive support for a transparent tax ecosystem.
- **Data infrastructure and privacy:** West Bengal is investing in digital infrastructure while ensuring that data privacy and security are prioritised, particularly as more people in rural areas gain internet access.
- **Connected government services:** Specialised platforms are helping governments integrate workflows across departments, allowing citizens to track their service requests in real time, improving efficiency and transparency.



5d. Digital solutions: The new building blocks for physical infrastructure development

Shashank Mani Tripathi
Member of Parliament, Deoria
Uttar Pradesh

Shikha Goel
IPS, Director General CID,
Telangana

In a nation with over 1.4 billion individuals, it is essential to develop solutions that resonate with all segments of society to ensure that the benefits of technology reach every citizen.

As India confidently moves into the digital age, integrating technology into physical and social infrastructure is key to fostering a truly inclusive society. Digital tools hold immense potential to bridge social gaps, offering access to information, services and opportunities that can transform lives, especially in rural areas where resources are often scarce. However, challenges such as language barriers and digital literacy must be resolved for these solutions to reach their full impact.

Today, urban residents enjoy seamless access to technology, yet many rural communities face obstacles that limit their engagement. In this regard, outreach programmes must go beyond just providing access to technology; they must empower individuals with the skills and knowledge to use digital tools meaningfully. By addressing these barriers, India can unlock the transformative potential of technology, building a foundation for equal opportunity and growth across communities.

Panel Discussions: Bringing the Power of Digital to Physical & Social Infrastructure Development

Participants:

Shashank Mani Tripathi, Member of Parliament, Deoria, Uttar Pradesh; Shri Kunal, Joint Secretary, Sports Development, Ministry of Youth Affairs and Sports; Shikha Goel, IPS, Director General CID, Telangana; Rahul Himalian, Director (Tourism & Marketing) at Indian Railway Catering and Tourism Corporation Limited (IRCTC Ltd); Vikas Arora, Director, Sales, Traditional Enterprise, Google Cloud, India

Moderator:

Shefali Goradia, Chairperson, Deloitte South Asia

Successful initiatives have already shown the transformative power of digital engagement, notably empowering women through internet connectivity and enabling them to pursue entrepreneurship, thereby breaking traditional barriers.

Empowering constituencies through digital integration is a critical objective of the digital transformation journey. Digital technology has the power to connect communities in profound ways, creating human-centric networks that promote emotional and social engagement. The vision, therefore, is to motivate individuals to harness available digital resources for personal and collective advancement.

If we want to get jobs, then there's a long way to go, there's no instant solution, but it's very important that we are holistic and humanistic. We have to democratise this thing, not dehumanise it.

Shashank Mani Tripathi
Member of Parliament, Deoria, Uttar Pradesh

A significant highlight of this empowerment is evidenced through successful initiatives targeted at women in rural areas, where connectivity has opened many economic opportunities. One such initiative connected 1.7 million women to the Internet, offering them avenues for entrepreneurship and economic independence. This success reflects the transformative capabilities of digital literacy in dismantling traditional barriers and empowering marginalised populations.

Current digital engagement levels

AI, cloud computing and data-driven decision-making are key to unlocking new efficiencies and personalisation in public services.

Vikas Arora
Director, Sales, Traditional Enterprise, Google Cloud, India

Despite wider access, many still use digital technology mainly for entertainment, not for personal or economic growth. This reality necessitates purposeful intervention, a strategy to ensure technology fosters active engagement, participation and a sense of community responsibility.

To shift entrenched perceptions of technology, the narrative must move beyond automation and focus on integration and human-centred outcomes. Automation can conjure fears of job loss and decreased human agency. Instead, the dialogue must embrace how technology enhances life and potential by unlocking new pathways for engagement. This is why any digital interventions should be framed in terms of purposefulness and personalisation, as they serve to uplift communities, enhance education and foster economic development. For example, initiatives aimed at digital entrepreneurship can promote job creation and economic stability, shifting the perception of technology from a threat to an asset.

Educational initiatives and infrastructural development

Collaborative digital infrastructure bridges gaps across healthcare, education and law enforcement, enhancing access and efficiency for every citizen.

Education is one of the most powerful tools for transforming lives, and integrating digital resources into the education system can revolutionise learning. Currently, the challenges faced by rural students, such as a lack of access to quality education and resources, call for innovative strategies. One such innovative idea suggests connecting the most qualified educators to students via digital means. By identifying the best instructors and enabling them to provide online guidance, schoolchildren in underserved areas can benefit significantly from advanced curricula and personalised instruction. This shows that the educational gap can be closed with the right resources, and students can access essential knowledge without geographical constraints.

Furthermore, enhancing teacher training through digital platforms ensures educators can navigate these new landscapes. Technology-driven assessments can identify the training needs of teachers, leading to tailored professional development that aligns with the demands of contemporary education. Incorporating AI into educational frameworks can provide real-time feedback and facilitate personalised learning experiences. This can tremendously improve learning outcomes for both teachers and students.

Using analytics, stakeholders can monitor educational interventions, assess their effectiveness and identify gaps that need addressing. This data-driven approach will help create adaptive learning paths tailored to learners' unique needs. Lastly, implementing robust data collection methods ensures accountability within the education system. By establishing measurable benchmarks, stakeholders can continuously refine their strategies to meet the educational needs of all segments of society.

Creating an inclusive sports ecosystem through digitisation

The National Sports Repository System provides a real-time database for tracking three lakh players and 30,000 coaches, using technology to optimise athlete development at every level.

Shri Kunal
Joint Secretary, Sports Development, Ministry of Youth Affairs and Sports

The integration of digital technology presents significant opportunities for nurturing a vibrant sports ecosystem in India. Initiatives that emphasize grassroots talent identification and development and use digital platforms to track individual performance and guide training strategies are vital in this regard. Such initiatives enhance inclusivity within sports by extending opportunities to diverse groups across the country.

Through technology, India can provide training and competition avenues to those who may have faced barriers to entry in sports. Access to digital platforms creates a culture of inclusivity and excellence, enabling aspiring athletes from all backgrounds to make their mark and represent India on global platforms.

Indian Railways setting the benchmark

From 25 tickets in 2002 to over 13 lakh bookings daily, IRCTC's digital evolution redefines user experience in railway services.

Rahul Himalian
Director (Tourism & Marketing) at Indian Railway Catering and Tourism Corporation Limited (IRCTC Ltd)

The Indian Railway Catering and Tourism Corporation (IRCTC) plays an exemplary role in bringing the power of digital to physical infrastructure development through innovative initiatives. Delivering a range of services that include ticketing, catering and tourism management, it has evolved significantly since its inception. With the advent of online ticketing, IRCTC revolutionised how millions of passengers book tickets. This advancement streamlined the process and made it accessible to a broader audience, reflecting the corporation's commitment to enhancing customer experiences.

Moreover, by integrating various services such as food delivery, travel insurance and hospitality, IRCTC has created a comprehensive travel ecosystem. Initiatives such as e-catering services further illustrate the corporation's customer-centric approach, allowing passengers to order meals from a selection of restaurants for delivery to their seats during travel. Similarly, the launch of Urban Pods has redefined accommodation while travelling by starting the accommodation cycles when a traveller checks in, rather than following the prevalent noon-to-noon cycle.

Ārohaṇa (आरोहण) | Growth with impact

Cybersecurity and the role of police

Telangana's "She Cyber Labs" and 1930 cybercrime helpline demonstrate how digital tools can empower law enforcement to tackle gender-based violence and cyberthreats.

Shikha Goel
IPS Director General CID, Telangana

Although the role of the police is often not felt directly in economic development, its role in maintaining law and order is critical for the prosperity of any economy. The role of police in the digital era is becoming increasingly significant as law enforcement agencies adapt to the demands of a connected society. The integration of technology into policing practices enhances operational efficiency and ensures that police forces can effectively address crime and public safety challenges. Police cybercrime departments are now using data analytics, AI and smart tools to improve crime prevention through pre-emptive actions.

Cybersecurity and data solving have become very critical concerns for both the public as well as private sectors. Ensuring that data is secure, compliant with all local regulations and protected from cyber threats is now a top priority.

Shefali Goradia

Moreover, the emphasis on community engagement through digital platforms transforms the relationship between law enforcement and the public. By using social media and mobile applications, police can communicate more effectively with citizens, fostering trust and transparency. Initiatives aimed at improving citizen reporting and feedback through digital channels empower communities to collaborate with the police in maintaining safety and security.

Collaboration for enhanced digital governance

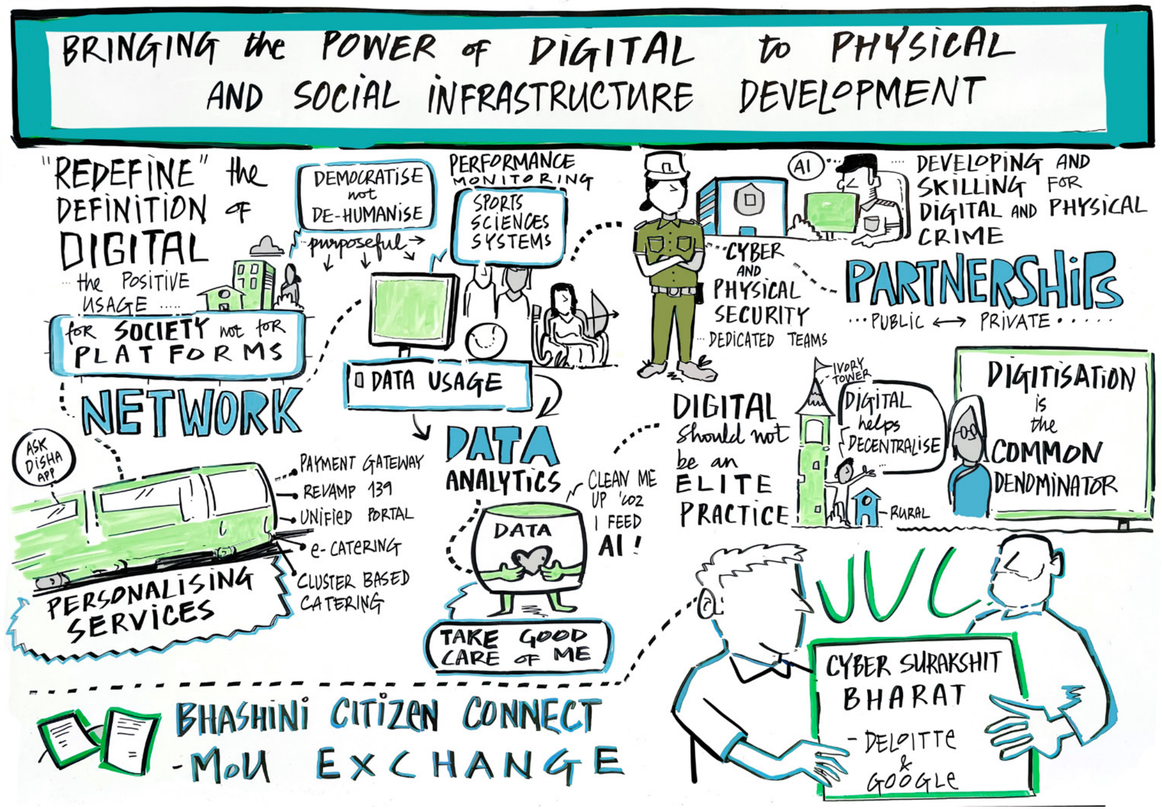
Every year, the Indian government proves the sceptics wrong by demonstrating that collaborative public innovation can rival even the world's largest digital platforms.

Enhancing digital initiatives across India requires collaboration among stakeholders, including state and federal entities, educational institutions and sporting bodies. This cooperative framework focuses on aligning shared objectives, pooling resources and using expertise to efficiently implement digital solutions.

PPPs have been particularly effective in driving innovation and ensuring infrastructure development aligns with community needs. By harnessing the capabilities of both sectors, the nation can maximise the benefits of digital technologies across multiple spheres, enhancing service delivery and access for citizens.

Key takeaways

- **Digital inclusion as a priority:** Bridging the urban-rural divide through digital technology is vital for ensuring equitable access to information, services and opportunities. The need for initiatives addressing barriers such as language and accessibility is essential.
- **Focus on skill development:** Initiatives that promote digital literacy and skill development are essential for enabling individuals, particularly youth and marginalised groups, to thrive in a technology-driven economy.
- **Data-driven education:** Using data analytics within educational systems allows for personalised learning experiences, helping identify student skill gaps and tailoring interventions accordingly.
- **Sports and digital ecosystems:** The integration of digital technologies into sports initiatives enhances talent development and promotes inclusivity, ensuring that individuals from various backgrounds can engage in athletics.
- **Digital transformation in Indian Railways:** Digital innovation in IRCTC, from online ticketing to services such as e-catering and Urban Pods, has transformed railway travel into a more accessible and customer-centric experience.
- **Digitally-enabled law enforcement:** From AI-powered crime prevention to citizen-friendly platforms such as cyber helplines, technology is reshaping how police maintain safety and build public trust.
- **Measurable outcomes as a goal:** Establishing clear metrics and benchmarks will help evaluate the success of digital initiatives, ensuring accountability and continuous improvement in service delivery and educational outcomes.
- **Community-centric solutions:** Designing digital initiatives with a focus on community needs and involvement will enhance participation and effectiveness, ensuring that the benefits of technology reach those who need them most.



5e. Empowering MSMEs

Bringing MSMEs into the digital economy involves onboarding them and ensuring their sustained success through continuous nurturing and support.

Micro, Small and Medium Enterprises (MSMEs) are essential to India's economy, contributing to employment, industry output and Gross Domestic Product (GDP) growth. However, despite their economic importance, many MSMEs face challenges in accessing larger, digitally driven markets. MSME aims to use the ONDC to democratise e-commerce through a decentralised network. This initiative, backed by the Government of India, helps MSMEs overcome challenges posed by large e-commerce platforms.

ONDC empowers MSMEs to sell their products and services without being constrained by the restrictive policies and high commission fees of large e-commerce giants. Eliminating platform monopolies reduces dependence on dominant marketplaces and creates a more level playing field. Further, ONDC lowers customer acquisition costs and expands market reach for MSMEs as products become accessible across multiple buyer apps. ONDC addresses the challenge of setting up online stores, which many small businesses struggle with due to technological complexities.

> *By fostering innovation, ONDC enables businesses to explore diverse pricing models, personalised delivery options and enhanced customer service. Beyond driving MSME growth, it also strengthens the Atmanirbhar Bharat vision by reducing reliance on foreign e-commerce players and promoting a more inclusive digital economy.*
>
> **Ankita Pandey**
> **IRS, Director (IC & WEC), Ministry of MSME**

The *Manthan,* led by the Ministry of MSME, examined how the ONDC can use digital commerce for MSMEs in India. The government has approved the Trade Enablement and Marketing (TEAM) initiative to support MSME onboarding onto the ONDC (and has other similar initiatives in the pipeline); this unique discussion focused on identifying potential hurdles that may arise during the digital transition. Key stakeholders united around a shared vision for an inclusive e-commerce ecosystem, addressing challenges such as digital literacy, technology access and logistical barriers. The aim was to create a sustainable digital marketplace that enhances livelihood opportunities for MSMEs nationwide.

Manthan: Digital Enablement of MSMEs via the ONDC

Participants:

Ankita Pandey, IRS, Director (IC & WEC) at Ministry of MSME, Government of India; Vidya Sagar Singh, Senior General Manager (IT), Digital Services Facilitation, NSIC; Zahra Cader, Partner, ESG and Government and Public Sector, Deloitte Sri Lanka; and others

Guru:

Viswanathan Ravichandran, Partner, Deloitte India

Digital awareness and readiness for adoption have been key issues for MSMEs in their ONDC onboarding endeavours. Many MSMEs in rural areas face challenges due to limited digital and financial literacy, inadequate technological infrastructure and a lack of entrepreneurial skills, which hinder their ability to tap into e-commerce opportunities. India's MSMEs need to be digitally competent. However, many of today's enterprises lack basic digital awareness.

Societal obstacles further intensify the challenges for female-owned MSMEs, underscoring the need to raise awareness about the advantages of engaging in the digital economy.

Digital literacy, e-commerce catalogue management and online transaction handling are vital training programmes that can improve the digital preparedness of MSMEs. Moreover, providing support in local languages and simplifying onboarding processes could assist enterprises in rural areas with their transitions.

Building trust and overcoming apprehensions

Even when the government offers subsidies, many MSMEs hesitate to engage due to deep-rooted trust issues with digital platforms.

Trust remains a critical issue for MSMEs. The complexities of online transactions, fear of fraud and additional taxation can cause hesitation for many MSMEs, preventing them from using these online platforms. This is particularly concerning due to the oligopolistic nature of traditional e-commerce platforms, which many MSMEs believe favour larger sellers and more established brands. The ONDC's decentralised structure attempts to alleviate these concerns by unbundling e-commerce processes and allowing businesses to act as sellers, aggregators or intermediaries without being shackled to just one platform.

> *The challenge is to get MSMEs on digital platforms and ensure they are prepared to maintain their presence and grow.*
>
> **Viswanathan Ravichandran**

Building trust with MSMEs on the ONDC platform requires sharing success stories from similar businesses and demonstrating how they can thrive alongside larger players. By highlighting these achievements, the ONDC can help MSMEs build credibility and establish a strong reputation for quality in e-commerce. Quality and reliability are essential in the online marketplace, and MSMEs must uphold these standards to unlock substantial growth opportunities. Additionally, the government offers various schemes to support MSMEs in enhancing product quality, which these enterprises can use to strengthen their market presence and competitiveness on the ONDC.

Access to market

Expanding market access is crucial to the growth of MSMEs, allowing them to compete in broader markets and tap into previously unreachable opportunities. By onboarding onto the ONDC, MSMEs

can reach wider geographies, expanding their customer base beyond local limitations and into diverse, distant markets that were traditionally inaccessible.

The ONDC ecosystem also offers MSMEs new pathways to use advanced technologies, such as GenAI, which can streamline cataloguing, branding and customer engagement. This allows businesses to enhance their visibility and appeal within competitive online spaces. These advancements equip MSMEs to navigate and thrive in the dynamic e-commerce landscape, making their products accessible to a larger audience while optimising their operations.

Using financial resources and logistics

MSMEs can expand their market reach without increasing their physical footprint; digital platforms offer that potential, but the journey requires careful navigation.

Vidya Sagar Singh
Senior General Manager (IT), Digital Services Facilitation, NSIC

To take advantage of the ONDC, MSMEs need reliable financial and logistical support. Access to credit or loans on affordable terms is very hard for many enterprises that lack the capacity to take their businesses to the next level. Logistics is also critical, as e-commerce heavily relies on efficient delivery systems that MSMEs often lack.

This gap can be bridged by integrating financial literacy programmes into e-commerce onboarding processes. The ONDC can collaborate with financial institutions to introduce tailored financial products, such as working capital loans or credit lines, especially for MSMEs. Also, MSMEs can collaborate with local logistics providers and aggregators to reduce the per-unit cost of deliveries and make them more efficient.

Ensuring sustainability through clusters and mentorship

Organising MSMEs into clusters allows businesses to share resources, ideas and infrastructure, ensuring they thrive collectively in a competitive digital environment.

The digital enablement of MSMEs on the ONDC is only part of the solution; establishing a sustainable ecosystem also requires a framework to support and mentor MSMEs in this new digital marketplace. Clustering is quite beneficial as it helps MSMEs achieve more with less by building synergies among businesses in the same geographical or sectoral region, allowing them to improve their digital capabilities in mutually beneficial ways. Clusters can act as a cooperative network of mutual learning opportunities where businesses can share best practices, resources and infrastructure. This helps reduce the burden on individual MSMEs and boosts their confidence in navigating a digital transition independently.

It also introduces mentorship programmes, where successful MSME players empower other entrepreneurs on their ONDC onboarding and scaling journey via community-driven support. PPPs could play a significant role in establishing these mentorship frameworks.

Navigating taxation and regulatory frameworks

Many MSMEs fear that going digital will expose them to greater tax scrutiny; there is a need for clearer communication about the benefits and exemptions available.

Zahra Cader

A prevalent concern faced by several MSMEs is increased scrutiny by tax authorities, which often prevents them from participating in formal digital ecosystems. Many small enterprises' informal operations can raise concerns about potential tax burdens after transitioning to the ONDC. Clarity in regulatory frameworks, simplified taxation processes and transparent communication regarding compliance requirements are essential to facilitate MSMEs' entry into the formal digital economy.

Educating MSMEs about tax benefits, especially for schemes meant for small businesses, is crucial. By addressing their formalisation concerns, MSMEs can better focus on scaling through the ONDC.

Fostering women-led MSMEs

While we have already made great strides in onboarding MSMEs to digital platforms, we have barely scratched the surface of what is possible.

Ankita Pandey
IRS, Director (IC & WEC), Ministry of MSME

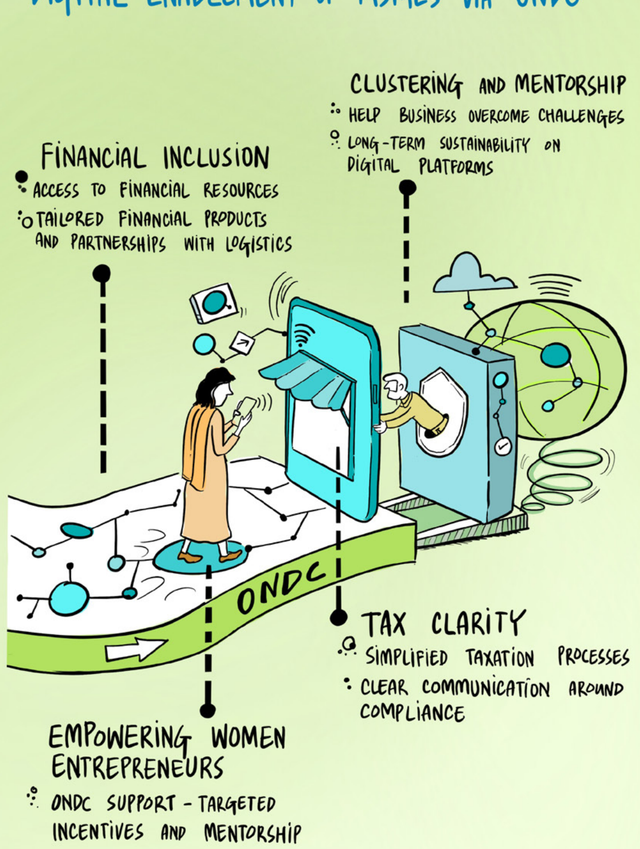
Despite the growth of the MSME sector, women entrepreneurs face unique challenges in securing funds to expand their businesses. Societal norms, particularly restrictions on financial inclusion, limit their opportunities. In this context, the most significant change for women-led MSMEs is the wider market access through the ONDC, especially in non-urban areas where existing traditional opportunities are more limited.

Furthermore, special incentives can be designed for women entrepreneurs on the ONDC, such as reduced platform fees, access to finance, mentorship programmes and additional marketing support. These initiatives can encourage more women to step forward, use digital platforms and create sustainable businesses that empower entire communities. One prominent example of this is the proposed *Yashaswani* initiative. While this is like the TEAM initiative mentioned earlier, the Yashaswini project primarily supports women-led businesses by allowing them easier and more efficient access to financial resources and trading opportunities.

By addressing these challenges through targeted interventions, the ONDC can transform the MSME landscape in India. It can enhance digital inclusivity and create a sustainable ecosystem that enables MSMEs to thrive in a competitive digital economy, contributing to the country's overall economic growth.

Key takeaways

- **Digital awareness:** Digital literacy and training programmes are essential for MSMEs to benefit from the ONDC. Programmes focusing on digital skills must be tailored to MSMEs' needs, particularly in rural areas.
- **Building trust:** Success stories of MSMEs that have scaled through the ONDC can be shared widely to foster trust and alleviate apprehensions about digital platforms.
- **Financial inclusion:** MSMEs need better access to financial resources to participate effectively in e-commerce. Tailored financial products and collaboration with logistics providers are key to their success.
- **Clustering and mentorship:** Establishing MSME clusters and mentorship networks can help businesses overcome challenges collectively, ensuring long-term sustainability on digital platforms.
- **Compliance enablement:** Simplified taxation processes and clear communication around compliance requirements can help MSMEs transition smoothly to formal digital ecosystems without fearing legal or financial repercussions.
- **Empowering women entrepreneurs:** The ONDC offers a unique opportunity to support women-led MSMEs with targeted incentives and mentorship, which can boost their participation in e-commerce.



5f. Future-ready policies

The vision of *Viksit Bharat@2047* emphasizes the need for a spirited, equitable and ICT-enabled nation. Achieving this vision requires a revolutionary change in policymaking paradigms. Outdated bureaucratic structures can impede progress as the world becomes more interconnected. India must adopt transformative policy changes that address public needs and reflect global evidence.

Ārohaṇa: Growth with Impact convened leaders for a *Manthan on Innovation in Policymaking to Realise the Vision of India@2047.* It provided a platform to discuss how innovation can shape future-ready policies, enabling more efficient governance, informed decision-making and enhanced stakeholder engagements. The session focused on innovative and sustainable policymaking to support the Government of India's vision of *Viksit Bharat@2047.*

Participants addressed strategic perspectives and tolerant approaches to emerging socioeconomic challenges. They highlighted the importance of tech-enabled governance and how reforming obsolete policy frameworks is a necessity and a strategic imperative for economic resilience and national progress. Collaboration between governments and businesses was identified as crucial for future development.

Manthan: Innovation in Policymaking to Realise the Vision of India @ 2047

Participants:

Bikas Kr. Singh, Vice President & India Head, Government Affairs, SAP; Pankaj Banarase, Partner, Deloitte India; Bishakha Bhattacharya-AWS; Rakesh Maheshwari, former director at the Ministry of Electronics and IT (MeitY); Dr Preet Deep Singh, Vice President apna; Dr Dhawal Gupta, Group Business Director, Chase India; and Anirban Deb, Senior Manager, Chase India

Gurus:

Goldie Dhama, Partner, Deloitte India; Neha Aggarwal Jain, Partner, Deloitte India

Innovative policymaking is crucial for fostering sustainable development. Such innovations enable governments to respond effectively to rapid changes in their environment. As digital tools evolve, their growing impact on policy formulation and implementation will enhance the capabilities of the government, industry and civil society. Conventional solutions are often insufficient for addressing complex societal problems. This *Manthan* explored how a proactive stance towards policy development can drive change.

The role of digital solutions

Digital tools, such as the Government of Andhra Pradesh's SAP dashboard, enable real-time governance but require broader integration.

Digital systems and solutions are central to modern governance, enhancing efficiency, accountability and citizen participation. Integrating information technology into policymaking allows for informed decisions that better address the diverse needs of today's population.

Goldie Dhama emphasized the importance of Information and Communication Technology (ICT). ICT tools can streamline processes, making them faster and more accessible to citizens. Moreover, Data, when combined with ICT tools, significantly enhances policymaking. ICT tools facilitate the collection, analysis and dissemination of vast amounts of data, providing real-time insights and enabling evidence-based decisions. This technology also improves the flow of information between government organisations and the public, ensuring transparency and engagement.

Public-Private Partnerships

Public-private partnerships have been both a hit and a miss in this country. Sometimes, it ends up being a single-vendor situation.

Neha Aggarwal Jain

Both governmental and non-governmental organisations play key roles in policy implementation. Collaboration between these sectors uses their respective strengths to drive innovation. Moreover, PPPs facilitate risk-sharing, ensuring that both sectors are invested in the successful implementation of policies. At the session, case studies highlighted the positive outcomes of such collaborations.

Neha Aggarwal noted that private entities bring technological expertise to the table. This expertise can support public institutions in designing efficient service delivery structures. By combining strengths, these collaborations can result in policies that effectively address the broader population's needs, ensuring impactful and sustainable solutions.

Inclusivity in policymaking

Any policy must account for India's diverse demography. Inclusivity is vital to ensuring that everyone has equal opportunities. During the session, techniques for engaging different stakeholders in policy decisions were a key focus.

Chase India's Anirban Deb emphasized the importance of amplifying citizen voices in policymaking. The consensus was that policies developed with community involvement are more likely to succeed. Engaging citizens in policy formulation fosters a sense of ownership, leading to higher compliance and better outcomes. Involving the broader population is crucial to shaping effective and sustainable policies.

Addressing future challenges

Future policies need regular reviews and flexibility to adapt to evolving business and societal needs.

This analysis highlights the evolving nature of policymaking. ICT addresses contemporary business challenges by using emerging technologies. Future policies must be proactive to anticipate and overcome potential obstacles.

During the discussions, experts highlighted several key areas for focus. These included climate change, digital literacy and the economic divide. Addressing these issues in policy formulation is crucial for developing reliable and future-proof strategies. Aligning these factors within policies will help create sustainable and effective approaches to future challenges.

Building a collaborative ecosystem

Creating an environment conducive to innovation requires collaboration across sectors. The session served as a reminder of the power of collective efforts. By working together, stakeholders can share knowledge and resources.

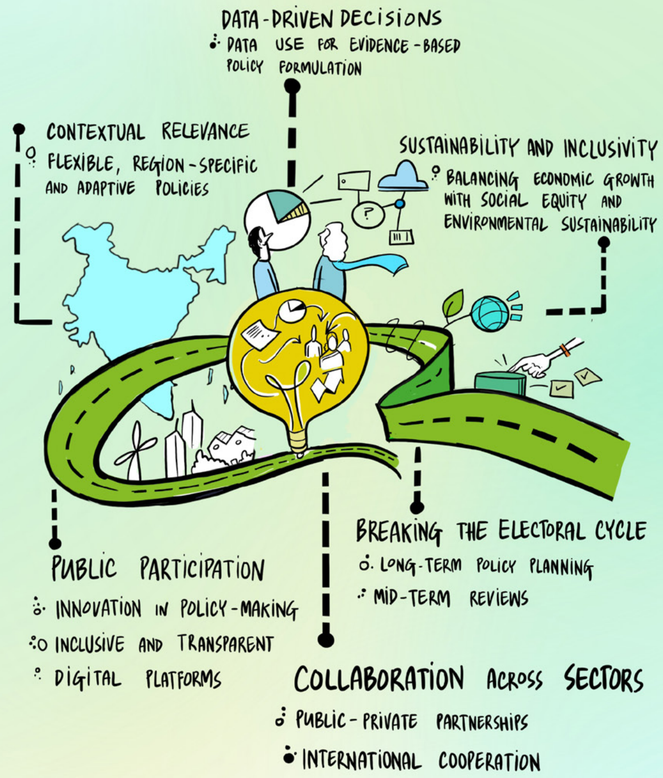
The key to effective collaboration is listening to as many people as possible, but not thinking that your view is the only view.

Goldie Dhama

The dialogue focused heavily on continuous training. Authorities must remain open to new ideas and practices. This flexibility will enable them to adapt to evolving conditions and integrate innovations effectively into their practices. Embracing change is essential for creating policies that stay relevant and responsive to future challenges.

Key takeaways

- **Transformative policy approaches:** To realise the vision of *Viksit Bharat@2047,* India needs a revolutionary shift in its policymaking paradigms. Traditional bureaucratic approaches may hinder progress in a connected, ICT-enabled world. A transformative approach that is responsive to citizens' needs and aligned with global policies is essential.
- **ICT integration in governance:** The use of ICT in policymaking enhances efficiency, accountability and citizen involvement. Digital systems enable informed decision-making and improve communication between government bodies and the public.
- **Public-private collaboration:** Successful policy implementation requires strong collaboration between governmental and non-governmental organisations. The *Manthan* highlights how private entities, particularly in technology, can assist the public sector in designing structures for effective service delivery.
- **Inclusivity in policy formulation:** Policy formulation must consider India's diverse demography. Engaging citizens in the decision-making process increases compliance and ensures that policies reflect the needs of all segments of society.
- **Focus on emerging issues:** Experts at the conference identified critical areas for future-ready policies, including climate change, digital literacy and bridging the economic divide. Addressing these issues in policy development is crucial for creating resilient and proactive strategies for the future.
- **Continuous learning and adaptation:** Stakeholders must embrace continuous training and remain receptive to new ideas and practices. Innovation can be institutionalised through cross-sector collaboration when authorities and organisations embrace flexibility. This adaptability ensures policies remain relevant as challenges evolve.



6 | Trust: The security and justice imperative

Building a secure and just future for India, where trust forms the foundation of cyber defences, transparent policies, advanced tech and equitable access to justice, is essential for protecting its growing digital economy, ensuring national security and promoting social equity.

In a world that is becoming more digitally connected, trust is now the cornerstone of justice and security. Maintaining trust in our digital spaces and legal systems is essential as technology transforms almost every part of our lives. Public confidence in the institutions in charge of national security, governance and equitable access to justice is based on trust, which supports individual safety and privacy. This important idea is examined in the four chapters under *Trust: The security and justice imperative,* which provide guidance on establishing and preserving trust in both the legal and digital spheres.

Strong cyber defences are essential to national security as cyberthreats become more sophisticated. The chapter, *Securing the nation's cyber defence and strengthening connectivity,* includes the key takeaways from a panel discussion on *Fortifying Digital Infrastructure – Elevating Cyber Defence for a Secure, Resilient and Vibrant Nation.* Various leaders also speak on *Building a Secure and Viksit Bharat.*

The chapter, *Designing trust-first policies,* includes a *Manthan* on Building trust with Sovereign Cloud – *Policy, Technology and Strategy.* This chapter delves into the importance of creating transparent, accountable policies that protect user data and privacy, emphasizing that sovereign cloud ecosystems enable compliance with local regulations and enhance overall data sovereignty. The *chapter on Decoding and optimising modern SoCs* comprises a *Manthan* on demystifying modern SoCs in hybrid and hyperconnected environments. This chapter examines how optimising SoCs for security, reliability and efficiency can strengthen device performance while protecting sensitive data.

The chapter on *Ensuring fair and timely justice for all* covers two sessions. In the first session, the Honourable Minister of State (IC) for Law & Justice, Arjun Ram Meghwal, speaks on the story of transforming law and justice in Digital India. The second is a *Manthan* on envisioning a user-centric justice system. Both sessions discuss strategies for ensuring accessible, transparent and timely justice.

All four chapters offer a comprehensive guide to building a trust-based foundation in security and justice.

6a. Securing the nation's cyber defence and driving sustainable growth

Lieutenant General N. S. Raja Subramani
PVSM, AVSM, SM, VSM,
Vice Chief of Army

Rajendra Kumar
Secretary (Border Management),
Ministry of Home Affairs,
Government of India

Cybersecurity and self-reliance in defence are pillars of a strong Bharat, ensuring safety, sovereignty and sustainable growth.

India's journey to becoming a secure, resilient and digitally empowered nation hinges on a strong commitment to cybersecurity and self-reliance in defence. As digital infrastructure expands, this rich landscape also faces evolving cyberthreats. This, in turn, necessitates the urgency of high-quality defence mechanisms to protect India's digital economy and safeguard sensitive citizen data. At the heart of that nation's fortified digital framework are initiatives such as zero-trust cybersecurity models and AI-driven threat detection, which provide proactive, rapid responses to dynamic threats.

This also highlights the roles of citizens and cross-sectoral collaborations in building an enduring digital environment, with multi-stakeholder efforts such as the National Cybercrime Reporting Portal (NCRP) and the Indian Cybercrime Coordination Centre (I4C) being instrumental building blocks for a resilient digital ecosystem.

Furthermore, India's drive towards self-reliance in defence, rooted in indigenous manufacturing and technological advancement, is also crucial. India's advancements in geospatial intelligence and real-time data analytics for enhanced border security and disaster response are all made possible through PPPs. By reducing foreign dependencies through homegrown defence production, India strengthens both its sovereignty and national security. Taken together, these projects collectively create the image of a technologically advanced and resilient Bharat ready to lead the world.

Leaders Speak: Building a Secure Bharat, A Viksit Bharat
Speakers:
Lieutenant General N. S. Raja Subramani, PVSM, AVSM, SM, VSM, Vice Chief of Army; Dr Rajendra Kumar, Secretary (Border Management), Ministry of Home Affairs, Government of India

Moderator:
Anthony Crasto, President, Assurance, Deloitte South Asia

Digital security is the backbone of a resilient, self-reliant India, driving the nation forward to *Viksit Bharat 2047*.

As India rapidly expands its technological capabilities, the integration of advanced technologies is key to protecting borders, enhancing internal security and supporting disaster management.

Directing the nation's defence sector towards self-reliance and augmenting strong cyber defence measures are necessary to protect the sovereignty of the country as well as safeguard the interests of its citizens. These strategic initiatives and technological advancements were discussed by Lieutenant General N.S. Raja Subramani and Dr Rajendra Kumar in this special panel. Over the course of this discussion, both speakers highlighted the importance of indigenisation, cybersecurity, data management and PPPs in building a secure Bharat.

Integrating AI and advanced technologies in defence and security

AI empowers our armed forces to make rapid, informed decisions, ensuring that India remains secure in an increasingly complex world.

Lieutenant General N. S. Raja Subramani
PVSM, AVSM, SM, VSM, Vice Chief of Army

As India's defence sector continues to build an effective digital arsenal, AI-driven solutions for optimising decision-making and real-time surveillance have also seen integrated usage. Just as the government has integrated AI into logistics and health monitoring systems in other sectors, AI-based solutions' capacity to process vast amounts of data allows them to power novel military systems, including those used for autonomous weaponry and strategic operations. Emphasizing the role of data centres, esteemed Lt. General Subramani noted the importance of secure data processing to facilitate faster, informed decisions in critical scenarios.

The use of geospatial intelligence further enhances India's security framework. Real-time satellite imagery, drones and remote sensing technologies provide precise situational awareness in disaster-prone areas and border regions, where threats such as smuggling and infiltration are common. These advanced technologies, combined with real-time monitoring systems, enable the Indian defence forces to proactively address both internal and external security challenges.

Strengthening cybersecurity

From zero-trust cybersecurity to sovereign data clouds, India's secure digital infrastructure is a model of resilience and strategic foresight.

With digital expansion comes an increase in cyberthreats, and cybersecurity is now considered essential for a secure Bharat. Embracing a zero-trust policy for cybersecurity, India's strategy includes securing government systems on sovereign clouds and establishing multiple Centres of Excellence (CoE) in collaboration with leading academic institutions, such as IIT Delhi and IIT Madras. The I4C plays a central role, providing a framework for coordinating cyber defence across federal and state agencies and supporting real-time response to cyber incidents.

The creation of platforms such as the NCRP enables citizens to report incidents while multi-stakeholder teams respond rapidly to mitigate risks. This infrastructure, combining public and private expertise, ensures that India's digital ecosystem remains secure and resilient in the face of evolving cyberthreats.

Data as a strategic asset

Data is the new strategic asset, and sovereign cloud infrastructure is crucial for safeguarding sensitive information and supporting real-time intelligence.

Dr Rajendra Kumar
Secretary, Border Management, Ministry of Home Affairs, Government of India

Recognising that data is the new oil, the Indian government has implemented sovereign cloud infrastructure to securely store and process government data. Data analytics plays a critical role in intelligence gathering, especially in military operations where quick, accurate insights are essential. For instance, real-time data analysis enables better responses to border threats and improves efficiency in handling large-scale operations. The integration of Augmented Reality/Virtual Reality (AR/VR) networks and dedicated data centres across the armed forces enhances data accessibility, reduces redundancy and enables coordinated action among military branches.

A secure Bharat is the foundation of a Viksit Bharat. By combining technological innovation, cyber resilience and self-reliance in defence, we are shaping a future where national security and digital empowerment go hand in hand.

Anthony Crasto

Moreover, real-time data processing across departments and quick integration with other security agencies ensure India's defence system remains agile and responsive, effectively addressing threats at every level.

Advancing indigenisation in the defence sector

A self-reliant defence sector is vital for national security. "Design, Develop and Make in India" is more than just a slogan; it's our roadmap to resilience.

India's self-reliance in defence is fundamental to maintaining national security and reducing dependence on foreign sources for military equipment. The government is working with MSMEs and academic institutions to bolster indigenous manufacturing capabilities. Through PPPs, defence projects such as Tejas aircraft development and indigenous drone manufacturing are gaining momentum. This focus on "Design, Develop and Make in India" aligns with the broader vision of a self-sufficient defence sector, which includes establishing incubation centres and CoEs dedicated to R&D in defence technologies.

As stressed previously, indigenisation supports national security, creates a robust defence ecosystem, expanding manufacturing bases and ensuring that India can maintain and enhance its defence capabilities independently.

Panel: Fortifying Digital Infrastructure – Elevating Cyber Defence for a Secure, Resilient and Vibrant Nation

Participants:

Laxmi Singh, Commissioner of Police, Gautam Buddha Nagar, Government of UP; Dr Amit Sharma, Advisor (Cyber) and Additional DG, Office of Secretary, Department of Defence (R&D), Ministry of Defence; G Narendra Nath, Joint Secretary, NSCS

Moderator:

Gaurav Shukla, Partner, Deloitte India

A resilient digital infrastructure is the backbone of a secure, inclusive and future-ready India.

In today's digital age, a secure and resilient cyber infrastructure is foundational to India's ambition of becoming a US$1 trillion digital economy. India has witnessed exceptional growth in its Digital Public Infrastructure, with notable achievements such as Aadhaar, the world's largest biometric system, and UPI, a widely used instant payment system. These advancements have propelled the country into the digital age, driving greater connectivity, promoting inclusivity and improving service delivery across the nation.

With this context in mind, however, it is still important to remember that cybersecurity is no longer just a technical issue. It represents a cornerstone of national resilience that impacts every facet of society, ranging from citizen safety to economic health. That is why it is crucial to fortify digital infrastructure by using a full understanding of what good defence systems need across critical sectors. Initiatives such as *Cyber Surakshit Bharat* play a vital role in enhancing the security and resilience of the nation's digital framework. When these are paired with enhanced digital literacy and collaborative PPPs to protect and empower citizens in an increasingly digital landscape, only then can the nation advance to realise its vision of *Viksit Bharat 2047.*

Expanding cyber defence across critical sectors

Each sector has unique vulnerabilities, and cybersecurity protocols must be tailored to address them effectively.

G Narendra Nath
Joint Secretary, NSCS

From telecom to financial services and beyond, robust cybersecurity protocols must be upheld for every sector that operates in India's burgeoning digital ecosystem. This translates to implementing secure-by-design principles in system architecture, adopting a zero-trust model across devices and networks and fortifying systems against Advanced Persistent Threats (APTs).

A notable solution that can assist in this regard is the National Malware Repository. This initiative uses AI-based threat detection capabilities and provides organisations with insights into malware trends and preventative measures across various operating systems and platforms. This collaborative tool is essential for national security, allowing public and private agencies to strengthen their defences against the rapidly evolving cyberthreat landscape.

Collaborative PPPs for enhanced cyber resilience

An effective response to cyberthreats requires strong collaboration between government, industry and academia. Achieving this requires critical PPPs for intelligence sharing, capacity building and the development of advanced cybersecurity solutions.

A cyber-aware society begins with every individual being equipped with the knowledge to recognise and report risks.

Laxmi Singh
Commissioner of Police, Gautam Buddha Nagar, Government of UP

Through joint initiatives such as CENCOPS (a fusion centre integrating data across 112 emergency systems, forensics and law enforcement), India can enhance real-time response capabilities and strengthen data integrity across critical systems. By using resources and expertise from both sectors, these collaborations aim to provide a robust defence structure that can scale alongside India's digital growth.

Building a digitally literate and cyber-aware society

Building a secure digital society depends on citizens being digitally literate and aware of cyberthreats. To this effect, "cyber hygiene" is an important educational front that must be taught, encouraging users to remain vigilant and report suspicious activity when identified.

Initiatives such as the *Chakshu Portal* empower citizens to report cyber fraud in real time, increasing awareness and helping law enforcement agencies identify emerging threats quickly. Additionally, simplifying processes for citizens to recognise trusted sources, such as standardised bank URLs and SMS codes, minimises risks and enhances public trust in digital interactions.

Adopting AI-driven solutions and advanced technologies

Technology is never good or bad. It's the application. Somebody uses it incorrectly, but the same technology can still be used for positive purposes.

Dr Amit Sharma
Advisor (Cyber) and Additional DG, Office of Secretary, Department of Defence (R&D), Ministry of Defence

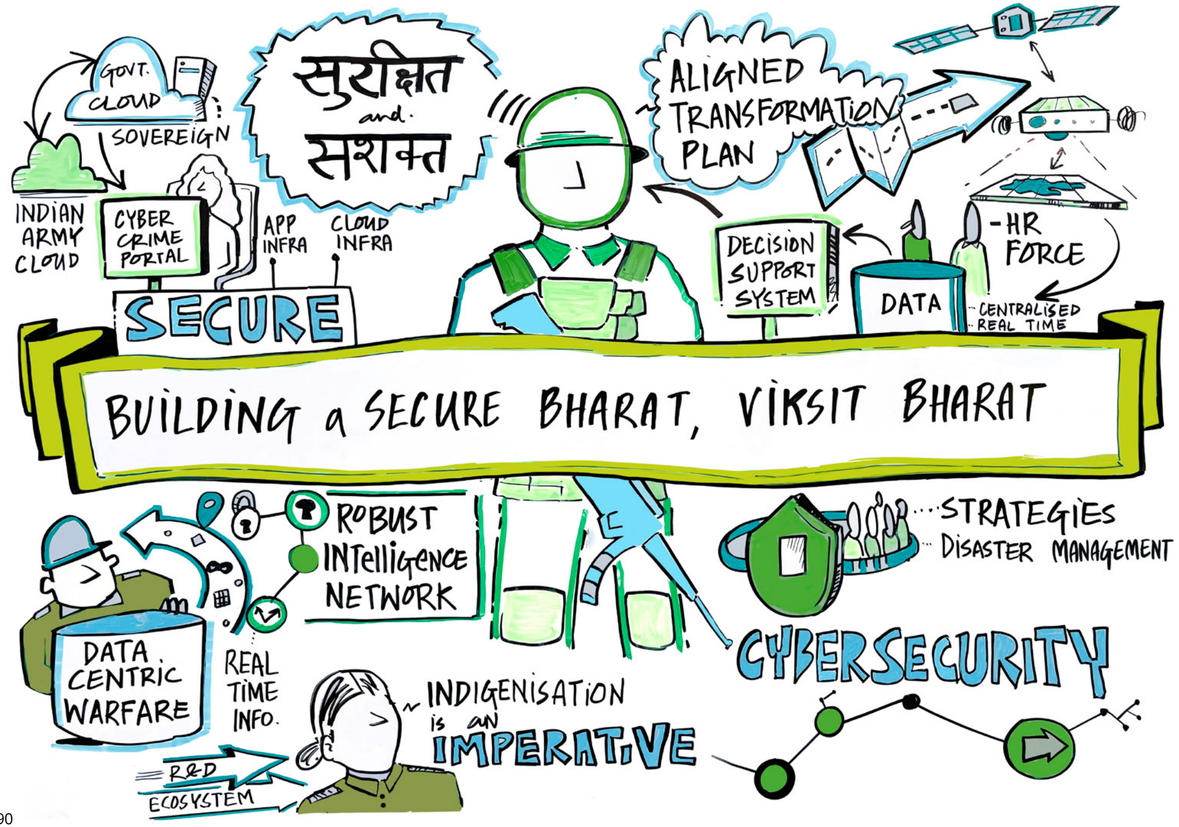
Traditional security approaches have become obsolete in the present cyber landscape. Our response systems and next-generation technologies need agility to combat sophisticated threats. With digital boundaries extending beyond office premises to remote workplaces and devices, security paradigms must adapt accordingly. As cybercriminals increasingly use sophisticated tools, the role of AI in cybersecurity becomes paramount. AI-driven solutions allow for rapid detection of anomalies and predictive analysis, helping organisations anticipate and mitigate threats before they escalate.

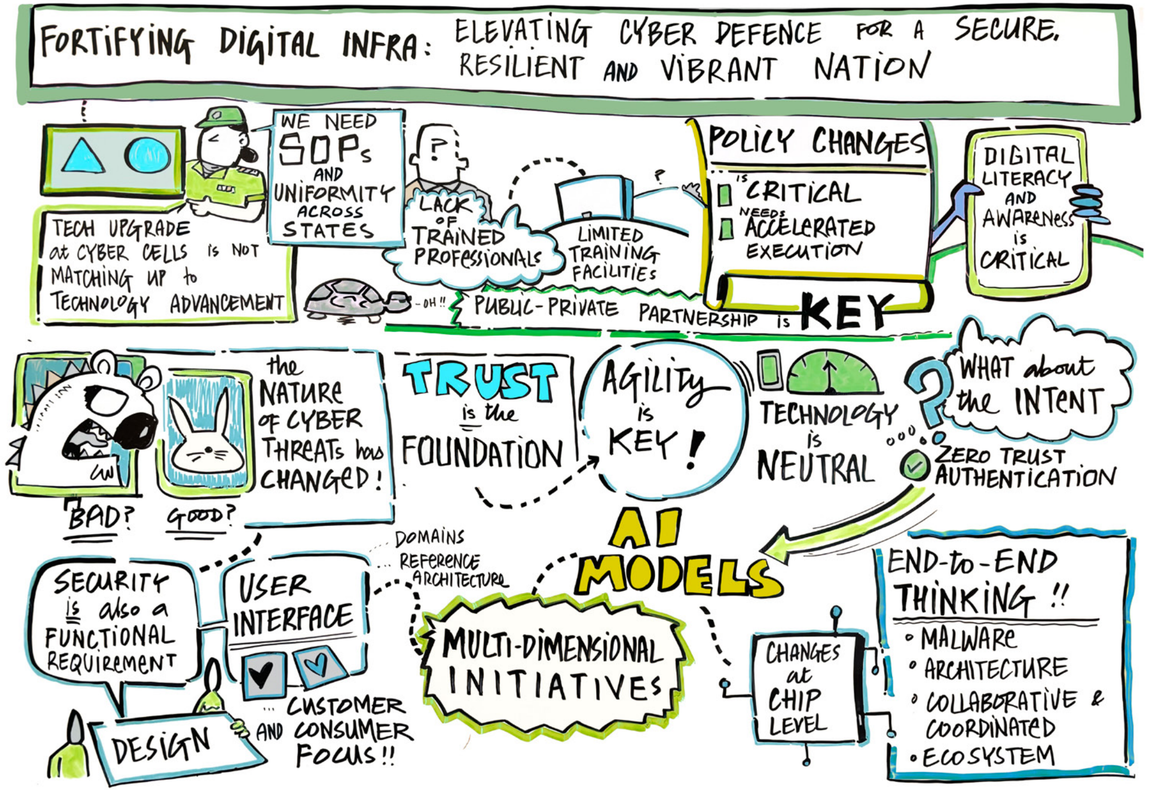
By opting for AI-based endpoint protections and zero-trust architecture for digital assets, only verified users and devices can access vital data, even within internal systems. The integration of AI with other advanced threat monitoring tools can provide a proactive, as opposed to reactive, defence posture against complex cyberattacks on critical infrastructure.

Ārohaṇa (आरोहण) | Growth with impact

Key takeaways

- **Sector-specific cybersecurity measures:** Each sector needs to implement unique protocols, from zero-trust models to malware detection repositories, to address specific vulnerabilities and bolster national cybersecurity resilience.
- **PPPs and intelligence sharing:** Collaborative initiatives such as CENCOPS enhance real-time response and data integrity, fostering a robust defence framework through shared resources and expertise.
- **Digital literacy and public cyber awareness:** Educating citizens on cyber hygiene and simplifying the recognition of legitimate digital interactions, such as secure bank SMS codes, is essential for reducing vulnerabilities and empowering users.
- **AI-driven threat detection and zero-trust architecture:** Integrating AI into cybersecurity, including endpoint protection and anomaly detection, offers proactive protection, allowing India to stay ahead of advanced cyberthreats.
- **Security-by-design in system design:** Embedding security as a functional requirement in digital systems ensures a security-by-design architecture, establishing a foundation of trust and resilience from the ground up.
- **AI-driven defence and surveillance:** AI is integral to modern defence, enhancing decision-making, real-time monitoring and logistics, allowing India's armed forces to maintain a strategic advantage.
- **Data sovereignty and real-time analytics:** Secure data storage and real-time analytics on sovereign cloud platforms enable faster, data-driven decisions crucial for national security.
- **Indigenisation and PPPs:** Promoting indigenous defence manufacturing through PPPs reduces foreign dependency and fosters a resilient domestic defence ecosystem.
- **Geospatial intelligence for security and disaster management:** Using geospatial technology enhances situational awareness across border security and disaster management, ensuring a proactive approach to both natural and human-made threats.


GOVT. CLOUD
SOVEREIGN
INDIAN ARMY CLOUD
CYBER CRIME PORTAL
APP INFRA
CLOUD INFRA
SECURE
सुरक्षित and सशक्त
ALIGNED TRANSFORMATION PLAN
DECISION SUPPORT SYSTEM
DATA
HR FORCE
CENTRALISED REAL TIME
BUILDING a SECURE BHARAT, VIKSIT BHARAT
ROBUST INTelligence NETWORK
DATA CENTRIC WARFARE
REAL TIME INFO.
STRATEGIES
DISASTER MANAGEMENT
CYBERSECURITY
INDIGENISATION is an IMPERATIVE
R&D ECOSYSTEM


FORTIFYING DIGITAL INFRA: ELEVATING CYBER DEFENCE FOR A SECURE, RESILIENT AND VIBRANT NATION
TECH UPGRADE at CYBER CELLS is NOT MATCHING UP to TECHNOLOGY ADVANCEMENT
WE NEED SOPs AND UNIFORMITY ACROSS STATES
LACK of TRAINED PROFESSIONALS
LIMITED TRAINING FACILITIES
POLICY CHANGES
is CRITICAL
needs ACCELERATED EXECUTION
PUBLIC-PRIVATE PARTNERSHIP is KEY
DIGITAL LITERACY AND AWARENESS is CRITICAL
BAD?
GOOD?
the NATURE of CYBER THREATS has CHANGED!
TRUST is the FOUNDATION
AGILITY is KEY!
TECHNOLOGY is NEUTRAL
WHAT about the INTENT
ZERO TRUST AUTHENTICATION
AI MODELS
DOMAINS
REFERENCE ARCHITECTURE
SECURITY is also a FUNCTIONAL REQUIREMENT
USER INTERFACE
CUSTOMER AND CONSUMER FOCUS!!
DESIGN
MULTI-DIMENSIONAL INITIATIVES
CHANGES at CHIP LEVEL
END-to-END THINKING !!
MALWARE
ARCHITECTURE
COLLABORATIVE & COORDINATED
ECOSYSTEM

6b. Designing trust-first policies

Distributed Cloud AirGap is a pioneering solution that combines cloud power with complete ownership and control for enterprises.

Trust is a fundamental element of governance in the digital age. As governments rely on digital technologies to enhance public services and improve citizen satisfaction, ensuring the protection and sovereignty of national digital systems is paramount. At the heart of this digital transformation lies the concept of a sovereign cloud, a technology framework that allows nations to retain control over their data, software and operations.

Manthan: Building Trust with Sovereign Cloud – Policy, Technology and Strategy

Participants:

Kshitij Kushgra, Scientist, MeitY; Brigadier S Balakrishnan, Army (MoD); Colonel Nishant Rathee, Army (MoD); Amrish Kohli, Google Cloud; Kapil Kapoor, Google Cloud; Vinamra Jain, Google Cloud; Mohit Gulati, Google Cloud.

Gurus:

Amit K Singh, Partner, Deloitte India; Ritesh Pal, Partner, Deloitte India

During the *Manthan,* "Building Trust with Sovereign Cloud," experts from industry, government and technology came together to explore the role of sovereign cloud in shaping India's digital future. They emphasized the importance of trust-first policies underpinned by cloud sovereignty to safeguard sensitive data and ensure the success of India's digital transformation.

Data sovereignty: A necessity in today's cloud solutions

Data sovereignty was a recurrent theme in the session. With ever-escalating data privacy and cybersecurity threats, keeping sensitive information within national borders has become non-negotiable. Data-sensitive entities, such as defence and government, are especially focused on maintaining control over data for security reasons. The sovereign cloud solution presented by Google Distributed Cloud (GDC) addresses this need by offering an environment where data remains within the country's borders, with no external access or transfers. By combining the strengths of a public cloud with the operational independence of a sovereign cloud, GDC provides the flexibility and control that sensitive industries require.

Data sovereignty goes beyond security; it ensures that critical national assets remain within the control of the nation.

Software sovereignty and the open-source approach

Unlike data sovereignty, which ensures ownership of critical information, software sovereignty seeks to minimise reliance on certain systems. The session speakers explained how hyperscalers (large cloud service providers) often lock their customers into using their software.

Software sovereignty is about having the freedom to choose and control the technology stack that best serves your mission without being locked into a single provider.

Ritesh Pal

This becomes a problem when the goal is to enable independent process automation for some specific functions, especially in governments and defence sectors.

To address these concerns, Google has introduced the use of open-source software within its GDC solution. This approach allows organisations to run their operations without being tied to a specific provider's proprietary technology. GDC ensures that organisations can manage their workloads independently without relying on third-party vendors for critical updates or maintenance.

The influence of geopolitical risks on cloud adoption

As the global geopolitical landscape becomes more volatile, the dependence on foreign cloud service providers for sensitive and critical applications is apprehensive. The session emphasizes the necessity of operational sovereignty, which goes beyond merely owning data and software.

In today's geopolitical climate, survivability and control over mission-critical workloads are paramount. We cannot afford to be reliant on external forces when national security is at stake.

Amit K Singh

Google's GDC solution, particularly its AirGap component, is designed to mitigate these risks. The AirGap system operates entirely offline, isolated from the public internet, ensuring that even the most sensitive operations are carried out securely within national borders. This feature is critical for defence and government agencies, as it guarantees that their operations remain shielded from external geopolitical pressures.

The power of GDC and Vertex AI

The session also introduced participants to the advanced capabilities of the GDC solution, particularly its integration with Vertex AI. This AI-driven functionality allows organisations to process large amounts of data on-premises, ensuring that critical data is analysed securely and efficiently.

This synergy of advanced AI with secure cloud networks enables organisations to have the solutions they need in the new context of a data-oriented environment. Whether analysing videos, translating text or using AI, the GDC solution enables sensitive industries to harness these opportunities while having full control over their operations.

Modularity and flexibility: Addressing the integration challenge

One major theme of the session was tackling the challenge of integrating sovereign cloud solutions with current systems. For many organisations, the fear of vendor lock-ins and the complexity of integrating new solutions into legacy systems can be significant barriers to cloud adoption.

Google's solution to this problem lies in its modular and flexible

We are addressing the interoperability challenge by making solutions modular and open, allowing easy integration and expansion.

architecture. The GDC platform is designed to easily integrate with existing systems, allowing organisations to scale their operations without being locked into a specific provider's ecosystem. By offering a modular approach, GDC empowers organisations to adopt new technologies and expand their operations without costly overhauls or vendor dependencies.

Achieving a future of innovation and sovereignty

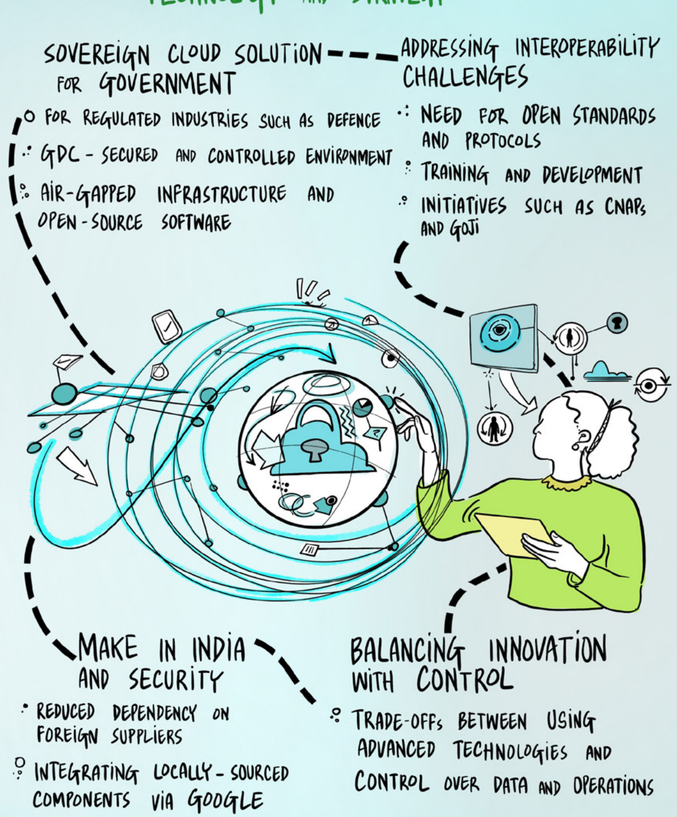
In conclusion, as organisations in highly regulated sectors continue to navigate the complexities of cloud adoption, sovereign cloud solutions, such as GDC, are becoming increasingly essential. The insights shared during the *Manthan* make it clear that building trust with sovereign cloud solutions is a strategic and practical necessity in today's geopolitical landscape.

Tailored cloud solutions are essential as they balance regulatory compliance, operational control and cutting-edge technology to drive secure, mission-critical workloads forward.

As India continues to innovate and adopt new digital solutions, the role of trust-first policies will become even more critical. By prioritising sovereignty, transparency and accountability, India is securing its digital future and setting a global standard for digital governance.

Key takeaways

- **Sovereign cloud solutions are essential for regulated sectors:** Sovereign cloud platforms, such as GDC, are vital for industries dealing with sensitive data. By ensuring that data and operations remain within national borders, these solutions offer the control needed to protect critical workloads.
- **Open-source software reduces vendor lock-in:** By using open-source software, organisations can maintain control over their technology stack without being tied to proprietary systems. This flexibility is critical for sectors that require full autonomy.
- **Geopolitical risks demand operational sovereignty:** In an unpredictable geopolitical environment, organisations must ensure that they can operate independently. GDC's AirGap technology provides the operational sovereignty needed for secure, mission-critical operations.
- **Modular and flexible cloud infrastructure:** Google's GDC platform addresses the challenge of integration by offering a modular approach that allows organisations to scale and evolve their operations without vendor lock-in.



6c. Decoding and optimising modern SOCs

Robust SOCs combine technology, skilled employees and advanced processes to handle the complexities of modern cybersecurity.

With the rapid digitisation globally, strong cybersecurity measures have also grown in importance. Entities in the public sector, charged with sensitive data and critical operations, are increasingly coming under cyberattacks. Complex threats, particularly those backed by states and using AI, are on the rise, making traditional Security Operations Centres (SOCs) increasingly insufficient.

In particular, the rapid growth of India's DPI has positioned it as the second-largest mobile and internet market worldwide. As a result, governments will adopt technologies such as cloud computing, Operational Technology (OT) and Industrial Control Systems (ICS), requiring modern SOCs to adjust their techniques to protect these highly connected environments against targeted threats.

Manthan: Demystifying Modern SOCs in Hybrid and Hyperconnected Environments

Participants:

Dr M. K. Sharma, Group Captain, Indian Air Force; Kamal Kumar Agarwal, DDG (Quantum Tech), TEC, Department of Telecom; Bhupesh Janoti, Senior Programme Manager, Data Security Council of India (DSCI); Vineet Kshirsagar, Palo Alto (Alliance); Ankush Charagi, Palo Alto (Alliance); Brig. N. R. Pandey, Indian Army; Manish Anand, Indian Army; Lt Col S. Anirudha Rao, Indian Army; Shaleen Khetarpal, CISO, BSES; Sunil Kumar, CISO, Power Grid Corporation of India Limited; Sanjay Kumar, CISO, IREDA; Col Nishant Rathee, Indian Army; Brig. S. Balakrishnan, Indian Army.

Gurus:

Gaurav Shukla, Partner, Deloitte India; Anand Tiwari, Partner, Deloitte India

This *Manthan* brought together Deloitte and other industry experts for a compelling discussion on the complexities, components, challenges and strategies shaping the evolution of SOCs in India's digital ecosystem.

The changing landscape of cybersecurity

The traditional SOC model was designed for a simpler IT environment, but the integration of cloud, OT and ICS has introduced a complex threat landscape. Public sector organisations now handle vast amounts of sensitive data, including data from biometric systems and national digital payment platforms. India processes one of the highest volumes of digital payment transactions globally, making it a prime target for cybercriminals.

Today, SOCs must defend against APTs and state-sponsored cyberattacks. Experts from the DSCI emphasize that the modern digital infrastructure demands SOCs capable of monitoring real-time data and integrating advanced technologies for threat detection and response. Neglecting to act leaves our infrastructure at risk, as the costs of recovering from catastrophic cyberattacks are significantly higher than the minimal investment required by cybercriminals to launch such attacks.

Core components of a modern SOC

A modern SOC must go beyond securing IT systems; it must also integrate cloud platforms, OT devices and physical security systems. Key components include the following:

- **Comprehensive log ingestion and monitoring:** With the growing diversity of systems, SOCs must ingest data from multiple sources, such as the cloud, OT and ICS, to maintain a complete view of security events. Real-time monitoring is essential to identify unauthorised access or anomalous behaviours.
- **Advanced threat intelligence and incident response:** AI-powered threat intelligence allows SOCs to anticipate potential attacks and respond rapidly. Automation of routine tasks enables faster and more accurate detection and mitigation, improving overall SOC efficiency.
- **Automation and AI integration:** Automation is critical for managing large volumes of security data. AI-driven systems can sift through security logs, flag potential risks and trigger initial response actions, allowing employees to focus on strategic decision-making.
- **Skilled workforce:** A skilled workforce is essential despite the rise of automation. SOC teams must stay updated on evolving cyberthreats and technologies. Continuous learning is necessary to manage complex hybrid environments and use AI effectively.

Air-gap networking in high-security environments

Air-gapped networks offer protection but require vigilant monitoring to prevent breaches through vendor systems or indirect connections.

Air-gapped networking is often used in highly sensitive environments, such as government or industrial operations, where systems are physically isolated from external networks. While this creates a robust layer of protection, air-gapped systems are not immune to breaches. This was highlighted by the case of a European utility company with air-gapped infrastructure. The company experienced a severe cyberattack when a vendor's laptop, temporarily connected for troubleshooting, became the entry point. The breach demonstrated the vulnerabilities that exist, even in supposedly isolated systems.

Additionally, modern adversaries may exploit physical methods, such as USB malware or wireless attacks, via drones, making it necessary to monitor air-gapped environments with the same vigilance as interconnected ones. Strong policies, regular auditing and endpoint visibility are essential to managing these risks. Even air-gapped systems require layered defences and comprehensive monitoring to ensure security.

Integration with broader cybersecurity frameworks

Modern SOCs must collaborate across departments and with external stakeholders, particularly in government entities where coordination is crucial. Public sector organisations often manage diverse datasets, making it necessary to integrate SOC operations into a larger national or sector-wide cybersecurity framework.

To achieve this, Indian SOCs must protect critical digital infrastructure by securing a range of public-facing services, such as biometric systems and digital payment gateways. This involves close collaboration with private companies and regulatory bodies, ensuring that SOC strategies align with broader cybersecurity objectives.

Compliance and regulatory requirements

Public sector organisations face unique cybersecurity challenges, making a robust SOC essential for protecting mission-critical data and infrastructure.

Public sector SOCs face stringent regulatory requirements for data protection. Ensuring compliance with these laws is essential, and modern SOCs must be built with these regulations in mind. Failing to do so can result in fines, operational shutdowns and reputational damage.

A participant made a compelling comparison, likening an SOC to a casino environment. Unlike a checkpoint that only verifies credentials, a SOC should continuously monitor user behaviour, detecting anomalies such as a card counter at a table rather than relying solely on static access controls. The key takeaway was that modern threats are more than just entering through the front door; they also exhibit unusual behaviour once inside.

The discussion then shifted to threat tolerance, emphasizing that organisations must define their risk appetite and visibility requirements to avoid overwhelming security operations. The need for behavioural baselining was highlighted, stressing the importance of understanding what “normal” behaviour looks like for users and systems so deviations can be identified early, especially in light of how easily stolen credentials and default passwords can be exploited if ignored.

SOCs must continuously audit their practices to stay aligned with changing regulatory frameworks, particularly regarding data privacy laws. This requires SOCs to balance real-time threat management with ongoing regulatory obligations.

Addressing blind spots and blurred visibility

Blind spots are more prevalent now because of the sheer amount of available data. As we are all so focused on the bigger picture, our attention is now being drawn away from more specific cybersecurity issues.

In hyperconnected environments, SOCs face two major visibility challenges, namely blind spots and blurred visibility. Blind spots arise in areas that are not properly monitored, such as testing environments left exposed to external networks. Meanwhile, blurred visibility occurs when SOCs are overwhelmed by vast amounts of data from multiple endpoints, making it difficult to focus on critical threats.

The participants collectively emphasized that a modern SoC is no longer just a reactive setup; it must detect, respond and adapt in the near real time.

As cyberthreats evolve, SOCs need tools to sift through large volumes of data and isolate high-priority incidents. Proactive measures, such as Attack Surface Management (ASM) and endpoint detection, can mitigate these risks. SOCs must have visibility across network layers, especially in hybrid and hyperconnected environments where the attack surface is constantly expanding.

Ārohaṇa (आरोहण) | Growth with impact

Evolving threats and adaptive strategies

Cybersecurity today requires more than just defence; it demands continuous evolution, integration and constant understanding of how threats evolve.

Gaurav Shukla

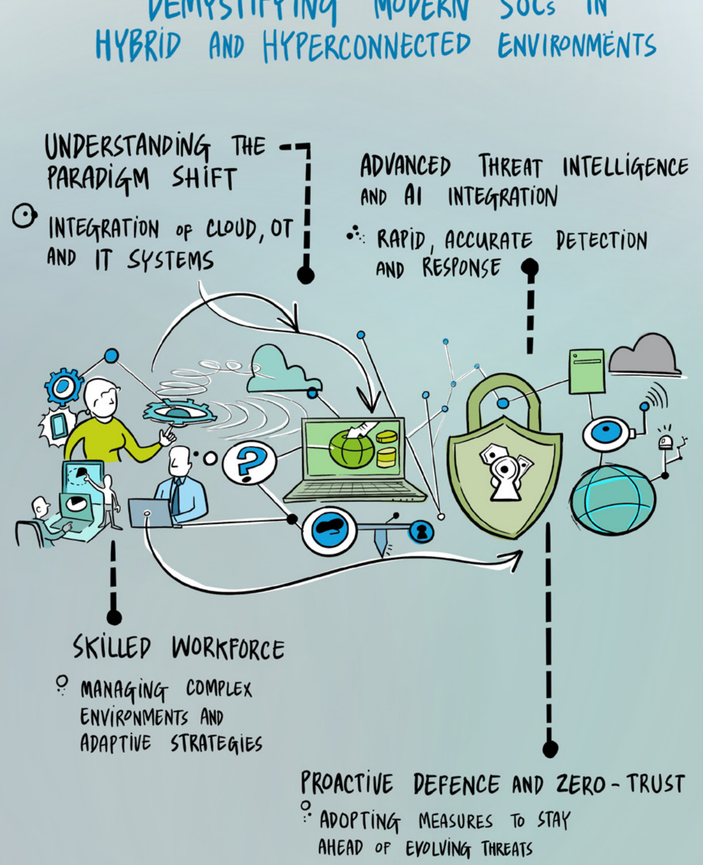
Cyberthreats continue to evolve, requiring SOCs to remain agile and adaptive. The zero-trust model, where every action within the network is treated as potentially hostile, has gained traction in this context. SOCs implementing zero-trust principles can better safeguard their systems by treating each network interaction cautiously.

A forward-looking approach to cybersecurity is essential, as the potential impact of quantum computing on cryptographic systems is unpredictable. Speakers warned of “harvest now, decrypt later” strategies, in which attackers steal encrypted data today in anticipation of future decryption capabilities. This underscores the need for organisations to future-proof their SoC designs, recognising that today’s encryption may not remain secure in the quantum computing era.

SOCs must also anticipate new attack vectors, such as AI-driven cyberattacks and develop proactive defences to combat these evolving threats. Modern adversaries will quickly outpace a static SOC, making continuous adaptation key to an effective defence.

Key takeaways

- **Paradigm shift:** Traditional SOC models are inadequate in today's interconnected environments. Modern SOCs must integrate cloud, OT and IT systems to safeguard against sophisticated threats.
- **Comprehensive monitoring:** Effective SOCs ingest data from multiple sources, enabling comprehensive visibility and early detection of security incidents.
- **Advanced threat intelligence and AI integration:** AI-driven threat intelligence and automation are essential for rapid, accurate detection and response.
- **Air-gap networking:** While effective for sensitive environments, air-gapped systems are not foolproof. SOCs must monitor and secure even isolated networks to avoid breaches through indirect or physical methods.
- **Skilled workforce:** Automation does not replace the need for skilled cybersecurity professionals, who are critical in managing complex environments and adaptive strategies.
- **Quantum computing and cybersecurity risks:** Quantum computing challenges encryption, requiring organisations to future-proof SoC designs against potential threats.
- **Proactive defence and zero-trust approach:** SOCs must adopt proactive strategies, including zero-trust principles, to stay ahead of evolving threats.



6d. Ensuring fair and timely justice for all

Arjun Ram Meghwal
Minister of State, Ministry of Law and Justice (Independent Charge), Government of India

A modern justice system is the foundation of Viksit Bharat, and India's legal transformation is paving the way for timely, accessible justice for all.

A critical transformation is underway to make India's justice system more efficient, more accessible and more user-friendly. Holistic reforms in the Indian Penal Code (IPC) and Criminal Procedure Code (CPC) require modernising legislation to create a system that provides timely and fair resolutions. Embracing technology-driven initiatives, including e-courts and digital documentation, aims to streamline case management, reduce delays and foster transparency.

The key to this transformation is a focus on a user-centric approach and changes that work towards ensuring justice for all citizens. Unbundling dispute resolution into distinct stages, from advisory to resolution, allows users to navigate legal processes more intuitively. Technology solutions such as language translation tools and online dispute resolution platforms break down linguistic and geographical barriers, making justice more inclusive.

These innovations reflect a broader vision of society's evolving empowerment and trust in its justice system, nurtured by core tenets of transparency and accessibility. These efforts, working together, are creating a framework for a fair, resilient and open justice system for everyone.

Leaders Speak: Law and Justice – A Transformation Story
Speaker:
Arjun Ram Meghwal, Minister of State, Ministry of Law and Justice (Independent Charge), Government of India

Moderator:
Ajay Singh, Partner, Deloitte India

Modernising the IPC and other foundational laws is essential to creating a justice system that reflects today's realities and aspirations.

Arjun Ram Meghwal
Minister of State, Ministry of Law and Justice (Independent Charge), Government of India

The Honourable Minister, Arjun Ram Meghwal kicked-off the discussion with an insightful overview of India's legal evolution, referencing pivotal milestones such as the capital's shift from Kolkata to Delhi and the influence of British legal reforms on India's governance framework. Recognising the need to adapt to contemporary demands, he advocated for the modernisation of the IPC, CPC and the Indian Evidence Act. These are legal codes which have barely been amended since colonial times and desperately demand to be adjusted to more modern socio-economic standards that reflect modern judicial processes.

Modernising these frameworks includes setting timelines for investigations, trials and case resolutions to combat the systemic delays that often hamper justice delivery. This theme emphasized the importance of updating traditional structures to meet India's goal of becoming a fully developed nation by 2047.

Using technology to enhance justice delivery

From e-courts to updated legal codes, India is reshaping its justice system to meet the demands of a fast-evolving society.

Technological integration emerged as a crucial pillar of India's legal transformation, especially in addressing the issues of backlog and delay. The e-Court project and the implementation of digital platforms for court proceedings, document management and prison systems were proposed as key solutions to increase efficiency and transparency in the justice delivery process. These digital platforms aim to streamline case management, improve document accessibility and allow for real-time monitoring of cases, thus significantly reducing the wait time for resolutions.

Additionally, technology in investigative procedures and data sharing among law enforcement agencies was discussed to support inter-agency collaboration and reduce procedural redundancies. The esteemed minister stressed the potential of these technological changes to create a more accessible and transparent justice system for citizens, promoting trust and accountability within the legal framework.

Capacity building for law enforcement and judicial officers

For legal reforms to succeed, we need empowered police and judicial officers trained to handle modernised processes and digital tools.

Arjun Ram Meghwal
Minister of State, Ministry of Law and Justice (Independent Charge), Government of India

For legal reforms to be effective, capacity-building initiatives were deemed essential to equip police, judicial officers and other legal professionals with the necessary skills and knowledge to implement modern practices. Training programmes focused on digital literacy, new investigative techniques and updated procedural guidelines are pivotal for achieving a uniform understanding of reformed legal processes across the country.

This focus on capacity building is about going beyond theoretical changes and bringing about real improvement. By empowering those on the frontlines of law enforcement and justice, India can put its legal system in a position to adjust more naturally to a fast-paced, digital society.

Future-focused initiatives for a resilient justice system

Clear timelines for investigations and trials are critical—delayed justice must become a thing of the past in a truly developed India.

Arjun Ram Meghwal
Minister of State, Ministry of Law and Justice (Independent Charge), Government of India

Looking ahead, the overall discussion underscored several initiatives aimed at creating a more resilient and adaptable justice system. The e-Court project was highlighted as an important step in digitalising courtrooms, thereby enabling remote hearings and enhancing accessibility. Future projects are expected to improve coordination among federal and state agencies, especially in handling high-stakes cases that require efficient data sharing and collaboration.

Additionally, establishing procedural timelines for specific case types, such as sexual harassment cases and privacy-related matters, was discussed to ensure timely justice. These forward-looking initiatives aim to uphold citizens' rights and foster a judicial system that is prepared for both current and emerging challenges.

Manthan: Envisioning a User-centric Justice System
Participants:
Krishnakumar Thiagarajan, eGov; Keerthana Medarametla, Agami; Ayushi Singhal, Agami; Atul Singh, Customs Dept.; Partha Sarathy Bhaskar, CPGRAMS, DARPG; Hemakshi Meghani, Indian School of Democracy; Rohit Sharma, Law Firm Ready; Amita Katragadda, Cyril Amarchand Mangaldas; Aditya Prasanna Bhattacharya, Vidhi; Daksh Aggarwal, Vidhi; Hitesh Kukreja, Indus Action; Chitra Rawat, Indus Action; Deeksha Gujral, iProbono; Pravash Prashun Pandey, J-S (eCourts), DoJ; Gaurav Masaldan, J-S (Admin, Legal Reforms), DoJ; Justice Sanjay Kishan Kaul, Retd SC Judge; Justice Gautam Patel, Bombay HC; Arghya Sengupta, Vidhi; Bikkrama Daulat Singh, Convergence Foundation; Shikha Hundal, UNDP & DoJ (Consultant); Tarun Cherukuri, Indus Action; Joseph Phookat, Staram; Aaditeshwar Seth, IIT-D / Gramvani; Dr Ashutosh Modi, IIT Kanpur; Nusrat Khan, UNDP; Sandip Garg, IBBI; Gaurab Banerjee, SC Senior Advocate; Narinder Singh, Tax Policy Research Unit; Pankaj Gupta, AWS

Guru:
Sreeram Ananthasayanam, Partner, Deloitte India

Building a justice system that listens, learns and adapts is essential for meeting the real needs of Indian citizens.

Central to the framework is unbundling the dispute resolution process to make it more user-focused. This approach categorises legal interactions into phases which include prevention, advisory, preparation, initiation, resolution and enforcement. It emphasizes the need to address specific user needs at each stage. Whether it is through legal advice, document management or securing resolutions, each phase is designed to serve the end user efficiently.

Key stakeholders, such as lawyers, counsellors, mediators and even MSME facilitation councils, play specialised roles across these stages. The framework also identifies gaps where new participants, such as community paralegals and mediators, can fill essential roles, making justice more accessible and affordable for individuals, particularly those from underserved communities.

Ārohaṇa (आरोहण) | Growth with impact

Enhancing accessibility through technology

Tools such as Jugalbandi and online dispute resolution break down barriers, ensuring justice is accessible regardless of language or location.

The panel discussed how technology can streamline and simplify the legal journey for users. Solutions such as language translation tools, online dispute resolution platforms and real-time advisory services are examples of how technology addresses barriers in legal accessibility, particularly for users with limited language proficiency or those in remote areas.

For example, the Jugalbandi tool enables users to access legal information in their native languages, breaking down language barriers that often inhibit understanding and engagement with the justice system. By enabling online dispute resolution, the framework promotes quicker resolutions for specific disputes, such as labour and real estate cases, making the legal process faster, less intimidating and more accessible.

Building trust and ensuring consistency in information sharing

Trust is built through transparency, where standardised information sharing across platforms allows users to receive consistent and reliable guidance.

Trust and credibility are foundational for any user-centric justice system. The new framework aims to establish consistent, reliable information-sharing mechanisms by implementing APIs and open information exchange protocols between different services. This approach encourages transparency, ensuring that users have access to accurate and verified legal information.

By establishing common registries and promoting interoperability between systems, users can easily authenticate documents, access discovery resources and manage case information. Furthermore, consistent information-sharing fosters transparency, reducing discrepancies and encouraging citizens to engage more openly with the justice process.

Adaptability and real-time feedback for continuous improvement

Feedback-driven improvement means our justice system can evolve in real-time, adapting to unique regional and social contexts.

Continuous improvement is integral to building a justice system that evolves with user needs. The *Manthan* delved deeper into the importance of ongoing feedback from users, which enables the framework to adapt in real time and better address specific regional or situational requirements. Through feedback loops, the framework can be stress-tested in various contexts, such as domestic violence and labour disputes, ensuring that it remains flexible and responsive.

Experimenting with new solutions and learning from initial implementations are central to this approach. The framework encourages participants to share insights and challenges, facilitating a community-driven evolution that allows the system to adapt quickly and effectively to unique case demands.

Addressing digital divides and fostering community-driven solutions

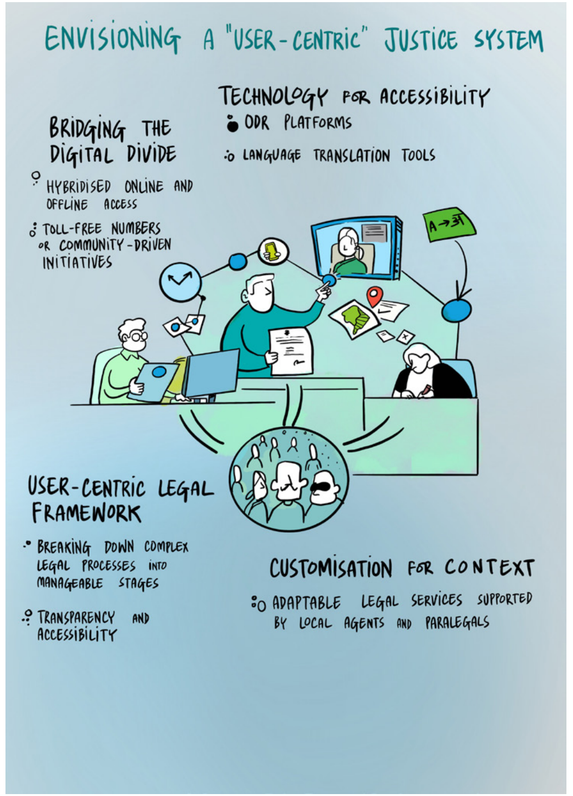
Inclusive justice means reaching users, even those without digital access, through community-driven support and offline resources.

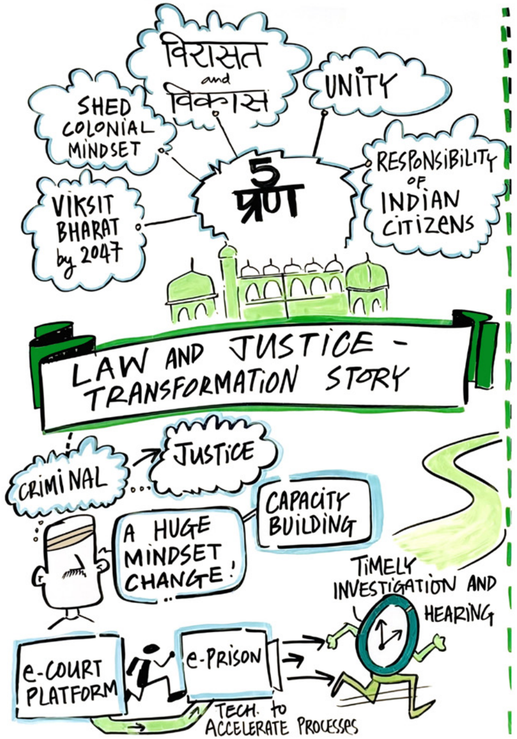
A user-centric justice system must address the digital divide that excludes users without access to smartphones or internet connectivity. The panellists emphasized solutions such as toll-free numbers and community-driven initiatives to ensure inclusivity. By integrating paralegals, community agents and other grassroots-level participants, the system can reach a broader demographic, particularly in rural or underserved areas.

Community agents play a crucial role in helping users navigate the justice system, providing support in local languages and offering legal advice through accessible means. These strategies ensure that technology doesn't leave anyone behind, fostering inclusivity even for those who may not be digitally connected.

Key takeaways

- **Overhauling foundational legal frameworks:** Updating the Indian Penal Code, Criminal Procedure Code and Indian Evidence Act to reflect today's social realities is critical for efficient governance and swift justice delivery.
- **Embracing technological innovation:** The e-Court project and digital platforms for case management, documentation and prison systems are pivotal to reducing case backlogs and improving transparency.
- **Empowering legal professionals:** Capacity-building programmes for police, judicial officers and other legal professionals ensure that modernisation efforts are effectively implemented at every level of the justice system.
- **Future-ready justice initiatives**: Projects such as e-Courts and inter-agency coordination mechanisms aim to build a resilient justice system capable of addressing both present and future needs.
- **Timelines for justice delivery:** Implementing clear timelines for investigations and case resolutions is essential for reducing procedural delays and ensuring timely justice.
- **Unbundling for user focus:** The justice system is streamlined through unbundling phases of dispute resolution, addressing specific user needs at each stage for a smoother, more effective experience.
- **Using technology for accessibility:** Language translation tools, online dispute resolution platforms and real-time advisories make legal resources more accessible, especially for underserved communities.
- **Building trust with consistent information:** The framework establishes a trustworthy, consistent justice system that encourages user engagement through open APIs, common registries and transparent information sharing.
- **Adaptability through feedback:** Ongoing user feedback allows the framework to adapt to specific contexts and unique user needs, ensuring flexibility in a fast-evolving society.
- **Bridging the digital divide:** Community-driven solutions, such as toll-free numbers and local agents, address the digital divide, ensuring inclusivity for users, even those in remote areas.





07 | Service delivery excellence: Optimising digital pathways

India's innovation journey is beyond urban success; it is a story of technological prowess transforming Bharat from the ground up.

India's development journey towards *Viksit Bharat 2047* hinges on the power of innovative, technology-driven solutions that bridge social gaps and create a sustainable impact.

The next few chapters showcase transformative efforts across multiple domains, whether enhancing public services with GenAI, empowering rural cooperatives through digital transformation or revolutionising healthcare delivery as part of the Ayushman Bharat Digital Mission (ABDM). Each initiative emphasizes the importance of digital in bridging rural-urban divides and building a future-ready digital infrastructure.

GenAI, for instance, is reshaping public service delivery by enabling real-time assistance and multilingual capabilities that bring government services closer to citizens. Meanwhile, digital cooperatives are also revolutionising rural finance, modernising the agricultural sector and expanding opportunities for women in rural communities. Similarly, ABDM is establishing new benchmarks for accessible and patient-centric healthcare, creating a seamless ecosystem of digital health records and services for every citizen.

These efforts underscore a unified vision of a future where technology enhances efficiency, inclusion and resilience across sectors. By placing its citizens at the heart of these digital advancements, India is paving the way for inclusive growth and setting an inspiring example as a nation committed to using technology to uplift its people.

7a. GenAI: A gateway to new efficiencies

Shri Abhishek Singh
Additional Secretary, MeitY

GenAI is increasingly being adopted in India to improve the efficiency of public service delivery. Many government departments at the centre and across states have introduced public-facing, GenAI-based tools and services. Countries adopting GenAI focus on AI sovereignty and rely on local AI ecosystems rather than offshore frameworks. The government is keen on collaborating with private companies and start-ups in this space to fortify the necessary technology ecosystem. With such efforts to use the growing power of GenAI in realising the vision of *Viksit Bharat 2047*, the ethical bias-free application of GenAI has emerged as a key focus area for stakeholders.

[19] Deloitte, Generative AI in Asia Pacific: Young Employees Lead as Employers Play Catch-up
[20] Deloitte, The State of Generative AI in the Enterprise
[21] Deloitte, State of AI in India

GenAI is no longer a futuristic concept; it is a reality that India is actively harnessing to benefit its citizens, bolster national security and support local businesses. A Deloitte survey establishes that India ranks first in the adoption of GenAI across Asia Pacific.[19] Indian companies are refining their strategy to make the most of AI opportunities.[20,21] The government is also rapidly adopting AI to deliver world-class services to the public.

Government agencies are advancing the use of AI in public services. Notable examples include the Jugalbandi chatbot, which facilitates access to government services, IRCTC's AskDISHA 2.0 virtual assistant and BharatGPT (India's first homegrown Large Language Model (LLM)). Other applications include AI integration in investor support processes by Karnataka and improved public service delivery in Telangana through AI-driven grievance management.

The discussions in *Ārohaṇa: Growth with Impact* focused majorly on GenAI as it is one of the transformative technologies that will help achieve the *Viksit Bharat 2047* vision. Experts shared their views on GenAI during various discussions during the event. For instance, they noted that AI models are primarily trained in Western datasets and underlined the need for Indian foundational models to be developed and trained on Indian datasets. They also pointed out a huge opportunity for companies to invest in R&D and develop products for the global market.

The Fireside Chat: The Power of GenAI explored how GenAI can improve citizen services, highlighting vernacular chatbots and inclusive digital access. In the panel discussion, "The Power of GenAI: Driving Service Delivery Efficiencies for Citizens and Businesses," experts from the government and private sectors discussed how GenAI is reshaping the delivery of public services, the challenges ahead and the synergies required. Along with the panel discussions, experts also congregated for a *Manthan* on GenAI.

Panel: The Power of GenAI – Driving Service Delivery Efficiencies for Citizens and Businesses
Participants:
Anil Sagar, IAS, Government of Uttar Pradesh; and Sundar Nagalingam, Global Director, Nvidia

Moderator:
Saurabh Kumar, Partner, Deloitte India

India is taking bold strides in deploying GenAI to enhance governance. Many government departments have mandated AI-driven chatbots and are fast becoming the frontline communicators between these departments and citizens. From tourism services to healthcare inquiries, these chatbots are helping citizens get personalised answers in real time. Imagine planning a trip across India. A chatbot can suggest the best routes, timings and places to visit, all tailored to your preferences.

Strong computing power is essential to optimising GenAI's capabilities. The government and the private sector are collaborating to enhance computing capacity by modernising existing facilities and encouraging more research and development. GenAI works with gargantuan amounts of data. State-of-the-art data centres are key to efficiently and safely handling such huge volumes of data. The government is working with private players and start-up companies to build and enhance the capacity of data centres.

In the Asia-Pacific region, the increasing use of GenAI and the expansion of data centres are giving rise to a trend identified as Sovereign AI.

Sovereign AI is where every country wants to develop its indigenous computing infrastructure within its shores. They want to be self-reliant when it comes to AI computing capacity. Both the government and private sectors are heavily investing in building computer capacity. In addition to the three big cloud service providers, many smaller native Cloud Service Providers (CSPs) are also coming up and setting up AI-capable data centres.

> *We want to have good computing facilities so that companies can reuse all those computing facilities and generate those AI components that can be used elsewhere, both in the private sector as well as in the public sector.*
>
> **Anil Sagar**
> **IAS, Government of Uttar Pradesh**

The government of India is modifying and strengthening its semiconductor policies to accommodate the growing need for computing capacity and data centres. Uttar Pradesh boasts a supportive semiconductor technology ecosystem with many GPU chip design companies already operating in the state. Under its flagship scheme, "StartInUP," the UP government has collaborated with IIT Kanpur to establish the CoE for AI and Innovation-driven Entrepreneurship. The CoE has helped incubate and accelerate over a hundred start-ups in the AI, ICT, IoT, cyber and AR/VR sectors. The state government plans to set up a 1,000-acre semiconductor park near Jewar International Airport, aiming for self-reliance in

In addition to the big three global CSPs, smaller native indigenous conglomerates are also setting up their own data centres. And these data centres are becoming AI-capable data centres.

Sundar Nagalingam
Global Director, Nvidia

semiconductor production and GenAI capabilities.
Upskilling students and the public with emerging AI technologies is key to broader adoption. Those aspiring to grow in AI should start by

To bridge the gender gap, the UP government has made initiatives to upskill five lakh women in GenAI technology. This will also serve as a strategic approach to reduce AI biases.[22]

strengthening their fundamentals in mathematics and computer science. The wider adoption of AI has its challenges. One of the most pressing issues is that AI tools can inadvertently reflect societal biases embedded in the data used to train them. The panel discussion emphasized that AI itself is not biased, but the data it processes can be. Global research is focusing on making AI systems more explainable and unbiased to counter the bias in AI. This is crucial for ensuring that AI-driven decisions in law enforcement, healthcare and employment are bias-free and accountable. With the conversation around AI ethics evolving, governments and organisations must work together to ensure that AI is used responsibly.

India is also taking a leadership role in AI adoption. AI will eventually transform how public services are administered, particularly in a populous country such as India. This change will lead to a future that is more efficient, accessible and equitable.

Fireside Chat: The Power of GenAI
Speaker:
Shri Abhishek Singh, Additional Secretary, MeitY

Moderator:
Sreeram Ananthasayanam, Partner, Deloitte India

In this session, Abhishek Singh shared his perspective on how GenAI can shape India's digital future. GenAI has the potential to transform the way citizen services are offered. For example, GenAI can revolutionise helpline services in the insurance, healthcare and agriculture sectors. AI-enabled chatbots can be used to deliver information to people in vernacular languages. The citizens need not visit a municipal office or a tax office to get their questions answered. They can obtain the necessary information at the touch of a button. Such systems are already in use in other countries and can be replicated in India. He emphasized the need for inclusive, citizen-centric infrastructure that reflects the country's linguistic and cultural diversity. With the increasing smartphone penetration, digital services should be made available to first-time internet users, especially in rural and semi-urban areas. Platforms such as Bhashini are helping bridge this gap by enabling voice-based access to government schemes in agriculture, health and education.

[22] https://government.economictimes.indiatimes.com/news/technology/yogi-govt-partners-hcl-groups-guvi-sawit-to-drive-genai-learning-for-women/113540633

Tackling the digital divide

Platforms such as UPI, DigiLocker and Aadhaar have simplified access to financial services and digital identity verification, reducing friction for citizens. True inclusion means services must be available in Indian languages and accessible through voice, allowing citizens to engage without intermediaries or technical barriers.

Localising AI for India

Current models trained on Western datasets often fail to reflect India's cultural and socio-economic realities.

Ask for an image of an Indian kitchen, and you might get firewood instead of a gas stove. We are working to correct that bias.

Abhishek Singh
Additional Secretary, MeitY

To overcome such biases, the India AI Mission is developing an Indian foundational model using indigenous datasets. This includes building a structured, anonymised and interoperable data repository, supported by metadata standards and privacy tools, to ensure AI models are relevant and representative.

Balancing data privacy and AI innovation

While personal data is governed by the Digital Personal Data Protection (DPDP) Act, many AI applications rely on non-personal data, such as traffic patterns or infrastructure details. There is a need to equip departments with anonymisation tools and build confidence in data sharing.

Enabling AI-powered decision-making

India has a strong pool of AI talent, but compute has been a missing piece. That is now changing, with the India AI Mission setting up infrastructure with over 10,000 GPUs to support model training and

India is ranked number one in AI skill accreditation, and we have many trained engineers. However, computing is a challenge due to insufficient AI infrastructure.

Abhishek Singh
Additional Secretary, MeitY

innovation. The next challenge is making public data usable. Many departments have valuable datasets but need support to organise, anonymise and share them securely. The India DataSets platform is helping bridge that gap by building capacity and providing the right tools to unlock data for meaningful AI applications.

From digital skilling to product innovation

The session concluded with a discussion on India's digital skilling landscape and the need to foster a product-oriented mindset. Abhishek Singh acknowledged that while India has long been a global IT services hub, domestic innovation in product development has lagged. Large IT firms should look at investing in R&D and building scalable solutions. Government schemes are also being launched to support product development and entrepreneurship.

India as a proving ground for AI innovation

India's digital infrastructure and widespread adoption create a distinctive environment for AI innovation. With strategic collaboration between the government and the industry, India is well placed to lead the next wave

of AI-driven transformation, delivering both societal impact and global relevance.

Manthan: GenAI

Participants:

Prakash Kumar, CEO, Wadhwani Centre for Government Digital Transformation; Sudhir Aggarwal, Director and Head – Client Partner, Wadhwani Centre for Government Digital Transformation; Pradeep Jhunjhunwala, Head of Partner Solutions Architecture, AWS; and Gautam Jha, Cloud Solution Architect, AWS

Guru:

S Anjani Kumar, Partner, Deloitte India

The *Manthan* centred around the practical applications and challenges of GenAI in various sectors, especially within government and public services. Several key themes were explored.

Use of AI in public sector operations

AI is revolutionising how governments function by improving the efficiency of complex and time-consuming processes. The discussion highlighted how AI is used in the following areas:

- **Procurement:** AI simplifies the creation, analysis and management of government procurement processes. Governments are using AI to generate and analyse Request for Proposals (RFPs), compare responses and identify discrepancies faster than manual processes.
- **Legislative drafting and policymaking:** GenAI can analyse legislation and provide summaries and suggestions for improvements by comparing similar laws from other countries. This application ensures that governments can quickly adapt to new challenges and regulatory needs.
- **Data processing and insights:** Government operations generate massive amounts of data daily, from field operations to citizen feedback. AI's ability to summarise large datasets and extract patterns is invaluable for decision-making. For example, in the defence sector, AI can analyse surveillance data, extract insights from incident reports and detect important patterns that human operators may miss.

In procurement, GenAI reduces effort across functions, from creating RFPs to getting and analysing responses and turning the data into actionable insights. The entire process, which sometimes takes weeks and months, can now be executed within days.[23]

AI for improved citizen services

With the adoption of AI for improved citizen services, the government aims to offer personalised, inclusive and responsive services.

- **Localised language services:** In multilingual countries such as India, where English is not widely spoken, AI is crucial for overcoming language barriers. For instance, the AI-enabled Bhashini tool can provide real-time support in over 20 Indian languages, offering citizens easy access to government schemes and services, regardless of their literacy level.
- **Real-time assistance:** AI can help citizens navigate complex bureaucratic processes, such as determining eligibility for various government schemes or filing complaints. The system can answer queries in local languages via voice or text, making it more accessible for rural or non-tech-savvy users. Integrating AI into government websites and services will enhance the delivery of services. For example, when citizens seek advice regarding agricultural practices or a particular insurance scheme by the government, they can quickly find relevant real-time information from GenAI-supported chatbots without physically visiting a government office.

Crisis management and digital twin technology

Government agencies can use AI to enhance their incident preparedness and crisis response capabilities. Advanced simulation techniques such as digital twins can greatly help disaster mitigation and crisis management.

Digital twins involve creating a virtual replica of a city or infrastructure to simulate various scenarios, such as natural disasters, public events or infrastructure failures. By running these simulations, governments can proactively plan to respond to crises. For example, a digital twin of Mumbai could simulate the impacts of a festival such as Ganpati immersion on traffic patterns, allowing authorities to optimise road closures and diversions for minimal disruption.

In real-time crisis management, AI can analyse large volumes of data (e.g., weather forecasts, public movement and resource availability) to give actionable insights, helping government agencies react faster and more efficiently during emergencies such as floods, pandemics or large public gatherings.

Education and training

AI tools can provide real-time translation of educational material in various regional languages, breaking barriers for students who may not be proficient in the language of instruction.

The *Manthan* also demonstrated two AI-based tools, one for training teachers and the other to help individuals practice with mock interviews. The InterviewAI conducted mock interviews and evaluated the interviewees for their clarity, persuasiveness, level of detail in answers, etc.

The Teacher Training AI provided specific feedback on conceptual clarity, voice modulation, pitch and use of filler words. Moreover, it captured the participant's facial expressions every 15 seconds and performed an emotional analysis. For example, the AI could identify the number of times the participant smiled and the number of times they were calm. This 360-degree feedback helps educators improve their teaching methods, ensuring students receive high-quality instruction regardless of geographical location.

Practical challenges of AI

Though AI has many potential use cases across various sectors, adopting GenAI has some practical challenges. The *Manthan* group explored those challenges and discussed the possible solutions.

Biases and hallucinations

AI models can unintentionally reflect biases present in the data they are trained on. For instance, if a model used for processing loan applications is trained on historical data where women were underrepresented, it might perpetuate discriminatory practices, unintentionally favouring male applicants.

AI hallucinations refer to instances where AI generates incorrect or nonsensical outputs. These hallucinations arise when AI models infer data without fully understanding it, leading to flawed decisions. For example, a legal AI tool might mistakenly generate non-existent case precedents because it relied on mock data used in training. AI outputs should never be accepted without human verification. Just as a new employee's work is double-checked until they gain experience, AI models also require regular monitoring and validation, particularly in the initial stages of deployment.

[23] https://government.economictimes.indiatimes.com/news/technology/yogi-govt-partners-hcl-groups-guvi-sawit-to-drive-genai-learning-for-women/113540633

Ārohaṇa (आरोहण) | Growth with impact

Privacy and data security
Data security and privacy are top concerns when deploying AI in public sectors. Governments must ensure that sensitive citizen data remains within national boundaries and is protected from unauthorised access. AI systems need to be configured to operate within strict guardrails, preventing them from accessing or sharing data beyond what is legally permissible.

They must also implement robust governance mechanisms, defining who controls and accesses the data that AI systems use. This involves anonymising personal data when required and providing full transparency in the decision-making processes of AI systems.

Synthetic data to address the lack of AI training data
In cases where governments lack enough real-world data, synthetic data generation is emerging as a solution. Some use cases, such as identifying fraudulent claims, don't have enough examples in the data to adequately train AI models. To overcome this, synthetic data is generated to simulate rare or unusual events, which can then be used to improve AI models' accuracy and decision-making capabilities. For example, synthetic data can be generated to simulate potential fraudulent claims in the insurance industry. AI models trained on this data can more effectively identify suspicious claims, even when there are few real cases.

Customisation and guardrails
Governments must tailor AI systems to specific needs while maintaining tight control over their outputs. AI models must be adapted to the unique contexts of government tasks, such as policy formulation, procurement and service delivery. This involves configuring AI systems to prioritise the most relevant data and ensure outputs align with government objectives. AI models can be designed to integrate data from multiple departments, but the government must decide which data sources the model can access. Governments can ensure more reliable and controlled outputs by restricting AI to only trusted datasets.

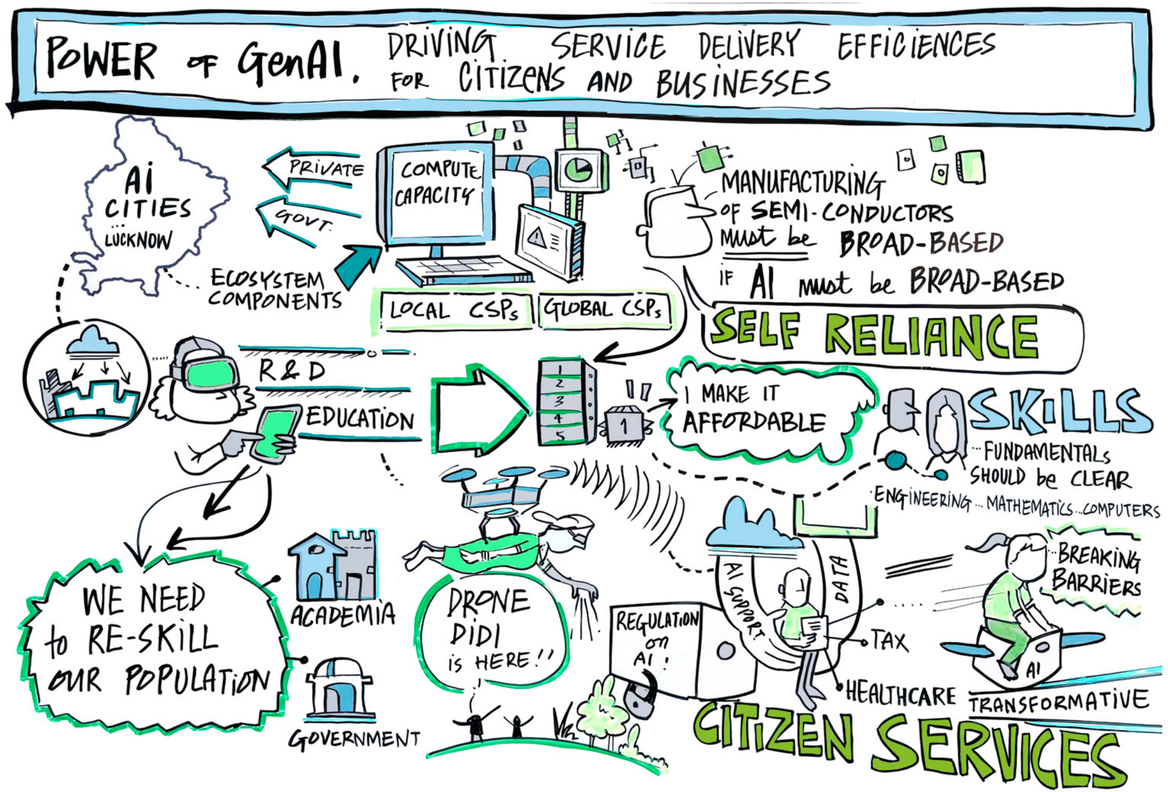
Guardrails are essential to control what an AI model can and cannot do. For example, an AI chatbot providing government services must only pull information from pre-approved sources, preventing it from giving inaccurate or misleading responses. This includes setting boundaries so that AI systems don't crawl the internet at large for data, potentially introducing biased or false information. In addition, regular audits of the AI model must be conducted.

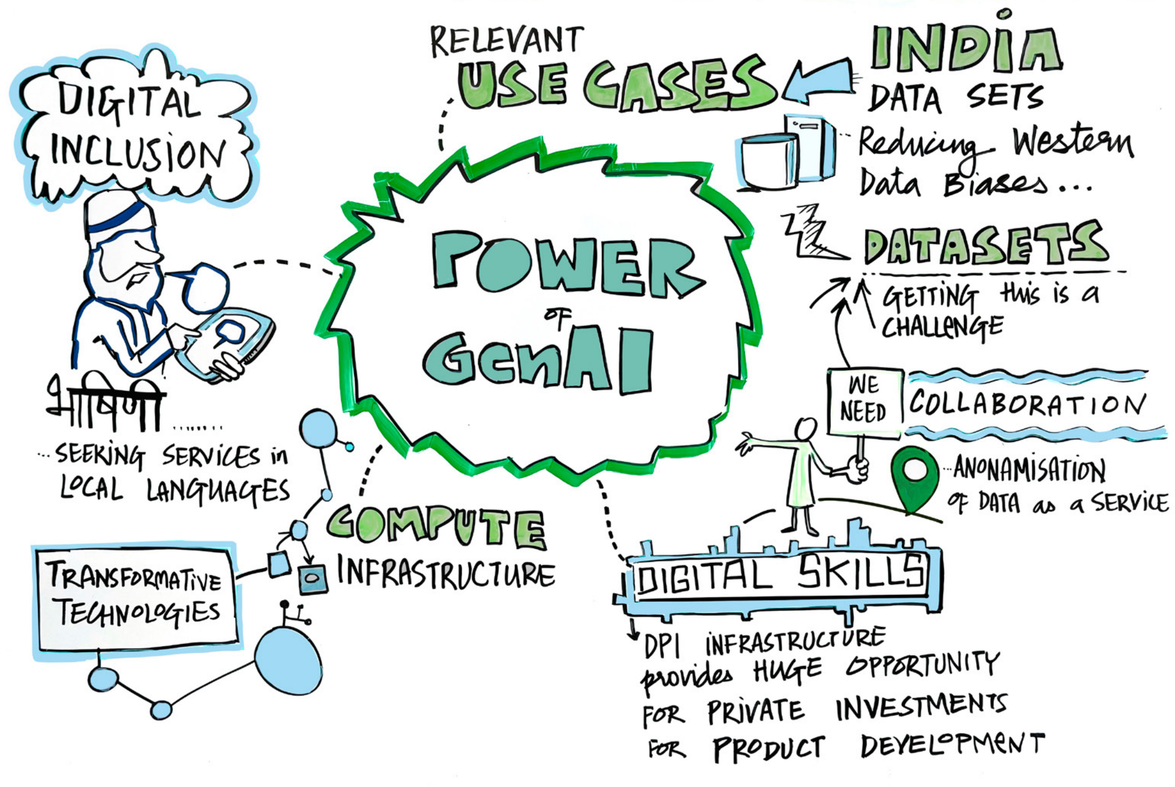
When GenAI is used with the right guardrails, its impact becomes exponential.

S Anjani Kumar

Key takeaways

- **Rapid adoption of GenAI in India:** India is embracing GenAI across government departments, enhancing public service delivery, especially through AI-enabled chatbots.
- **Focus on data security:** A strong emphasis on data security prevails, with countries, including India, focusing on AI sovereignty and developing indigenous AI infrastructure to reduce reliance on foreign systems.
- **Strengthening compute infrastructure:** India is working to bolster its computing power by developing the semiconductor industry and modernising data centres in collaboration with private companies and start-ups.
- **Application in defence and public services:** GenAI is improving efficiency in the tourism, healthcare and agriculture sectors. AI-powered chatbots are providing real-time assistance, and services are increasingly being delivered in vernacular languages.
- **Practical applications in governance:** GenAI streamlines government operations in procurement, legislative drafting and data processing, thereby improving efficiency and accuracy.
- **Crisis management:** Digital twins and real-time AI analytics are being used for disaster preparedness and crisis management, enabling better response planning.
- **Education:** AI tools are breaking language barriers and offering real-time feedback for students and teachers, improving education outcomes across different regions.
- **Bias and hallucinations:** Addressing biases and hallucinations in AI systems is a significant challenge in AI adoption. Efforts are being made to develop explainable, bias-free AI. Issues such as AI hallucinations (incorrect outputs), privacy concerns and the need for synthetic data to improve model training are critical challenges that require constant human oversight and monitoring.
- **Need for guardrails:** Customisation, strict governance and regular auditing of AI systems are essential to ensure responsible AI deployment, with governments setting boundaries to control what data AI models can access and analyse.


POWER of GenAI. DRIVING SERVICE DELIVERY EFFICIENCES FOR CITIZENS AND BUSINESSES
AI CITIES
LUCKNOW
ECOSYSTEM COMPONENTS
PRIVATE
GOVT.
COMPUTE CAPACITY
LOCAL CSPs
GLOBAL CSPs
MANUFACTURING OF SEMI-CONDUCTORS
Must be BROAD-BASED
IF AI must be BROAD-BASED
SELF RELIANCE
R&D
EDUCATION
MAKE IT AFFORDABLE
SKILLS
FUNDAMENTALS SHOULD be CLEAR
ENGINEERING ... MATHEMATICS ... COMPUTERS
WE NEED to RE-SKILL OUR POPULATION
ACADEMIA
GOVERNMENT
DRONE DIDI is HERE!!
REGULATION on AI!
AI SUPPORT
DATA
TAX
HEALTHCARE
BREAKING BARRIERS
AI
TRANSFORMATIVE
CITIZEN SERVICES


DIGITAL INCLUSION
भाषिणी
... SEEKING SERVICES in LOCAL LANGUAGES
RELEVANT USE CASES
INDIA DATA SETS
Reducing Western Data Biases...
DATASETS
GETTING this is a CHALLENGE
POWER of GenAI
WE NEED COLLABORATION
ANONAMISATION of DATA as a SERVICE
TRANSFORMATIVE TECHNOLOGIES
COMPUTE INFRASTRUCTURE
DIGITAL SKILLS
DPI INFRASTRUCTURE provides HUGE OPPORTUNITY FOR PRIVATE INVESTMENTS FOR PRODUCT DEVELOPMENT

7b. Cutting-edge Bharat: A showcase of innovative prowess

Vivek Agarwal
Director – FIU and Additional Secretary, Department of Revenue, Ministry of Finance

The future of India's digital transformation is envisioned as one where every citizen is empowered through universal digital access, demonstrating that inclusivity, efficiency and opportunities will characterise the path ahead.

India's digital transformation involves a significant shift for the government, transforming its role from a regulator to an active enabler of technological innovation. This evolution underscores India's success in bridging public and private efforts to create a thriving, inclusive digital landscape. Projects that once seemed improbable are possible and are reshaping India's infrastructure, enhancing everything from public services to entrepreneurial ecosystems.

As this digital revolution evolves, India's adoption of technology continues to redefine governance, improve accessibility to essential services and create fertile ground for start-ups and citizens. Through collaborative initiatives, India is setting a new global standard, creating a model of sustainable growth powered by innovation and inclusivity.

Fireside Chat: Transformative Solutions and Projects Showcase
Speakers:
Vivek Agarwal, Director – FIU and Additional Secretary, Department of Revenue, Ministry of Finance; Dr Arvind Gupta, Head and Co-Founder, Digital India Foundation

Moderator:
Sudeepta Veerapaneni, Partner, Chief Innovation Officer, Deloitte India

India's digital evolution showcases a decade-long shift from traditional infrastructures to a dynamic digital ecosystem.

Digitisation in India has evolved over the years. Previously, progress reports focused on physical infrastructure, with minimum emphasis on digital platforms or start-ups. Today, government initiatives are instrumental in bridging the gap between technology and people. This evolution is encapsulated in the concept of DPI, a paradigm shift that signifies hope and potential on a global scale.

DPI has become a key component of India's digital ecosystem, driving innovations such as the Aadhaar infrastructure and UPI. These initiatives are critical for various applications, helping India improve digital governance and public services while moving beyond traditional systems.

Building DPI

From UPI to DigiYatra, India's DPI is creating new avenues for start-ups and fostering a secure, accessible digital economy.

Dr Arvind Gupta
Head and Co-Founder, Digital India Foundation

India's progress is marked by the rapid development of its digital infrastructure, which surpasses the pace of physical infrastructure growth. This advancement is evident in initiatives such as DigiLocker and DigiYatra, which are designed to address important societal needs while fostering greater connectivity in a progressively digital world. DigiLocker provides a secure cloud-based platform to store critical documents, facilitating easy access during urgent situations, such as airport travel. On the other hand, DigiYatra has introduced a novel method of air travel by integrating biometric verification processes, significantly reducing waiting time and ensuring paperless transactions throughout the journey.

You can probably invent alone, but you cannot really innovate alone.

[24] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

These innovative solutions are geared towards addressing government inefficiencies and serve as valuable resources that enable start-ups and businesses to push their boundaries of ideation.

India's digitisation trajectory reflects a powerful narrative, where infrastructure advancements generate value for the government and the wider ecosystem.

Creating value through digital infrastructure

India's digital story brings together government, start-ups, telecoms and banks to build a thriving, interconnected ecosystem.

India has demonstrated that PPPs can effectively break duopolies by introducing a third player, allowing control over one's destiny. With 125,000[24] start-ups using the provided infrastructure, significant disruption is expected.

The success of DPI is visible in its ability to deliver value to stakeholders in the digital economy, including governmental entities, the private sector and society. The surge in India's start-ups, with over 4,000 Software-As-A-Service (SaaS) companies currently operating, highlights the potential for economic growth through digital innovation driven by this infrastructure.

Another example of value generation in India's local DPI ecosystem is how the establishment of services such as UPI has dispelled initial doubts surrounding digital payments. By enabling secure and efficient transactions, UPI competes effectively against global giants in the payment processing sector, illustrating that homegrown solutions can be powerful contenders in transforming the digital landscape.

Adoption and user engagement

Almost 98 percent of the money that is collected today on national highways is done on FASTag.

Dr Arvind Gupta
Head and Co-Founder, Digital India Foundation

Impressive engagement metrics evidence the escalating acceptance of digital services. About 50 million users conduct numerous transactions monthly, reflecting the growing comfort and trust in digital platforms. This significant adoption is largely driven by government initiatives employing nudge theory, i.e., strategies designed to subtly motivate users towards embracing new systems through accessible interfaces.

Programmes such as FASTag, which have already revolutionised toll collection on national highways, highlight the efficiencies that digital systems offer; nearly 98 percent of payments are now processed through electronic means. This enhances revenue for infrastructure maintenance and increases transparency while reducing opportunities for fraud.

Without adequate regulations and a procedural set-up for the detection and prevention of fraud, technological sustainability cannot be ensured.

Vivek Agarwal
Director – FIU and Additional Secretary, Department of Revenue, Ministry of Finance

Ensuring security and trust

Despite these revolutionary changes, challenges persist, particularly in cybersecurity and fraud prevention. Establishing robust regulatory frameworks is critical in maintaining public trust in these technologies. Initiatives such as the FINnet exemplify the government's commitment to safeguarding citizens against financial misconduct through meticulous transaction oversight.

Recent changes to combat financial fraud in India have focused on several key areas. Firstly, regulations have been expanded to cover non-financial businesses such as real estate agents and precious metals dealers. This ensures these sectors adopt the regulatory framework without hindering their activities.

Secondly, technological advancements have been crucial. Fintechs, payment aggregators and virtual asset service providers have adopted new technologies, necessitating regulations for banking transactions involving virtual assets. The MLCFT framework has been implemented to regulate these transactions, ensuring compliance and security.

Despite these efforts, challenges remain, particularly with peer-to-peer transactions on decentralised exchanges. These transactions often lack visibility and use obscure platforms such as Telegram for brokering deals, making oversight difficult.

Additionally, the focus is expanding to NIDHI companies and cooperative societies, which handle significant monetary transactions and pose risks of money laundering and financial crime. The mandate is being extended to these institutions to ensure comprehensive visibility and intervention capabilities.

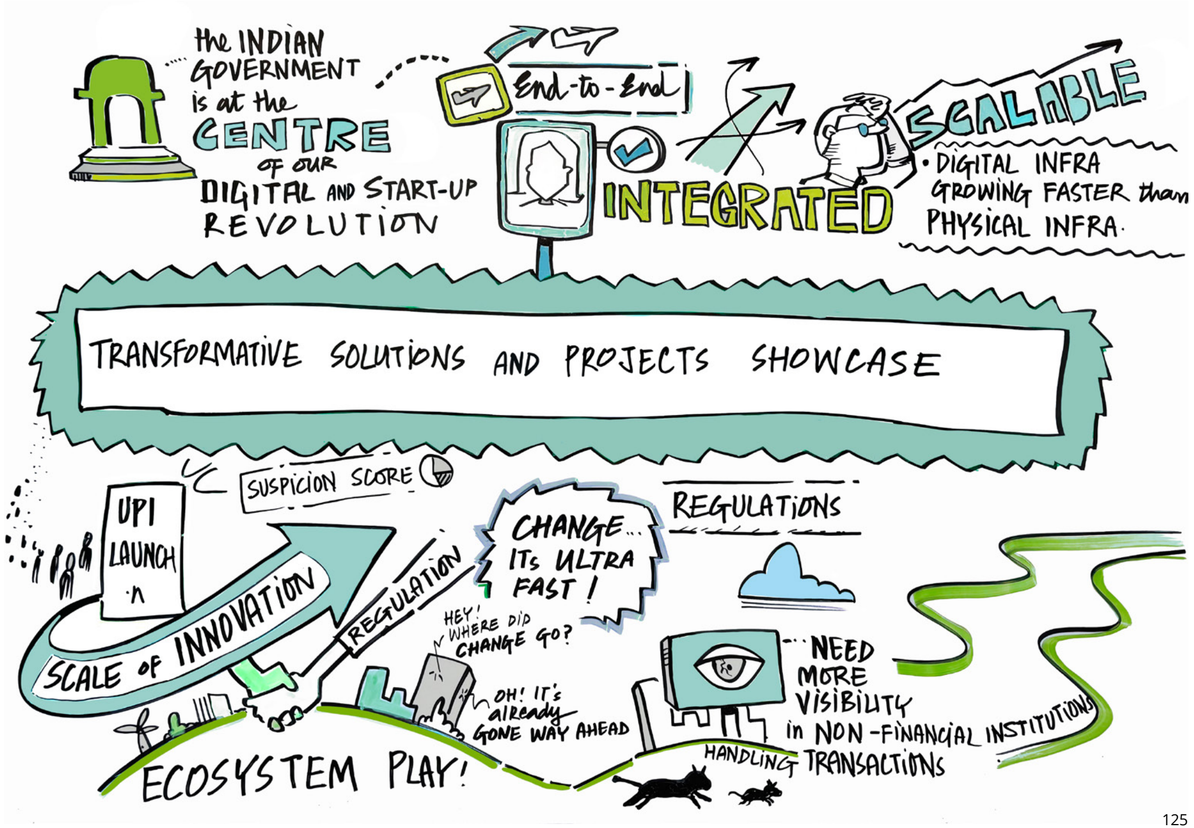
Overall, these measures aim to create a robust framework to detect and prevent financial fraud, using technology and expanding regulatory oversight to cover relevant sectors.

Trust in technology and innovation is built when three key groups, including regulators and policymakers, complementors (start-ups and businesses adopting the technology) and funders (venture capitalists and investors), are involved.

Moreover, using advanced data analytics and AI allows regulatory bodies to monitor transactions effectively and pre-emptively identify fraudulent activities. Establishing a balance between fostering innovation and ensuring security will play an essential role in maintaining the credibility of the digital financial landscape.

Key takeaways

- **DPI:** India is uniquely building a robust DPI, integrating systems such as Aadhaar and UPI to facilitate seamless governmental and societal interactions.
- **Rapid digital transformation:** Over the past decade, India has undergone significant digital transformation, positioning the government at the heart of technological advancement alongside the start-up ecosystem.
- **Value creation ecosystem:** The establishment of DPI creates value for the government, society and start-ups, benefitting stakeholders across the ecosystem.
- **Innovative applications:** Digital solutions, such as DigiLocker and DigiYatra, demonstrate practical applications of technology in addressing everyday challenges and enhancing public services.
- **Widespread adoption:** About 50 million users engage with digital payment solutions, such as UPI, showcasing a strong acceptance and trust in digital platforms.
- **Engaging with start-ups:** The government's proactive role in fostering technological innovation empowers an expansive start-up ecosystem, illustrating collaboration between the public and private sectors.
- **Regulatory frameworks:** Effective regulation is crucial for maintaining public trust and ensuring the security of digital transactions, with initiatives such as FINnet enhancing monitoring capabilities.
- **Continuous innovation:** India's ongoing commitment to evolving digital initiatives demonstrates its dedication to meeting local demands and setting benchmarks for global practices in digital governance.



7c. Bridging the rural divide through cooperatives: Technology as the difference maker

Ashish Bhutani
Secretary, Ministry of Cooperation

Technology is revolutionising rural India, especially by digitising cooperatives such as Primary Agricultural Credit Societies (PACS). Government initiatives, spearheaded by the Ministry of Cooperation, aim to modernise operations through digital platforms, improving efficiency and data sharing. This shift is empowering rural communities. Innovations such as IoT and blockchain are streamlining processes and enhancing transparency across various sectors, including agriculture, dairy and sugar production. These technological advancements also decrease reliance on traditional banks and foster financial sustainability in rural regions.

Rural development plays a pivotal role in India's journey towards becoming a developed nation. Given the scale of small farm holdings in India, collectivisation is the only way forward. PACS are legally recognised entities that operate under the cooperative laws of their respective states. The agricultural landscape is transforming with the rise of digital cooperatives, which the Government of India strongly supports. Digital innovation redefines the cooperative model by focusing on technology, education and inclusivity to build a sustainable and prosperous economy.

In a fireside chat, Ashish Bhutani, Secretary, Ministry of Cooperation, discussed the ongoing digitisation of PACS and their integration with digital ERP platforms, improving efficiency and supply chain management. Furthermore, leaders such as Munna Balaji and Srinath Sarkar shared their insights during the *Manthan* Digital Cooperatives.

Fireside Chat: Creating Impact in Rural India
Speaker:
Ashish Bhutani, Secretary, Ministry of Cooperation

Moderator:
Amit K Singh, Partner, Deloitte India

The Government of India is focused on empowering cooperatives in rural areas to drive national growth and address developmental challenges. Key ministries are working on this, with the Ministry of Cooperation, established in July 2021, playing a vital role. The Ministry aims to harness the collective efforts of different departments working in rural India by reimagining the role of agricultural credit societies and strengthening their role in rural economic development.

With more than 100,000 functional PACS serving about 130 million members, these cooperatives have so far been the cornerstone of rural finance and other agricultural support.

The government aims to create a unified approach to rural development by integrating the work of various ministries and converging existing schemes. Under the Ministry's guidance, States are issuing new by-laws to transform PACS into a one-stop solution for the rural population. Besides extending credit and supplying agricultural inputs such as seeds, fertilisers and pesticides, PACS are now providing support for storage, processing and marketing and are involved in over 25 other business activities, such as animal husbandry, dairy, poultry farming and fishing, allowing them to generate additional income and support their communities. A nationwide programme for the computerisation of all functional PACS is now underway. The digital backbone will integrate all functional PACS with NABARD onto an ERP platform, which will enhance efficiency, speedy disbursal of credits, seamless accounting and enhanced trustworthiness. Establishing digital kiosks will allow villagers to access government services and information from their villages. Similarly, the newly introduced SOPs in the dairy sector that aim to improve the quality of milk and animal welfare will enhance the functioning of nearly 150,000 village-level dairy societies, targeting to increase milk procurement by 1.5 times in five years.

India's food grain storage capacity is only 47 percent of the country's total food production. To address this situation, the Ministry plans to build the world's largest decentralised grain storage programme, which aims to create 70 million tonnes of decentralised storage capacity over the next five to six years.[25] Besides minimising post-harvest losses and addressing the shortage in foodgrain storage, these storage facilities will also serve as Fair Price Shops and provide procurement, storage and distribution services to ensure farmers can quickly access their produce and get better prices.

Over the past four years, the Ministry has been actively resolving the regulatory challenges imposed by the Reserve Bank of India (RBI) that previously limited the lending capabilities of cooperative banks. Today, rural and cooperative banks offer services such as housing and gold loans, expanding their reach and support in rural areas. This has helped liberalise the PACS.

The ministry has established the National Urban Cooperative Finance and Development Corporation, an RBI-approved entity, to provide affordable digital solutions, helping urban cooperative banks adopt modern technology more effectively and better serve their members.

The journey to rural prosperity is full of challenges, yet the ministry remains committed to making PACS the central pillar of rural cooperation.

Our ministry is only four years old, and we are working hard to rejuvenate the cooperative sector after years of stagnation. With collective efforts, we can improve competencies and create convergence at the grassroots level.[26]

Ashish Bhutani
Secretary, Ministry of Cooperation

[25] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

[26] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

Manthan: Digital Cooperatives

Participants:

Munna Balaji, Department for Cooperative Sector Development, Market-led Agricultural Projects and Reforms (MAPAR); Srinath Sarkar, Manager, Indian Production and Operations Management System (IPOMS); Dhruva Yadav, Director, National Mainstream Education for the Cooperative Sector; Vaibhav Sharma, Executive Director, Deloitte South Asia; and others

Guru:

Meghna Mittal, Director, Deloitte India

In this *Manthan*, the esteemed leaders shared their insights into the progress being made and the future potential of digital cooperatives in India.

Paving the way for India's agriculture revolution

Leaders from the cooperative sectors emphasized the transformative role of digital cooperatives in revolutionising India's agricultural sector, particularly in sugar production.

The sheer scale of cooperatives in India, representing almost the entire population when accounting for families, indicates the sector's vast untapped potential.

Leadership in digitisation

MAPAR's Department for Cooperative Sector Development is leading the digitisation of 500 cooperatives, with plans to expand to over 7,000. This underscores the role of technology in transforming traditional cooperative models. Srinath Sarkar also highlighted the efforts to digitise over 260 sugar cooperative units across nine states, significantly improving their operations.

The mantra is to move from being an importer to an exporter, which resonates deeply with us.

Srinath Sarkar
Manager, Indian Production and Operations Management System (IPOMS)

Government support for digital transformation under the ecosystem approach

New policies, such as the National Biotechnology Development Strategy-2015–2020, have enabled sugar cooperatives to diversify from sugar production to ethanol, increasing their profitability and sustainability. The new "ecosystem approach" in supply chain modernisation targets a more integrated and holistic development strategy by bringing factories closer to farming operations to reduce the supply chain length and make the farming-to-processing cycle more effective and efficient. This shift has shortened payment cycles and reduced reliance on bank loans, improving the financial stability of cooperatives and allowing cooperatives to focus on growth and sustainability.

The Indian sugar industry is diversifying its feedstock for ethanol production, using materials such as damaged grains and maize, offering more operational flexibility to cooperatives.

Education and training for digital integration

Dhruva Yadav emphasized the importance of education and training in facilitating the adoption of new technologies within cooperatives. Significant focus is placed on capturing financial data, integrating it into digital systems and training people across various sectors, such as bank directors, farmers and cooperative members, to ensure that cooperative leaders and members are empowered to adapt to new technology and economic models.

Empowerment of women's cooperatives

Women's cooperatives in agriculture and allied sectors play a significant role in rural economic growth, although challenges remain in achieving inclusive participation.

Women's cooperatives are driving growth in the agricultural and allied sectors.

Dhruva Yadav
Director, National Mainstream Education for the Cooperative Sector

Sustainability and a circular economy

The introduction of technological advancements and better water regulation is transforming small farms into more productive units. The objective is to create a more circular economy, increase productivity and reduce water consumption through better management.

Digital cooperatives for economic sustainability and financial support

Key elements of digital transformation include the cooperative structure and the integration of technology into financial systems. Unifying software systems across banks and states and integrating financial institutions using platforms such as a large-scale data framework will enable 60,000 banks to streamline operations, improving access to credit, merchandise and other services in rural areas.

Plans to create a national cooperative database and implement a digital stack will help improve efficiency. Tools such as eSign and UPI, in combination with other digital technologies, will make operations smoother and interoperable.

Munna Balaji
Department for Cooperative Sector Development, MAPAR

Cooperative banks and institutions such as the National Cooperative Development Corporation (NCDC) provide competitive loans. Digital cooperatives eliminate intermediaries from the supply chain, ensuring that farmers and consumers benefit directly.

Ārohaṇa (आरोहण) | Growth with impact

Digital technology and the future of labour cooperatives

Efforts are being made to enhance the efficiency of labour cooperatives based on recommendations from the National Advisory Council. Some states, such as Maharashtra, Haryana and Punjab, have already seen positive outcomes.

Tools such as the Health Card give farmers valuable insights into their soil and crop health, helping farmers make informed decisions, enhance yields and achieve better economic outcomes.

Challenges in technology adoption

While some cooperatives have adopted digital tools, others are falling behind, leading to decreased efficiency. Digitising legacy data and ensuring unified technology use across states is also difficult. Labour cooperatives continue to rely on paper systems, which hampers their adoption of digital solutions. Hence, digitising India's cooperative sector is crucial to its agricultural revolution. The cooperative model is being redefined through digital innovation, and the sector is well-positioned to take on the challenges of the future.

Key takeaways

- **Emphasis on rural development through cooperatives:** Given the role and footprint of cooperatives in rural India, they have a crucial role to play in its economic transformation. The setting up of a dedicated Ministry of Cooperation is proof of the Government's clear intent to strengthen this sector.
- **The role of the Ministry of Cooperation:** The Ministry of Cooperation is playing an enabling role in modernising and diversifying PACS into multi-service centres to strengthen their role in rural economic development. Additionally, support is provided to create decentralised storage facilities managed by PACS, reducing foodgrain spoilage and transforming India into a net exporter of pulses and maize.
- **Government support for digital transformation:** The Indian government is pushing for digitisation in the cooperative sector through policy and programme support. A national programme for the computerisation of PACS is being implemented. The digitisation will transform supply chains, ensure fair prices for farmers and enhance financial sustainability.
- **Empowerment of women's cooperatives:** Efforts are underway to boost women's participation in cooperatives, particularly in the dairy sector, promoting inclusive rural economies.
- **Sustainability:** Digital cooperatives are advancing sustainable farming by improving water management and fostering a circular economy that boosts productivity while conserving resources.
- **Financial sustainability:** Cooperative banks are digitising, supported by NCDC loans, to provide affordable financial services and modern technologies to cooperatives.
- **Eliminating intermediaries:** Cooperatives empower farmers by removing intermediaries, giving them more control over pricing, supply and direct access to consumers, thereby strengthening their economic influence.

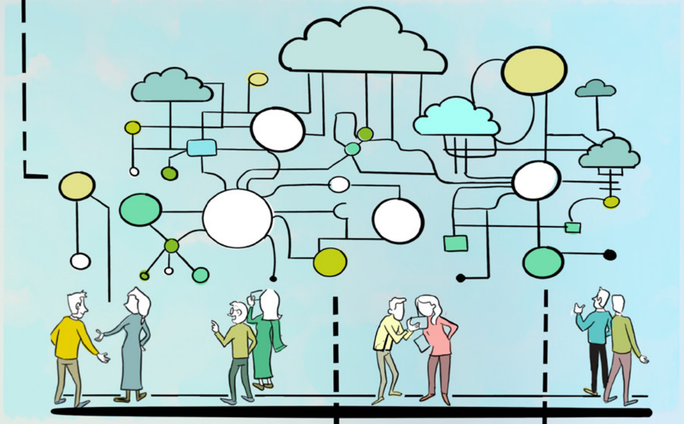
DIGITAL COOPERATIVES

DIGITAL TRANSFORMATION FOR COOPERATIVE SUCCESS

- ENCHANCED EFFICIENCY, TRANSPARENCY AND SUSTAINABILITY
- STREAMLINE INTERNAL PROCESSES,

EMERGING TECHNOLOGIES

- IOT, BLOCKCHAIN, AI AND HAPTIC DATA
- BETTER PRODUCT TRACKING AND TRACING
- BETTER RESOURCE MANAGEMENT
- QUALITY CONTROL

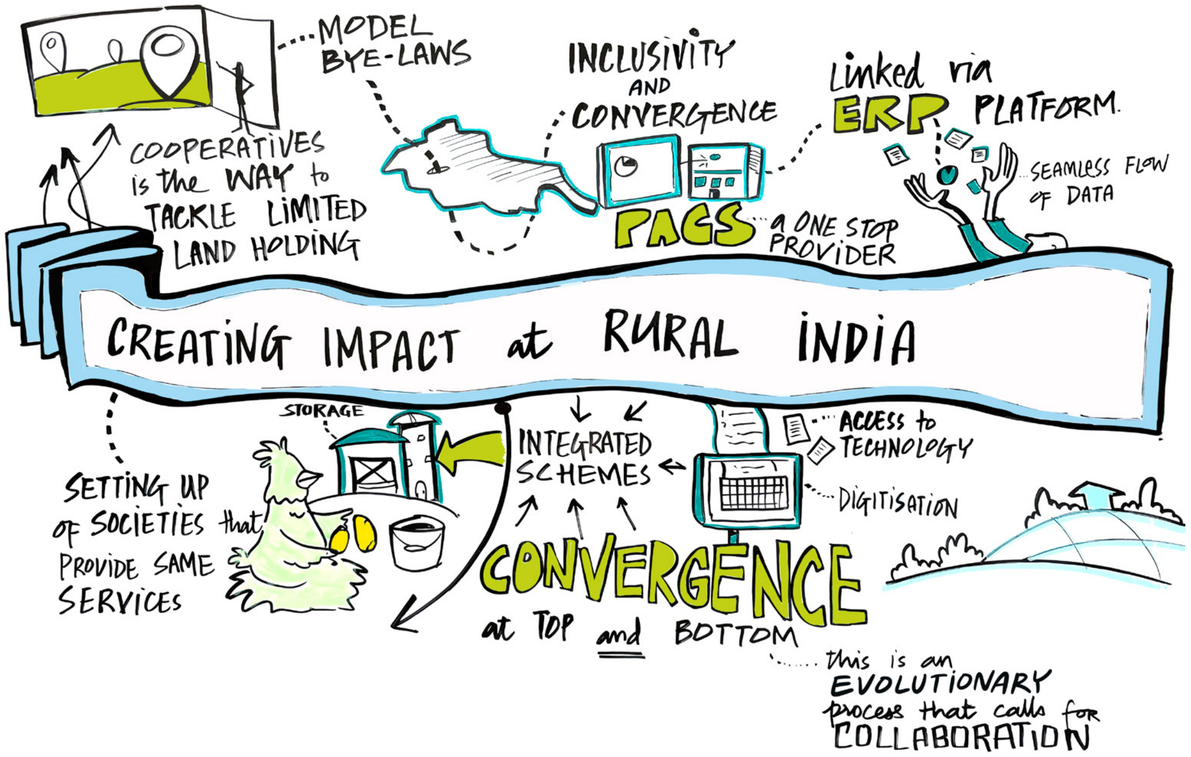


ENCHANCED SUPPLY CHAIN MANAGEMENT AND FINANCIAL INCLUSION

- IMPROVE FINANCIAL TRANSACTION
- REDUCE BARRIERS TO ENTRY

ENERGY AND SUSTAINABILITY

- PROMOTING CLEANER ENERGY ALTERNATIVES
- SMART GRIDS, ENERGY EFFICIENCY MEASURES AND RENEWABLE ENERGY



7d. Healthcare made easier: Enabling technology-aided delivery

Ayushman Bharat Digital Mission (ABDM) is digitising healthcare in India while empowering patients and healthcare providers.

Technology-aided service delivery has emerged as a key shift in the structurally dynamic context of the Indian healthcare industry today. The Ayushman Bharat Digital Mission (ABDM) is leading this change, a path-breaking initiative that aims to transform healthcare infrastructure across the country by building a resilient, digitally enabled foundation.

The Indian healthcare sector faces challenges related to accessibility, affordability and efficiency. ABDM represents a paradigm shift in addressing these challenges by creating a coherent digital health architecture that promises to reform healthcare delivery and access comprehensively.

Manthan: ABDM for HealthTech

Participants:
Raman Upreti, Tech Lead - ABDM, NHA; Praveen Shrivastava, Sr. Director, CDAC Noida; Dr Anshul Chowdhury, Programme Manager, Digital Health, BMGF; Dr Pankaj Gupta, Director Digital Health, WISH Foundation; Dr Vijay Agarwal, President, CAHO; Kushagra Goswami, Service Now; Vishal Gupta, Country Head, Healthcare Business, Ingram Micro; Sanjay Jain, Director, Akhil Systems; Sohit Kapoor, Co-founder, Driefcase; Saurabh Kochhar, Co-founder and Tech Lead, Doxper; Sumeet Chhetri, CTO, Ohum Healthcare; Anurag Vohra, CTO and Founder, Bajaj Finserv (PHR-HEALTH LOCKER); Anurag Sharma, VP Data and Innovations, Everwell Health Solutions; Dr Pranay Jaiswal, AVP Health Products Artivatic.AI; Sumeet Dugar, Head of Operations Vitraya Technologies; Akash Shah, Technical Director, eClinicalWorks and other representatives from Deloitte Public Health team.

Gurus:
Vikram Anand, Partner, Deloitte India; Alok Saxena, Executive Director, Deloitte India; and Pradeep Gupta, Director, Deloitte India

Supported by:
Anita Gupta, Kshiti Garg, Shweta Dhingra, Ruchika Sareen and Shailza Taneja, Deloitte India

ABDM is a digital initiative that is driving a healthcare revolution. Creating a unified digital health ecosystem makes healthcare more accessible, efficient and patient-centric.

The digital transformation of Indian healthcare takes a giant leap through ABDM. This revolutionary platform aims to create a unified health ecosystem that connects patients, providers, services and innovators. By integrating technology with healthcare delivery, ABDM strengthens foundational elements and tackles critical challenges in accessibility, efficiency and patient care across India. The key elements of ABDM in building a robust digital health infrastructure include:

- **Unique health IDs:** ABDM has generated about 680 million ABHA (Ayushman Bharat Health Account) numbers for citizens.[27] These unique identifiers serve as the basis of the digital health ecosystem and ensure seamless patient data integration across healthcare organisations.
- **Healthcare registries:** Integration with the national registries of healthcare professionals and health facilities under ABDM provides authenticity and an organised mutual database. Finding and accessing healthcare services is simplified, and care quality is enhanced by maintaining a verified database of healthcare providers.
- **Federated architecture:** ABDM follows a federated architecture where the data remains at the point of creation. Key concerns, such as data privacy and security, are effectively addressed by ensuring decentralised data management and patient consent-based sharing through secure information exchange platforms.
- **Health information exchange:** ABDM integration of health applications enables seamless data exchange and ensures total compatibility between healthcare facilities. This interoperability provides comprehensive and continuous care to patients, regardless of where they seek treatment.
- **Patient-centric applications:** ABDM has fostered applications that let patients maintain personal health records from various healthcare providers. This helps patients control their health information and make informed care-related decisions.

[27] https://pib.gov.in/PressReleasePage.aspx?PRID=2081482

We have almost 680 million ABHA numbers created throughout India to cover the entire population.

Raman Upreti
Tech Lead - ABDM, NHA

ABDM represents the future of healthcare delivery in India. Its robust digital infrastructure, comprehensive data integration and patient-focused approach create a foundation for accessible, efficient healthcare. With growing adoption and continuous innovation, it promises to pave the way for India's comprehensive, more connected health sector.

Impact on HealthTech

If a small administrative use case, such as "scan and share", has been used by over six crore people in less than two years of its launch, imagine ABDM's impact when we get to pure healthcare use cases. It is truly transformational.

Sohit Kapoor
Co-founder, Driefcase

ABDM implementation has created numerous opportunities for innovation in the health tech sector. Companies are using the ABDM infrastructure to develop solutions addressing various aspects of healthcare delivery.

Moreover, the success of "scan and share" shows the possibility of large-scale digital health applications in India. This feature lets patients share their health information with providers for instant and paperless registrations. About 0.2 million people use the ABHA-based instant OPD registration service every day.[28]

The ABDM ecosystem has created opportunities for innovation in various areas, including:

- **Health information management systems:** ABDM-enabled HMIS solutions present a comprehensive system of managing patient data and a seamless information flow within a standards-based secure environment.
- **Digital health use cases:** Additional use cases that streamline patient transactions at healthcare facilities, such as 'Scan and Pay' for sharing e-prescriptions and digital payments for OPD, diagnostic or pharmacy services, can be further explored and developed.
- **UHI-enabled service:** The Unified Health Interface (UHI) enables interoperability in digital health services. Developing service provider or user applications based on this principle can give health tech innovators an edge over other players.
- **AI and ML:** The healthcare industry struggles with massive unstructured and paper-based data. The use of AI/ML for structuring the data and integrating it into ABDM-enabled solutions enhances healthcare outcomes and enables AI-driven diagnostics and personalised treatment plans.

ABDM's introduction of the Unified Health Interface (UHI) aims to provide seamless healthcare access across platforms, making services such as doctor appointments and consultations more accessible.

[28] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2009483

Manthan: ABDM for Providers

Participants:

Raman Upreti, Tech Lead - ABDM, NHA; Dr Nirupam Madan, Medical Superintendent, AIIMS Delhi; Dr Vijay Agarwal, President, CAHO; JP Dwivedi, CIO, Rajiv Gandhi Cancer Institute and Research Centre; Dr Shuchin Bajaj, Founder, Director Cygnus Group of Hospitals; Dr Gopal Singh Meena, GM – Insurance Operations, Park Group of Hospitals; Dr Upasana Arora, MD, Yashoda Hospitals; Mohit Tandon, General Manager – ITAkash Hospitals; Dr Naveen Nishchal, Co-Founder, Meddo Health; Arun Goyal, CIO, Sir Ganga Ram Hospital and other representatives from Deloitte Public Health team.

Gurus:

Vikram Anand, Partner, Deloitte India; Alok Saxena, Executive Director, Deloitte India; and Pradeep Gupta, Director, Deloitte India

Supported by:

Anita Gupta, Kshiti Garg, Shweta Dhingra, Ruchika Sareen, Shailza Taneja, Deloitte India

The success of ABDM lies in its adoption by healthcare providers. We need to focus on creating user-friendly systems that make it easy for doctors and nurses to integrate digital solutions into their daily workflows.

Dr Nirupam Madaan
Medical Superintendent, AIIMS, Delhi

Under the ABDM, the base transactions are being digitised via ABHA-based patient identification, electronic medical records, digital prescriptions and integrated systems, fundamentally changing how providers deliver care across India. However, this transformative digital initiative needs widespread adoption by medical professionals to succeed. Healthcare providers are thus at the forefront of ABDM implementation.

Implementation in healthcare facilities presents these challenges and opportunities:

- **EMR adoption:** Healthcare professionals face challenges in adopting electronic medical records, a crucial step for digitising patient information and improving healthcare delivery.
- **E-prescriptions:** Inconsistent patient registration methods across hospitals hinder the creation of patient longitudinal health records and further complicate data standardisation efforts.
- **Awareness and education:** Healthcare providers need to be educated about ABDM's components, benefits and implementation to ensure widespread understanding and adoption.

Seamless integration of ABHA ID, digital health records and ABDM-enabled digital health services enhances patient experiences and ensures smoother, more efficient healthcare delivery for patients and service providers.

The journey to digital healthcare requires active participation from providers. The service providers can make a significant impact by actively adopting ABDM-enabled services and encouraging their patients to use them.

ABDM's success further depends on creating user-friendly systems, providing adequate training and ensuring smooth integration with existing workflows. By addressing implementation challenges, ABDM can revolutionise healthcare delivery while making providers' work more efficient.

Opportunities for innovation

Under ABDM, we're working on standardising health claims via the National Health Claims Exchange (NHCX) and making health services interoperable via the Unified Health Interface (UHI). As more and more providers join these platforms, the ecosystem benefits and the health sector progresses.

Raman Upreti
Tech Lead - ABDM

ABDM has emerged as a transformative opportunity for innovation in India. Its base architecture follows a patient-centric approach and provides an open field for innovations. The programme encourages cooperation between healthcare providers and seamless information flow within a secure environment, enabling a continuum of patient care.

National repositories, digitised health records and data anonymisation principles allow data-driven insights for public health initiatives and medical research; this further inculcates innovation and helps improve healthcare outcomes across the country. Some direct benefits include:

- **Improved efficiency:** ABDM's digitisation of health records and streamlined processes boost operational efficiency in healthcare facilities.
- **Better patient care:** Access to comprehensive health records enables providers to make informed decisions and provide personalised care.
- **Enhanced collaboration:** ABDM's interoperability features enable seamless provider information sharing.
- **Data-driven insights:** Health data aggregation through ABDM can yield valuable insights for public health initiatives and medical research.

ABDM opens unprecedented opportunities for healthcare innovation in India. Its unified approach breaks down information barriers between providers, enabling comprehensive patient care. The platform transforms

traditional healthcare delivery through digital integration, data-driven insights and seamless collaboration. Healthcare facilities can streamline operations, make informed decisions and deliver personalised treatment.

Looking ahead, ABDM's success will drive further innovations in clinical decision-making, telemedicine, AI-powered diagnostics and preventive care. The platform's robust infrastructure supports continued advancement in healthcare technology. By fostering innovation and collaboration, ABDM moves India closer to its vision of accessible, efficient and patient-centric healthcare delivery.

The path forward

The Ayushman Bharat Digital Mission represents a significant leap towards transforming healthcare delivery in India. By using technology to create a unified digital health ecosystem, ABDM is paving the way for more accessible, efficient and patient-centric healthcare services.

As we move forward, we should focus on addressing the challenges highlighted by healthcare providers and tech companies. This includes simplified EMR adoption, standardising healthcare data formats and creating more use cases that demonstrate the tangible benefits of the ABDM ecosystem.

As champions of ABDM, we need to focus on weeding out negative factors to build trust between providers and payers in healthcare.

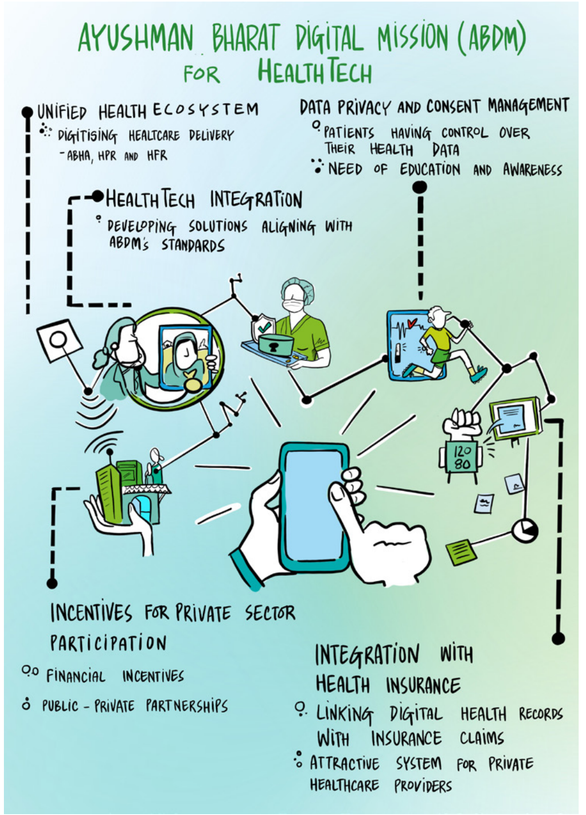
Dr Shuchin Bajaj
Founder, Director, Cygnus Group of Hospitals

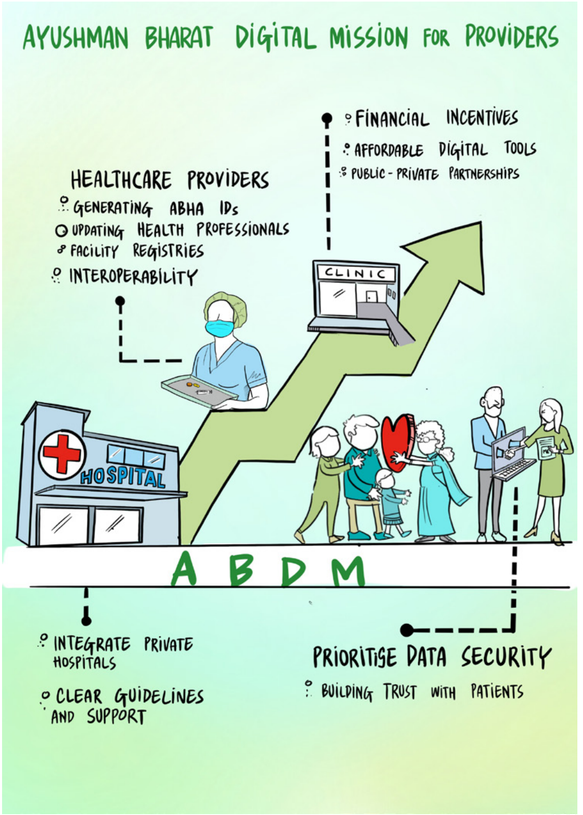
However, the journey is far from over. ABDM's success relies on its widespread adoption by healthcare providers and users, driven by initiatives that revolve around targeted awareness campaigns, capacity-building efforts, streamlined integrations and the development of standardised policies.

The potential of ABDM to revolutionise healthcare delivery in India is immense. By working collaboratively, stakeholders across the healthcare ecosystem can turn this potential into reality, bringing quality healthcare within reach of every Indian citizen. As India progresses towards its vision of a developed nation, ABDM stands as a crucial pillar in ensuring that this development is inclusive, with healthcare at its core.

Key takeaways

- **User-friendly systems:** A pressing need exists for intuitive and easy-to-use EMR systems. Healthcare providers need to focus on creating user-friendly systems that make it easy for healthcare professionals to integrate digital solutions into their daily workflows.
- **Standardisation:** Efforts should be made to standardise healthcare data formats and processes across the country. This will facilitate easier integration with ABDM and improve the overall quality of healthcare data.
- **Incentives for adoption:** As suggested during the *Manthan*, incentives could be provided to encourage adoption, especially among smaller healthcare providers. This could include IT hardware upgrades or financial incentives for digital adoption.
- **Education and awareness:** Comprehensive education and awareness programmes are needed for healthcare providers and patients. These programmes should focus on the benefits of digital health records and address concerns about data privacy and security.





08 | Inclusive Growth: Advancing India's equity

True progress for India means ensuring that every citizen shares the nation's growth, leaving no one behind on the path to Viksit Bharat.

India's strength lies in its unmatched diversity, and any progress towards *Viksit Bharat 2047* will not be possible unless every citizen is able to benefit from this growth. At Ārohaṇa: Growth with Impact, the idea of inclusive growth forming the foundation of equitable progress was at the heart of the event's discussions. For India, a nation rich in cultural and social diversity, inclusivity is much more than just a catalyst for transformative change; it is a moral responsibility and a commitment to the future.

Accessible education as a mechanism of social inclusion proved to be a vital topic of discussion. Special sessions focused on how digital tools are reshaping the education landscape and ensuring that high-quality learning is reaching even the most remote regions and underserved communities. Technology, paired with inclusive policies, is playing a pivotal role in bridging the education gap for millions across the country. The focus remains clear that technology is key to democratising educational access and securing the nation's future. Inclusive policies combined with technology are playing a crucial role in closing the education gap for millions nationwide. The central focus is evident, with technology being essential for making education accessible to all and ensuring the country's future.

As India looks ahead and beyond its shores, inclusive growth strategies must remain central to its agenda. Equitable access to education and opportunities can help India harness the diversity of its citizens and empower every individual to contribute to the development of this great nation. Through inclusive development, India can be assured that its journey on the path to being a global leader is one that is also walked by every single one of its citizens.

8a. Unity in diversity: A transformative reality

V Anantha Nageswaran
Chief Economic Advisor,
Government of India

India's growth must go hand-in-hand with inclusivity, ensuring that no community is left behind in the nation's journey towards becoming a global economic superpower.

In today's evolving global landscape, achieving a leadership position requires a delicate balance that treads the line between rapid economic growth and ensuring inclusivity for its citizens. To realise its goal of becoming a developed nation by 2047, India must achieve high levels of economic growth that are also equitable and inclusive. Achieving this requires public policies, fiscal reforms and sustainable development to work in unison. And while ambition is essential, growth cannot come at the cost of social equity.

The Chief Economic Advisor to the Government of India, V Anantha Nageswaran, spoke at length in a thought-provoking discussion about how India can achieve its growth targets while promoting inclusivity in key areas such as agriculture, export-driven industries and gender equality. These commitments underscore India's dual mission to strengthen its global economic footprint while enhancing the lives of its most vulnerable citizens.

Leaders Speak: Viksit Bharat – Balancing Inclusivity with Growth
Speaker:
V Anantha Nageswaran, Chief Economic Advisor, Government of India

Moderator:
Debasish Mishra, Partner and Chief Growth Officer, Deloitte South Asia

Agriculture and allied sectors are not relics of the past, they are engines of future growth, vital for both rural inclusivity and climate resilience.

V Anantha Nageswaran
Chief Economic Advisor, Government of India

V Anantha Nageswaran emphasized that agriculture and its allied industries will always remain integral to India's economy. Contrary to the assumption that industrialisation and services alone will drive future growth, he reiterated that India must continue to develop agriculture as a fundamental economic pillar while simultaneously developing adaptive strategies for climate change. This includes advancing heat-resistant crops, expanding agricultural R&D and implementing land consolidation measures. Initiatives such as "White Revolution 2.0" highlight how the government is strengthening agriculture and its allied industries, including dairy and poultry.

Agricultural productivity is crucial for India's economic performance, national food security and climate resilience. Therefore, focusing on this creates a dual benefit by increasing rural communities' economic participation while ensuring that agriculture contributes to India's growth story.

Navigating global trade and economic headwinds

Setting ambitious export targets is important. However, India's growth will largely rely on strengthening domestic demand and eliminating internal barriers to trade.

Global economic challenges, including climate-induced shifts in agricultural yields and volatility in international trade, must be closely monitored. While exports are essential to India's growth, domestic consumption will play a more dominant role in India's near-term growth. In this tumultuous landscape, India cannot solely rely on exports, especially amid rising global protectionism and economic slowdowns.

However, V Anantha Nageswaran also noted that while export targets, such as the goal of reaching US$2 trillion in annual exports, serve as strong economic motivators, India must prioritise strengthening its domestic trade networks. Sectors such as electronics and textiles, with their high potential for labour-intensive, job-creating growth, will benefit significantly from export expansion. However, improving internal trade efficiency and reducing logistical bottlenecks should remain central priorities.

Skilling and gender equality as catalysts for inclusivity

Gender equality and skilling aren't just social imperatives; they are economic drivers that will fuel India's progress towards its 2047 goals.

Increasing female labour force participation will directly impact India's economic trajectory, particularly in high-employment sectors such as textiles and electronics. However, to fully integrate women into the workforce, India must introduce additional legal and regulatory reforms to remove structural barriers. Beyond regulations, addressing social challenges, such as workplace safety, childcare and entrenched cultural norms, will be pivotal in fostering greater gender inclusivity.

Heartland Tripura, a collaboration between Deloitte and the National Institute of Electronics and Information Technology (NIELIT), is a remarkable initiative. We trained about 50 engineering and non-engineering graduates from Tripura in basic cyber skills and subsequently hired them into various Deloitte offices across India. It is a powerful story of empowering youth from the Northeast, especially those from non-technical backgrounds. These kinds of initiatives can and must scale.

Debasish Mishra

Another key enabler of inclusivity is large-scale skilling initiatives. Bridging India's skills gap will require sustained investments in vocational training and hands-on work experience, particularly in

tier-2 and tier-3 cities. Internship programmes, vocational training and labour force participation programmes will be essential in bridging the skills gap and ensuring that India's growth includes each segment of the population.

Balancing domestic and foreign investment

According to V Anantha Nageswaran, while FDI remains a crucial component of India's growth strategy, balancing domestic demand and private sector investment is equally essential. India's gross fixed capital formation is growing in the private and public sectors. While this boosts confidence in the nation's economic prospects, much of this growth must also come from tier-2 and tier-3 cities as they further integrate into the formal economy.

This forecast also disproved the myth that private capital has been waiting on the sidelines to invest in India, as the private sector has already made headway with strategic investments. In the end, sustained private sector engagement, particularly in areas such as infrastructure and technology, is key to India's long-term economic resilience.

Key takeaways

- **Agriculture and inclusivity:** Agriculture remains an important pillar for India's growth, especially with investments in R&D, climate resilience and land consolidation.
- **Climate resilience:** India's growth strategy must account for climate change, particularly in agriculture, by promoting heat-resistant crops, sustainable farming practices and agricultural R&D to build long-term resilience.
- **Export ambitions with domestic focus:** While export targets are critical for job creation and economic growth, India must focus on removing domestic barriers and using internal demand as global economic challenges continue.
- **Gender equality and skilling:** Increasing female labour force participation and enhancing skilling programmes are essential to achieve inclusive growth. Addressing regulatory and social barriers is the key.
- **Sustained investment:** Domestic and foreign investments are crucial to maintaining India's growth trajectory, and the private sector must remain actively involved in key sectors such as infrastructure and innovation.

8b. Enabling quality education

Sanjay Kumar
Secretary, Department of School Education & Literacy, Ministry of Education, Government of India

India, one of the world's youngest nations, holds immense human potential. Ensuring that quality education is accessible and affordable is crucial to harnessing this resource. The Government of India's Viksit Bharat vision for 2047 underscores the importance of education as a catalyst for long-term economic growth. However, realising this vision presents significant challenges, such as ensuring equitable access to education, enhancing teacher skills and modernising infrastructure. By focusing on inclusivity and quality, the NEP 2020 aims to eliminate barriers to education based on socioeconomic background. At *Ārohaṇa: Growth with Impact,* we explored the key issues and potential solutions for making quality education accessible and affordable across India.

[29] https://pib.gov.in/PressNoteDetails.aspx?NoteId=153439&ModuleId=3&reg=3&lang=1

The vision of *Viksit Bharat 2047* aims to transform India into a developed nation by the watershed year of 2047, which marks the centenary of India's independence, with education playing a pivotal role in achieving equitable development.[29] Education is essential to realising human potential, strengthening national development and fostering social cohesion. India's education system is among the most diverse in the world, with multiple state and central education boards alongside a vast network of private schools. The government is addressing various issues, such as inadequate access to schools, infrastructure gaps, a fragmented digital platform for recordkeeping and high dropout rates at the primary and secondary levels.

The NEP 2020 envisions a new education system that aligns with global standards, such as the 2030 Agenda for Sustainable Development, while honouring India's rich traditions. It aims to make education more holistic, flexible, inclusive and accessible. Key objectives include improving the gross enrolment ratio, reducing dropout rates, enhancing teacher training and integrating technology into the education system.

Leaders Speak: Affordable and Accessible Education – Critical Pathways for Advancing Social Inclusion and Equity
Speaker:
Sanjay Kumar, Secretary, Department of School Education & Literacy, Ministry of Education, Government of India

Moderator:
Shubranshu Patnaik, Partner and GPS Industry Leader, Deloitte India

The distinguished speaker, Sanjay Kumar, opened the session with a reference to Prime Minister Narendra Modi's remarks on the third anniversary of NEP 2020, which emphasized the importance of providing equitable access to quality education for all children and tailoring education to each child's needs and abilities.

Accessible and affordable education for all
Both state and central authorities govern India's education system. On average, Indian students spend 12.8 years in school, compared with 18 years in developed countries. The Gross Enrolment Ratio (GER) for Class 10 is 79.2 percent, while for Class 12, it is 56.8 percent.[30] The NEP aims to improve these figures by making education accessible and affordable, and improving the quality of our children's education.

Disparities in school enrolment across India are striking, with the average school accommodating about 170 students, while this number falls to approximately 130 students in government schools. In contrast, schools in China and the US average 500 and 461 students per school, respectively. Many Indian schools are very small, especially among the 10 lakh government schools, where 3.86 lakh are classified as such. This highlights challenges in access, which the Right to Education Act seeks to address by recommending a primary school within one kilometre of every neighbourhood.[31]

India aims to achieve 100 percent enrolment for senior secondary-level education by 2030, ensuring that every student completes 15 years of education.

Uniform assessment across boards
India's educational landscape is fragmented, with 62 different boards of education. This fragmentation results in discrepancies in curriculum and assessment methods, making it challenging to ensure continuity when students transfer between states. A uniform assessment system is critical to ensure that students are assessed uniformly regardless of their location.

One Nation, One Student ID initiative
The lack of a centralised system for tracking student achievements complicates the transfer process between schools and states. The One Nation, One Student ID initiative, also known as the Automated Permanent Academic Account Registry (APAAR), proposes a centralised academic repository that would streamline the academic journey for students and facilitate smoother transitions between educational institutions. APAAR brings in the much-needed accountability, and Vidya Samiksha Kendra (VSK) brings visibility that will allow educational decision-makers and service providers to track the end user in the learning ecosystem.[32]

Empowerment of teachers

India has 14.6 lakh schools with 25 crore students and 95 lakh teachers.[33]

Although the government controls 69 percent of the schools, only 54 percent of the teachers are in the public sector, with private schools accounting for 46 percent of teachers.[34] Teacher upskilling is vital to ensure the highest standards of education delivery. Over the past decade, there has been a significant increase in the number

[30] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[31] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024
[32] https://apaar.education.gov.in/#:~:text=This%20initiative%20is%20part%20of%20the%20'One,the%20new%20National%20Education%20Policy%20of%202020.&text=APAAR%20ID%20%2D%20a%20unique%2012%2Ddigit%20code,gradesheet%2C%20degrees%2C%20diplomas%2C%20certificates%.
[33] https://pib.gov.in/PressReleasePage.aspx?PRID=2097864
[34] https://pib.gov.in/PressReleasePage.aspx?PRID=2097864#:~:text=Government%20schools%20comprises%2069%20%25%20of,Ratio%20(GER)%20by%202030.

of female teachers, a positive trend reflecting broader social change. Groundbreaking initiatives such as ITEP, NISHTHA, NPST and NMM will play a pivotal role in creating the "Teachers of Tomorrow."

Digitisation of education
Technology plays a crucial role in teaching and learning, governance and monitoring. With the advent of AI, ML and big data, the demand for skills in mathematics, science, computer science and data science is growing. Digitisation of education is critical to meeting these demands and ensuring that our students remain competitive on the global stage. However, uniformity in digital access and course delivery is essential for effective implementation.

Rich pre-primary education
The NEP 2020 emphasizes foundational literacy and numeracy, especially in the early years, when 80 percent of brain development occurs. The policy encourages instruction in the mother tongue until Class 5 and promotes multilingualism to enhance cognitive skills.

From the age of 3 to 6, when almost 80 percent of your brain develops, you are expected to be in a pre-primary class and have basic foundational literacy and numeracy skills.

Sanjay Kumar
Secretary, Department of School Education & Literacy, Ministry of Education, Government of India

PM SHRI Schools
The PM SHRI School is a centrally sponsored initiative by the Government of India aimed at developing over 14,500 schools[35] managed by the Central Government, State/UT Governments and local bodies, including KVS and NVS. This initiative seeks to create an environment where every student feels welcomed and supported, offering a safe and stimulating learning atmosphere, a diverse range of learning opportunities and a well-equipped infrastructure with the necessary resources to foster effective learning for students.

It will nurture students to become engaged, productive and contributing citizens for building an equitable, inclusive and plural society as envisaged by the NEP 2020.

We hope that the PM Shri schools will become a benchmark for modern schools in India.

Sanjay Kumar
Secretary, Department of School Education & Literacy, Ministry of Education, Government of India

Digital initiatives
The following digital initiatives are already making an impact:

- **Vidyanjali:** This platform connects volunteers with schools, allowing them to contribute time, services or resources. This is complemented by the Digital Infrastructure for Knowledge Sharing (DIKSHA) portal of the Ministry of Education, which enables easy and flexible access to textbooks. The DIKSHA app is available for teachers, students and parents.

[34] https://pib.gov.in/PressReleasePage.aspx?PRID=2097864#:~:text=Government%20schools%20comprises%2069%20%25%20of,Ratio%20(GER)%20by%202030.
[35] https://dsel.education.gov.in/pm-shri-schools

- **Automated Permanent Academic Account Registry (APAAR):** Linked to AADHAAR, this system assigns each student a unique ID, simplifying access to academic records and credit transfers.

The government plans to fully digitise and computerise schools across India in the next five years.

Upskilling of teachers
Continuous professional development is essential for maintaining high teaching standards. The NEP 2020 mandates that teachers and headteachers undergo at least 50 hours of professional development annually on the NISHTHA online platform. The National Mission for Mentoring (NMM) initiative, designed to foster knowledge sharing, will engage 20 lakh mentors from a pool of 1 crore teachers across India.[36]

Manthan: Quality Education
Participants:
Ankur Goel, Manager, EdCIL; Manoj Pandey, Kendriya Vidyalaya Sangathan; Sapna Yadav, Delhi SCERT; Noopur Jhunjhunwala, Founder, Changeink; Avinash Kumar, Dy. Manager, EdCIL; Shivam Gupta, Dy. Manager, EdCIL; Vishal Singh, Dy. Manager, EdCIL; Gaurav Chaudhary, Asst Manager, EdCIL; Naidu, Assitant Manager, EdCIL; Megha Gupta, Executive, EdCIL; Ninad Patil, Executive, EdCIL; Meghna, Delhi University; Rajesh Chelle, Assistant Commissioner, Navodaya Vidyalaya Sangathan; Madan Yadav, Deputy Secretary, NCTE; Manoj Kumar, CMD, EdCIL

Guru:
Sahil Gupta, Partner, Deloitte India

This *Manthan* delved into the challenges and opportunities in delivering quality education across India. The discussions underscored the importance of holistic approaches, from infrastructural improvements to teacher training, as critical to achieving the nation's educational goals.

[36] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

The school of 2047: A transformational hub
In 2047, schools will likely transcend the traditional brick-and-mortar infrastructure we see today. The emphasis will shift from physical buildings to creating versatile learning environments that integrate physical and digital spaces. While access to basic infrastructure, such as classrooms and drinking water, will still be essential, the definition of "infrastructure" will expand to include robust digital platforms, seamless connectivity and AI-driven learning tools. The school of the future will not be constrained by four walls. Still, it will function as a dynamic hub where students learn inside and outside traditional classroom settings, using technology for deeper, more personalised learning experiences.

Foundational skills, conceptual knowledge, perspective development and experiential learning need to be provided in stages across preparatory and middle levels.

- **Teacher training and curriculum development:** The quality of education will start with teachers. Teacher recruitment, training and continuous professional development will be critical. Teacher education systems will be rigorous, ensuring that only those equipped with the necessary pedagogical skills and subject mastery enter the profession. Online training and induction, supported by digital platforms, will allow teachers to stay updated on the latest developments in education technology, psychology and subject matter.
- **Social responsibility and life skills:** Schools will place a greater emphasis on life skills, including leadership, teamwork, critical thinking and environmental consciousness. Beyond academic knowledge,

there will be a strong focus on social responsibility, cultivating future citizens who are aware of their impact on society and the environment. This approach ensures students excel academically and are prepared to contribute meaningfully to their communities and the world at large.

I don't think we need to be in a classroom with a traditional teacher to learn. Schools will become a place to pick up and manage things such as social skills and responsibilities.

Noopur Jhunjhunwala
Co-founder, Changeinkk

- **Equity and inclusion:** The future school will be designed as an inclusive space where diversity is celebrated. Accessibility for students from different social, economic and physical backgrounds will be a priority. The school will become a place for learning, fostering dialogue and understanding across different cultures, languages and abilities.

After the introduction of Samagra Shiksha Abhiyan, the accessibility of educational materials has significantly improved from 62 percent to 98.9 percent.[37] The Right to Education Act also ensures the availability of qualified teachers.

Vocational training

The uptake of vocational education is lower in India than in other countries. The general perception of vocational training in India is that there is not much vertical mobility associated with vocational training. In the Indian social context, education is viewed as a tool to build social justice and equality. When analysed from this angle, we can understand why there are not many takers for vocational education.

Online learning resources for certain skills, such as coding, designing and animation, are becoming immensely popular among learners. This hints that future schools will play a role as a hub of knowledge, and teachers will specialise in helping students acquire knowledge on their own. They will play the role of facilitators more than tutors.

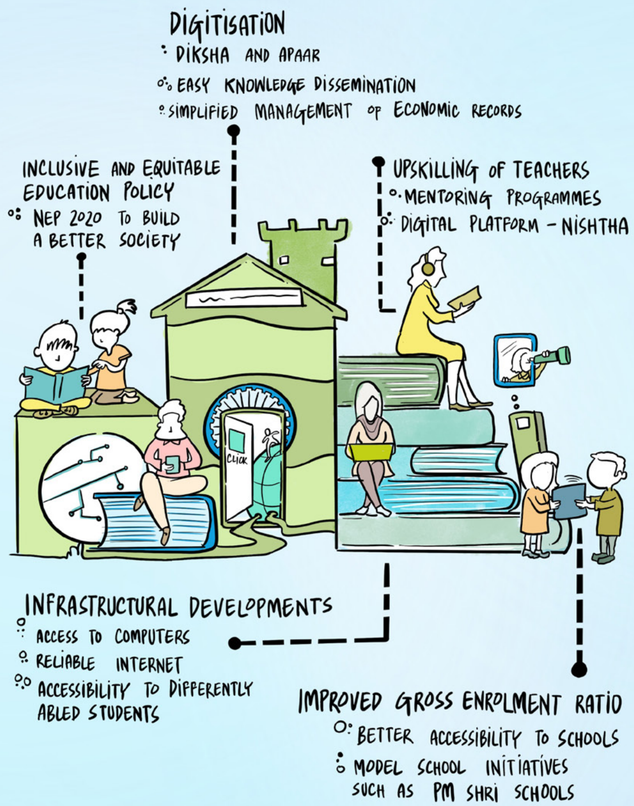
Active discussions are needed to increase the demand for vocational training. Corporations, think tanks and NGOs operating in the education sector have a significant opportunity to collaborate with the government and work towards providing affordable and accessible education for Indian citizens.

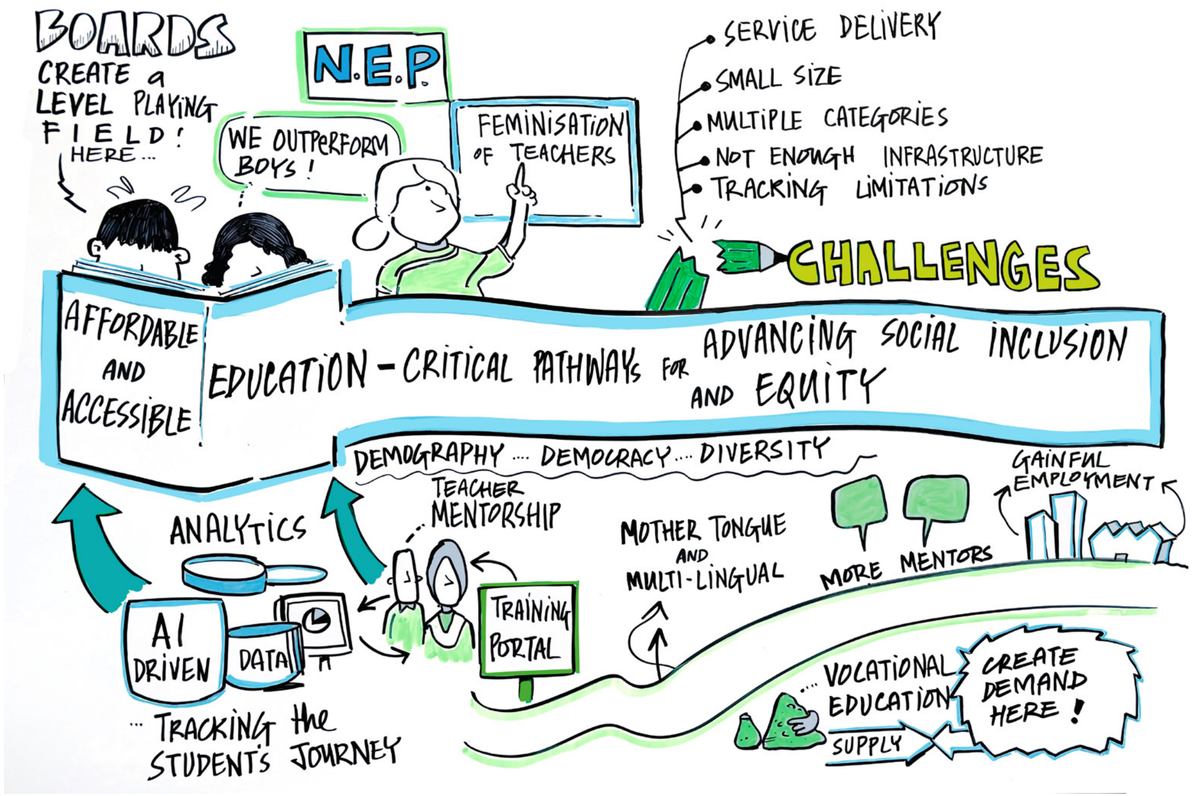
[37] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

Key takeaways

- **Inclusive and equitable education policy:** The NEP 2020 aims to ensure inclusive and equitable dissemination of education for its citizens to build a better society.
- **Infrastructural developments:** The *Viksit Bharat 2047* vision focuses on inclusivity and accessibility of education as its key objectives. In line with this vision, remarkable progress has been made in infrastructure development and digitisation. Schools are provided with access to computers with a reliable Internet connection and infrastructural changes to ensure accessibility for students with disabilities.
- **Improved gross enrolment ratio:** Gross enrolment ratio is increasing across the country. The retention rates are also strong. However, more focus and efforts are underway to ensure better accessibility to schools. Model school initiatives such as PM SHRI schools are expected to bridge the gaps in accessibility to quality schools.
- **Upskilling of teachers:** Mentoring programmes are introduced to ensure experienced teachers share their expertise with their mentees. Also, the digital platform NISHTHA coordinates continuous professional development opportunities for teachers.
- **Digitisation:** In the next five years, schools in India will be completely computerised and connected via the Internet. Digital platforms such as Diksha and APAAR aim to facilitate easy knowledge dissemination and simplified management of academic records, respectively.

QUALITY EDUCATION





09 | Green growth: Powering sustainability in energy and agriculture

India's unique pursuit of green growth is built around energy innovation and sustainable farming, thereby driving economic progress at various levels while preserving environmental integrity for future generations.

India's ambitious journey towards achieving sustainable development encompasses key sectors of energy and agriculture, aligning with its overarching vision of *Viksit Bharat 2047*. This chapter synthesises insights gathered from various panel discussions, and *Manthans* focused on green growth, emphasizing the need for a delicate balance between economic development and environmental sustainability as India confronts the dual challenges of climate change and increasing energy demand.

Panel discussions highlighted the importance of technological innovation in fostering climate resilience, with speakers discussing transformative approaches within the textile, coal and agricultural sectors. These discussions underscore a significant opportunity for India to harness renewable energy sources, improve soil health and enhance water management practices. The focus on inclusive development highlights essential strategies that mitigate environmental impacts and prioritise social equity, creating a sustainable framework for stakeholders.

In the agricultural domain, the session titled *"Sustainable Agri Network: Empowering Agriculture with Sustainable Supply Chain"* shed light on the integration of technology into traditional practices. The participants spoke about the construction measures of the watersheds and the urgent need for market integration to enhance the agricultural supply chain. By harnessing technological innovations, farmers can access other important commodities and markets as they continue to fight the effects of climate change. The promotion of sustainable practices is essential for enhancing agricultural resilience, reducing dependency on fertilisers and improving long-term productivity.

For example, project VISTAAR under the Ministry of Agriculture & Farmers Welfare, considers a vision to create a federated structure to share agriculture-related information and consultancy. Through the implementation of AI-driven platforms, farmers are empowered with localised, reliable data that assists in decision-making. Emphasis on digital tools and the creation of a transparent governance model signify a shift towards a modernised agricultural ecosystem. By bridging knowledge gaps and enhancing crop planning, VISTAAR envisions a resilient future for Indian agriculture, ensuring that farmers remain competitive and sustainable.

Furthermore, the discussions on the Unified Energy Interface (UEI) reflect a strategic transition in managing India's energy resources. The *Manthan* highlighted the necessity of an interoperable framework akin to the Aadhaar system, which aims to facilitate seamless energy transactions among diverse stakeholders. Implementing such a model is critical for fostering a decentralised energy marketplace, enhancing customer choices and connecting otherwise siloed energy networks. This transition is vital for integrating renewable energy solutions while ensuring the stability of the energy supply amid the growing peak demand.

The challenges posed by increasing energy demand require a more extensive approach that addresses both the supply and demand sides of the equation. The exploration of various interventions, such as enhancing conventional power plant capacity and deploying energy storage solutions, marks a proactive approach towards meeting rising energy requirements. Additionally, demand-side measures such as dynamic pricing and integrated agricultural load shifting can effectively reduce peak demand, steering the country closer to its net-zero goals.

In summary, India stands at a pivotal juncture in its journey towards sustainable development. The effective adoption of new technologies across the energy and agricultural domains is vital as they help solve existing problems and unlock new economic frontiers. Through collaboration between government organisations, industry stakeholders and local communities, India can create an inclusive and resilient environment that thrives in the face of climate change.

9a. Facing the climate crisis with green technology

Rupinder Brar
Additional Secretary
Ministry of Coal

Sanjay Garg
Additional Secretary, DARE & Secretary, ICAR

Amit Kumar Ghosh
Additional Secretary, Ministry of Social Justice & Empowerment

Rohit Kansal
Additional Secretary, Ministry of Textiles

India is steadily advancing towards its vision of *Viksit Bharat 2047*, a goal marked by sustainable development and economic resilience. Green growth, which integrates economic progress with environmental sustainability, has become a central pillar of this vision. At the national and state levels, India is increasingly adopting green technologies and strategies to mitigate the effects of climate change, protect natural resources and build a future-ready economy. This commitment reflects a collective effort to reduce dependency on fossil fuels, increase renewable energy use and establish ecologically balanced infrastructure.

The Government of India is fostering collaborations with private enterprises, innovative start-ups and multinational organisations to position green technology at the centre stage. Projects such as renewable energy grids, water management and smart agriculture highlight India's dedication to balancing development with environmental sustainability.

Green growth is no longer a vision; it has become a strategy that strengthens India's position in the global economy while maintaining ecological balance.

In the panel discussion, *"Green Growth Technology: A Pathway to Sustainable Development,"* leaders from the government and private sectors explored how green technology is reshaping industries, the challenges hindering sustainable progress and the collaborations required for success. India strives to achieve green growth in diverse areas, such as textiles, agriculture and energy, emphasizing quality-driven contamination control methods. These comprehensive initiatives position India for a more secure and integrated future driven by sustainable development.

Panel: Green Growth - Technologies for Energy Innovation and Climate Resilience
Participants:
Rupinder Brar, Additional Secretary, Ministry of Coal; Sanjay Garg, Additional Secretary, DARE & Secretary, ICAR; Amit Kumar Ghosh, Additional Secretary, Ministry of Social Justice & Empowerment; Rohit Kansal, Additional Secretary, Ministry of Textiles and Will Symons, APAC Climate & Sustainability Leader, Deloitte

Moderator:
Viral, Thakkar, Partner and Sustainability and Climate Leader, Deloitte South Asia

Green growth is not only an environmental necessity but also an opportunity to redefine India's global leadership.

Sanjay Garg
Additional Secretary, DARE & Secretary, ICAR

According to the Indian Council of Agricultural Research (ICAR), agriculture, an important sector of the Indian economy, has several climate risks triggered by changing weather patterns and declining cultivable land area. To address this, initiatives such as the Soil Health Card were launched, which offer farmers critical information on nutrient levels, enabling better crop management. More than 14.5 crore health cards have been distributed, advising farmers on efficient fertiliser usage and soil restoration methods. Alongside these initiatives, the *Pradhan Mantri Krishi Sinchai Yojana* focuses on water conservation and irrigation efficiency, bringing millions of hectares under micro-irrigation.[38]

Innovative and sustainable practices in agriculture can secure food systems and protect resources for future generations.

ICAR's research into climate-resilient seed varieties marks another leap towards sustainable agriculture, with drought-resistant crops ensuring productivity despite weather uncertainties. While food security has been achieved, the next challenge is ensuring nutritional security. To tackle this, Biofortification efforts are being implemented to enhance grains with essential nutrients, aiming to fight malnutrition and improve overall health.

The shift to coal gasification will allow us to produce clean energy without traditional mining, marking a transformative step for the coal industry.

Rupinder Brar
Additional Secretary, Ministry of Coal

The coal industry has been a cornerstone of India's energy landscape and is undergoing a significant transformation to align with sustainable goals. Current strategies to foster a sustainable coal sector while transitioning to greener alternatives focus on three key areas, including improving mining processes, optimising transportation logistics and enhancing afforestation efforts.

The ministry endorses better mining practices that integrate advanced machinery to minimise environmental impacts. This commitment extends to developing thermal power plants close to coal mines, aiming to reduce transportation distances and their associated environmental challenges. Restoring coal mines is part of a broader strategy, with plans to develop green clusters and promote ecotourism in these regions.

Green growth represents a path where economic development and sustainability coexist. Empowering communities through sustainable practices is key to achieving inclusive green growth.

[38] https://pib.gov.in/PressReleasePage.aspx?PRID=2043789#:~:text=by%20PIB%20Delhi-,Soil%20Health%20&%20Fertility%20Scheme%20is%20being%20implemented%20by%20Government%20since,reply%20in%20Rajya%20Sabha%20today.

Among the major employment generators of the Indian economy is the textile industry, which is gradually gearing up to install sustainable industrial standards. Apparel and textile industries employ one-third of manufacturing industries' employees and contribute about 10 percent to the export business, making sustainability efforts essential.[39]

The textile industry's potential for sustainable practices is vast, especially among smaller clusters and MSMEs.

Rohit Kansal
Additional Secretary, Ministry of Textiles

These initiatives are built on the four pillars of efficiency, which are material, water, energy and governance. For example, large textile companies increasingly source more than half of their energy from renewable sources such as solar power. Innovations from smaller clusters and MSMEs, such as Tiruppur, the largest knitwear export cluster, highlight these efforts, with the region successfully treating 95 percent of its wastewater and sourcing a significant portion of its energy sustainably.

The Samana cluster in Punjab, with 70 percent of its workforce comprised of women, demonstrates how sustainable development can drive inclusive economic growth. To further enhance sustainability, the textile sector is adopting solar power, optimising material usage and innovating wastewater treatment.

Inclusive strategies in green growth ensure that no community is left behind in the transition to a sustainable future.

Climate change's socioeconomic impact extends beyond environmental risks, disproportionately affecting vulnerable communities. The need for inclusive strategies to address this disparity was emphasized, with initiatives aimed at economically supporting marginalised groups, including waste pickers, sanitation workers and rural communities facing water scarcity.

The ministry has recently focused on waste pickers, ensuring their compliance with waste management systems and capacity building to allow productive employment. In addition, the ministry has been working hand in hand with the Ministry of Agriculture to help neglected farmers gain access to sustainable agricultural programmes.

Inclusivity is essential; without it, social justice remains an incomplete vision.

Amit Kumar Ghosh
Additional Secretary, Ministry of Social Justice & Empowerment

The ministry is committed to creating frameworks that address social disparities, ensuring no one is left behind in the shift to a green economy.

Technology plays a key role in driving green growth across agriculture, energy and waste management. Innovation, especially in renewable energy and carbon capture, is crucial, with advancements in solar, wind and battery storage essential for a cleaner, self-reliant energy grid. Additionally, the government's focus on hydrogen production supports India's goal of becoming a leading exporter of green energy.

[39] https://pib.gov.in/PressReleasePage.aspx?PRID=2117470#:~:text=Overview%20of%20India's%20Textile%20Industry,MSME)%20clusters%20in%20the%20country.

India has ambitious plans for green hydrogen and sustainable aviation fuel, using agricultural resources to drive decarbonisation.

Will Symons
APAC Climate & Sustainability Leader, Deloitte

India's transition to net-zero emissions hinges on three key strategies, including decarbonising electricity grids, removing carbon from the atmosphere and using hydrogen as a sustainable energy source.

Technological advancements, such as drones for assessing coal quality and reserves, help reduce environmental impact in the coal industry, with institutions such as IITs leading the way. Such advancements underscore the government's commitment to reducing the carbon footprint of traditionally high-pollution sectors through innovative technologies.

Institutional collaboration and policy support are vital in ensuring that green growth initiatives are effective and inclusive. Regulatory frameworks, such as the Business Responsibility and Sustainability Reporting (BRSR) mandate, require companies to disclose sustainability practices, promoting transparency and accountability.

PPPs in green technology are vital to achieving a large-scale environmental and economic impact.

Collaborations among the government, the private sector and international organisations have led to the creation of CoEs, such as IIT Kanpur's AI-driven entrepreneurship centre, which supports start-ups across sustainable technology sectors. These collaborations also drive the development of green infrastructure, such as renewable energy facilities, green hydrogen plants and Electric Vehicle (EV) manufacturing hubs.

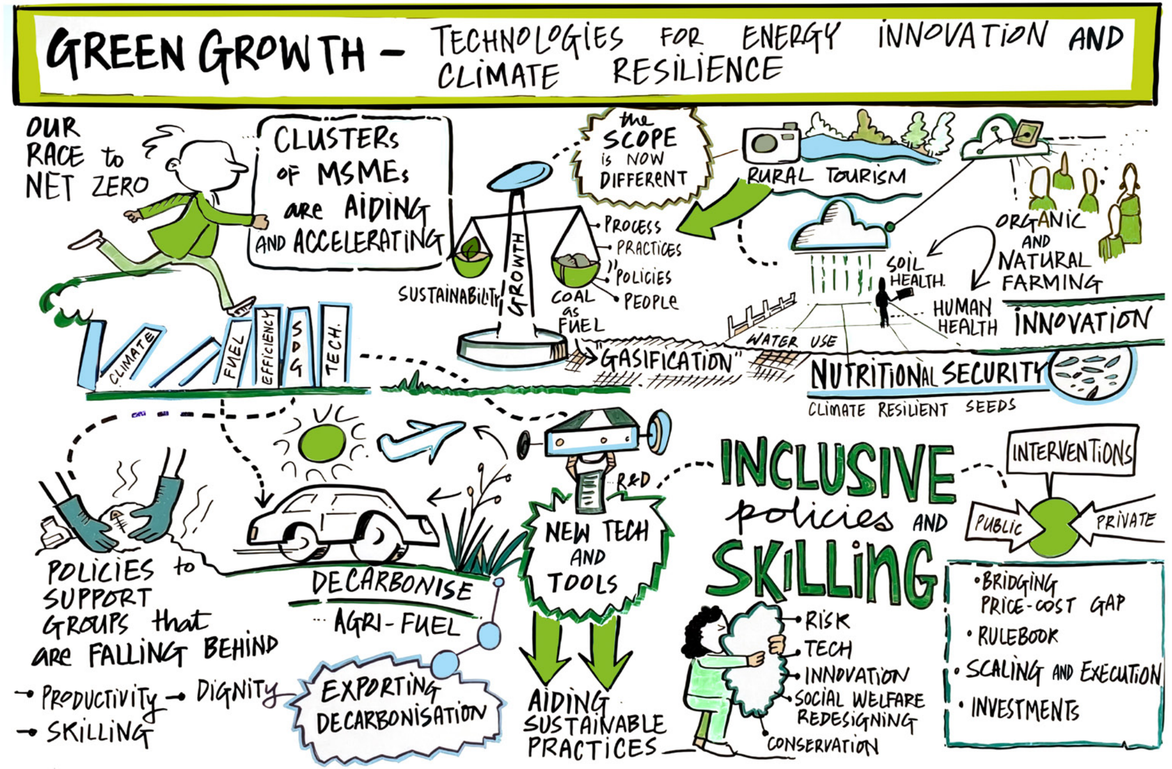
India's journey towards green growth is marked by innovation, collaboration and inclusivity. The collective efforts of the government, the private sector and research institutions set a foundation for sustainable development, prioritising resilience and equity.

Resource efficiency, from water conservation to clean energy, defines India's approach to a balanced, green economy.

As India strives to become a developed nation by 2047, addressing climate change alongside socioeconomic challenges remains central to national discussions.

Key takeaways

- **Green growth goals:** The Government of India is steadfast in turning its vision of *Viksit Bharat 2047* into reality. Addressing climate change challenges while identifying opportunities for sustainable transformation is essential for this vision.
- **Impact of climate change on GDP:** Potential GDP losses from climate change could reach US$15 billion by 2070, highlighting the urgent need for sustainability measures across sectors.
- **Textile sector innovations:** The Ministry of Textiles emphasizes sustainability through initiatives focused on material, water, energy efficiency and governance, showcasing successful examples from large companies and MSMEs.
- **Coal sector transition:** The Ministry of Coal advocates a balanced approach between energy security and sustainability, enhancing mining processes, optimising transportation and promoting afforestation efforts.
- **Agriculture resilience:** ICAR highlights sustainable agriculture practices, emphasizing soil health through initiatives such as the Soil Health Card scheme and promoting organic farming to improve agricultural resilience.
- **Social justice initiatives:** The Ministry of Social Justice and Empowerment addresses climate change impacts on marginalised communities by integrating waste pickers and urban sanitation workers into sustainable development frameworks.
- **Technology and innovation in sustainability:** The discussions highlight the role of technology, focusing on renewable energy, carbon removal and hydrogen production as key areas for India's transition to net-zero emissions.
- **Inclusive growth strategies:** The necessity for marginalised populations to benefit from sustainable development efforts is emphasized, advocating for targeted programmes and financial support.



9b. Sowing the seeds for India's smart and sustainable agriculture

Faiz Ahmed Kidwai
Additional Secretary,
Ministry of Agriculture
& Farmers Welfare

Ranjit Singh Deol
Principal Secretary,
Food & Civil Supplies,
Government of
Maharashtra

Nitin Khade
Joint Secretary,
Department of
Land Records

By ensuring that sustainability is embedded in every stage of agricultural production, India can create a more resilient and inclusive agri-economy that empowers farmers while ensuring food security for the nation.

With a greater focus on digital innovation and sustainability-focused networks, India is transforming its agriculture sector into a resilient ecosystem for farmers. AgriTech refers to applying agriculture, horticulture and aquaculture technology to improve various input and output processes. To meet the industry's critical challenges, digital frameworks, such as the Sustainable Agri Network, provide novel solutions by focusing on efficient supply chains, watershed management and optimised storage, all of which are geared towards nurturing sustainable farming practices and farmer income generation.

AgriTech further adds to this by giving farmers market access to various digital tools and platforms, helping them reduce post-harvest losses, access financing and respond to consumer demand.

Open AgriNet and VISTAAR complement these efforts with federated, AI-driven networks that understand a farmer's needs and help deliver localised, real-time advisory and input, agri equipment and other services to farmers across regions. Such open networks connect farmers with tailored insights, transparent resources and a trusted, standardised governance model, ensuring that they benefit from reliable guidance and seamless market integration. Together, these initiatives create a digitally empowered and sustainable framework for Indian agriculture, ready to meet the demands of a dynamic future.

Panel: Sustainable Agri Network – Empowering Agriculture with Sustainable Supply Chains

Participants:
Faiz Ahmed Kidwai, Additional Secretary, Ministry of Agriculture & Farmers Welfare; Ranjit Singh Deol, Principal Secretary, Food & Civil Supplies, Government of Maharashtra and Nitin Khade, Joint Secretary, Department of Land Records

Moderator:
Srinivas Kuchibhotla, Partner, Deloitte India

Sustainability in agriculture is the key to long-term resilience, empowering farmers while ensuring food security for future generations.

Being far more than just the backbone of India's economy, agriculture is intrinsically rooted in the nation's DNA, intertwining deeply with rural livelihood and food security. However, for Indian agriculture to thrive in the 21st century, it needs to be sustainable by promoting economic growth while also protecting the environment. The Sustainable Agri Network seeks to empower Indian agriculture in this regard by achieving the following:

- Addressing critical challenges in the supply chain
- Fostering inclusive growth
- Integrating sustainable practices
- Bolstering productivity and long-term resilience

This panel discussion will provide greater insights into themes such as watershed management, Farmer-Producer Organisations (FPOs) and how technology and digitisation will help improve agricultural practices.

Watershed development and agricultural sustainability

Through watershed management, we have raised water tables and increased farmer incomes by 70 percent, proving that sustainable practices lead to economic growth.

Faiz Ahmed Kidwai
Additional Secretary, Ministry of Agriculture & Farmers Welfare

One of the primary themes emphasized during the session was the importance of watershed management in promoting sustainable agricultural practices. Various initiatives have led to the restoration of degraded lands, boosting agricultural productivity, raising water tables, and increasing farmer incomes by up to 70 percent. By introducing integrated farming, such as mixed crops and agri-horticulture, India can maintain soil health and reduce the environmental burden on farming ecosystems.

Moreover, new technologies involving climate resource management and hydrology studies are also being introduced to effectively manage water resources and protect against drought risks in states such as Karnataka and Odisha. Ultimately, the goal is to develop resilient and climate-adaptive agricultural systems that can sustainably support local communities and ensure that they are no longer at the mercy of environmental hazards.

Digital tools for market integration and efficiency

By integrating technology into supply chains, India's farmers are gaining access to fairer markets and more efficient distribution systems.

Ranjit Singh Deol
Principal Secretary, Food & Civil Supplies, Government of Maharashtra

A significant challenge for Indian farmers is the disparity in market access and pricing, often leading them to sell at wholesale prices while purchasing inputs at retail prices. To address this, the expansion of specialised platforms can be a potential solution for integrating agricultural markets, offering better pricing transparency and market reach.

Digitisation also plays a crucial role in enhancing food distribution systems. The use of Aadhaar to streamline procurement processes in the Public Distribution System (PDS) has reduced inefficiencies,

saving up to 40 percent in logistics costs through route optimisation. Additionally, Aadhaar's integration in beneficiary identification ensures that food reaches those who need it most, making the supply chain both efficient and inclusive.

Farmer producer organisations and market access

Farmer Producer Organisations (FPOs) are revolutionising market access for small and marginal farmers, giving them the power to negotiate better prices.

Nitin Khade
Joint Secretary, Department of Land Records

FPOs are emerging as critical players in helping small and marginal farmers gain bargaining power and access better market opportunities. India now has over 40,000 FPOs, which are working collectively to reduce market barriers and standardise agricultural products. By organising into FPOs, farmers can aggregate produce, access higher-value markets and engage directly with industries that require quality-assured goods.

The growth of FPOs is also instrumental in achieving price consolidation, allowing farmers to bypass intermediaries and secure higher returns on their produce. As India continues to develop a central registry for FPOs, these organisations will play a pivotal role in supply chain efficiency and market integration.

Manthan: AgriTech

Participants:
Dr K Guite, Economic Advisor, Department of Consumer Affairs; Nipun Mehrotra, Co-founder and CEO, TAC; Sanjiv Rangrass, Co-founder, TAC; and Siddhartha Sinha, Chief Technology Officer, NeRL

Guru:
Srinivas Kuchibhotla, Partner, Deloitte India

AgriTech is transforming Indian agriculture by reducing inefficiencies and empowering farmers with data-driven insights and direct market access.

While agriculture has been rightfully lauded as the crown jewel of India's economy, the sector has had its potential dramatically limited by supply chain inefficiencies, lack of market transparency and post-harvest losses. The solution to overcoming many of these challenges lies in AgriTech, which involves integrating digital technology to boost productivity, reduce waste and streamline agricultural supply chains. AgriTech can empower Indian farmers through digital marketplaces and real-time data collection to achieve sustainable and profitable agricultural standards.

During this *Manthan*, critical issues such as price variation, data challenges and storage inefficiencies were addressed. Additionally, Indian agriculture's readiness to transform and create a more transparent, efficient and resilient system for farmers and consumers was at the forefront of discussion, with technology as the catalyst for this change.

Addressing price variations and post-harvest losses

With the right technology, post-harvest losses can be minimised, boosting farmer incomes and streamlining the agricultural supply chain.

Nipun Mehrotra
Co-founder and CEO, TAC

Price variations after harvesting have been a significant challenge in Indian agriculture, as this issue has arisen mainly due to the inefficiencies of supply chains. Consequently, this has resulted in catastrophic yearly losses in terms of logistics and warehousing, estimated to be more than INR1.2 lakh crore annually. The uneven distribution of storage facilities across India exacerbates this issue, with less than 50 percent of the required capacity available compared with developed countries, where storage exceeds demand.

AgriTech solutions focus on minimising post-harvest losses by improving storage infrastructure and traceability. Digital platforms can ensure real-time monitoring of produce, allowing for better decision-making on when and where to sell, reducing waste and ensuring better price realisation for farmers.

Data challenges in the value chain

Without timely data on market prices and stock levels, farmers are left in the dark: AgriTech is lighting the way with real-time insights.

Sanjiv Rangrass
Co-founder, TAC

AgriTech is also poised to make a sizable impact on the availability and quality of agricultural data. However, one of the current limitations to this endeavour is that the available data on market pricing, production and consumption is very limited and often outdated. For example, while production data is available, stock availability and consumption data are rarely published, creating a gap in understanding real-time market dynamics.

DPI for agriculture is vital to closing this gap. AgriTech can offer more accurate insights to farmers and policymakers by building platforms with real-time data on stock levels, price fluctuations and consumer demand. With these insights on hand, farmers will then be able to make the best possible decision regarding when to sell their produce and at what price and eventually obtain the maximum profit in the current market.

Quality standardisation and financing

Standardising quality through digital assaying systems will ensure that farmers get fair prices while building trust in the agricultural value chain.

Siddhartha Sinha
Chief Technology Officer, NeRL

One of the longstanding challenges in Indian agriculture is the lack of quality standardisation for domestic produce. While imports are subject to strict quality standards, domestic produce often suffers from inconsistencies, leading to transactional inefficiencies across the supply chain. AgriTech platforms can help standardise quality by offering assaying services, where produce is graded and certified based on specific parameters. This ensures that farmers get fair prices for quality produce and builds trust within the value chain.

Additionally, AgriTech is driving change in financial accessibility. These digital platforms use Electronic Warehouse Receipts (EWR), allowing farmers to store their produce in accredited warehouses and use them as collateral to access funds. This eases the pressure on farmers, who are often forced to sell quickly after harvest at lower prices and provides them with the liquidity to wait for better market conditions.

Consumer insights and market integration

By aligning agricultural production with consumer demand, AgriTech can reduce price fluctuations and bring stability to both farmers and consumers.

Dr K Guite
Economic Advisor, Department of Consumer Affairs

AgriTech also enables farmers to access information on consumer demand and prices, thus stabilising prices between farmers and consumers. Data collection about retail prices and consumer purchasing patterns allows farmers to align their production with market demand. This leads to better farmers' prices and benefits consumers by keeping prices stable through more efficient supply chain management.

Additionally, the proliferation of digital marketplaces such as the Electronic National Agriculture Market (ENAM) allows for the seamless sale of produce to buyers directly, reducing dependency on intermediaries and encouraging greater value for pricing. Finally, these platforms provide greater market transparency, enabling farmers to access national markets and ensure they receive fair prices for their produce.

Manthan: Open AgriNet and VISTAAR

Participants:

Samuel Praveen Kumar, Joint Secretary, Extension, Ministry of Agriculture & Farmers Welfare; Ramesh MC, CEO, COSS; Vivek Garg, Vertical Leader for Agriculture, AWS; Akanksha Nagpal, Senior Data Architect, CABI; Bhavika Nanawati, GIZ Advisor - AI, GIZ; Kirti Pandey, Advisor AI, GIZ; Reuben Swamickan, Deputy Director, USAID; Asha Chandra, Assistant General Manager, NABARD; Sumit Kumar, Product Leader, ONDC; Yuvraj Ahuja, Program Coordinator, IFC; Rob Strey, Co-Founder & CTO, Plantix; Vikas Kanungo, Senior Digital Transformation Expert, World Bank; Mamta Kohli, Regional Gender, Social Inclusion, and Adaptation Specialist, Climate Finance Network, Bureau for Asia and the Pacific, UNDP; Ankur Bansal, Founder and CEO, GDI Partner; Ruby Pathania, Programme Manager, Wadhwani AI; Ashutosh Pant, Programme Manager, Wadhwani AI; Dr Sujeet Kumar Jha, Principal Scientist, ICAR; Pankaj, AWS; Niyati Joshi, Director (Fisheries Statistics, Fisheries Economics), Department of Fisheries; Anchal Garg Karanth, Senior Economic Officer, ADB; Punith, Climate Collective; Anirban Sarma, Director, Digital Societies Initiatives, ORF; Savita Muley, Haqdarshak; M Dhar, WFIndia; Amitabh Nag, CEO, DIBD (BHASHINI) and Director IndiaAI; Ketav Mehta, Investor and Lead, Unified Krishi Interface, Nasik

Guru:

Sreeram Ananthasayanam, Partner, Deloitte India

Open AgriNet and VISTAAR are transforming Indian agriculture by connecting farmers to a digital ecosystem of trusted, real-time advisory and resources.

Inspired by the Beckn protocol, open networks can play a transformative role in fostering sustainable agriculture by connecting farmers with essential resources and services.

Open AgriNet and VISTAAR, two innovative open networks aimed at building a strong interconnected ecosystem for farmers, advisors and market stakeholders, are set to elevate Indian agriculture to new heights. Open AgriNet is a federated network aimed at enhancing accessibility to agricultural knowledge, practices and digital tools. VISTAAR is an initiative focused on creating a dynamic, AI-driven advisory network. It provides farmers with access to a curated repository of information on best practices, government schemes and real-time advisory services.

These platforms represent a shift from isolated, region-specific support to a unified digital framework, empowering farmers with greater market access, transparency and advisory resources. By connecting farmers to an extensive digital ecosystem, Open AgriNet and VISTAAR are set to foster sustainable growth, bridge information gaps and address the varied needs of India's agriculture sector.

Federated and decentralised structure for information flow

A federated, AI-driven approach ensures that every farmer, regardless of region, can access tailored, localised insights for better decision-making.

Open AgriNet and VISTAAR employ a federated structure, allowing decentralised governance while maintaining a consistent information flow across different states and platforms. This design ensures that each state can customise its VISTAAR system to meet local needs while adhering to a central protocol that standardises data exchange. As with UPI's unified payments protocol, this structure enhances reliability, ensuring that stakeholders, from state governments to local farmer groups, operate within a shared information framework.

Such a decentralised setup enables local adaptations while promoting a seamless flow of information across regions. By decentralising content vetting and policy review, each state can exercise autonomy in implementing tailored governance mechanisms, creating a system that can accommodate diverse agricultural needs and capacities.

AI-driven advisory and seeker platforms for personalised support

With VISTAAR's AI-enhanced advisory, farmers can access real-time, personalised advice, enabling them to adopt best practices based on specific crops, seasons and local conditions.

Samuel Praveen Kumar
Joint Secretary, Ministry of Agriculture & Farmers Welfare, Government of India

A standout feature of VISTAAR is its use of AI-driven advisory systems to provide real-time, tailored information to farmers. VISTAAR's seeker-side platform connects directly with farmers, acting as a user-friendly interface where they can access information relevant to their specific crops, local conditions and seasonal patterns. Through this AI-enhanced network, VISTAAR personalises advice, helping farmers make informed decisions based on localised insights and curated data.

This approach allows the seeker and provider platforms to support year-to-year learning, where farmers can adopt best practices shared by peers in similar climates or crop cycles. For example, a farmer in Karnataka could learn about drought-resistant techniques successfully implemented in Gujarat, fostering cross-regional knowledge sharing that builds resilience against climate variability.

Standardised, transparent to build trust

Standardised governance ensures that farmers can rely on the accuracy and quality of the information, building trust across the agricultural ecosystem.

Rajeesh Menon
Head- Global Programmes, FIDE

Transparency and trust are paramount in ensuring farmers' full engagement with these digital networks. To this end, Open AgriNet and VISTAAR emphasize standardised governance protocols, including content verification, fulfilment network vetting and feedback loops. Farmers' trust in these systems is built through reliable, verified information, which is achieved by setting clear guidelines and ensuring compliance across various fulfilment and advisory networks.

Furthermore, the standardised approach across platforms provides visibility into transactions and information exchanges, allowing farmers to verify the sources of their inputs, advisory services and market data. With well-defined vetting structures, farmers receive consistent quality across services and can make confident decisions on crop management, pricing and input selection.

Interoperability and compatibility across platforms

Interoperability with other digital platforms makes Open AgriNet and VISTAAR seamless, integrating public and private resources for holistic farmer support.

Samuel Praveen Kumar
Joint Secretary, Ministry of Agriculture & Farmers Welfare, Government of India

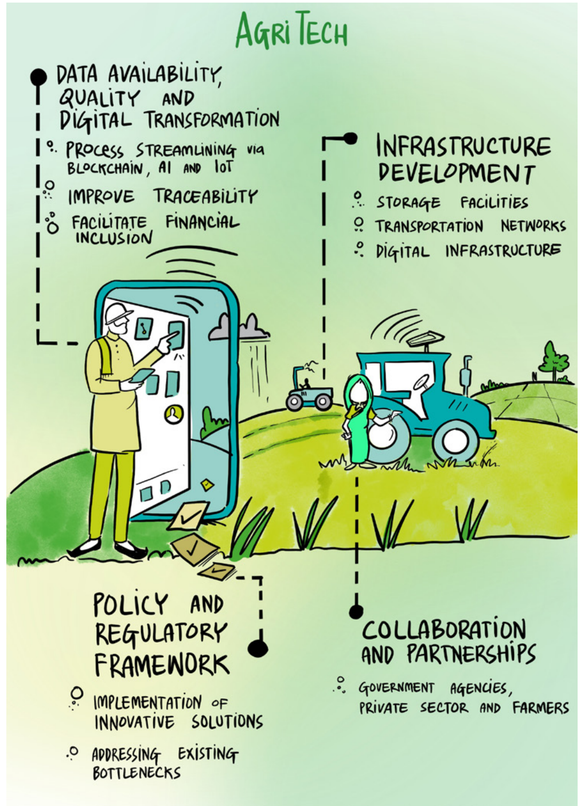
VISTAAR and Open AgriNet are designed to be interoperable with other digital networks, including the Open Network for Digital Commerce (ONDC) and Aadhaar-linked platforms. This interoperability ensures that information from government databases, market advisories and private sector solutions can flow seamlessly across the digital agriculture ecosystem.

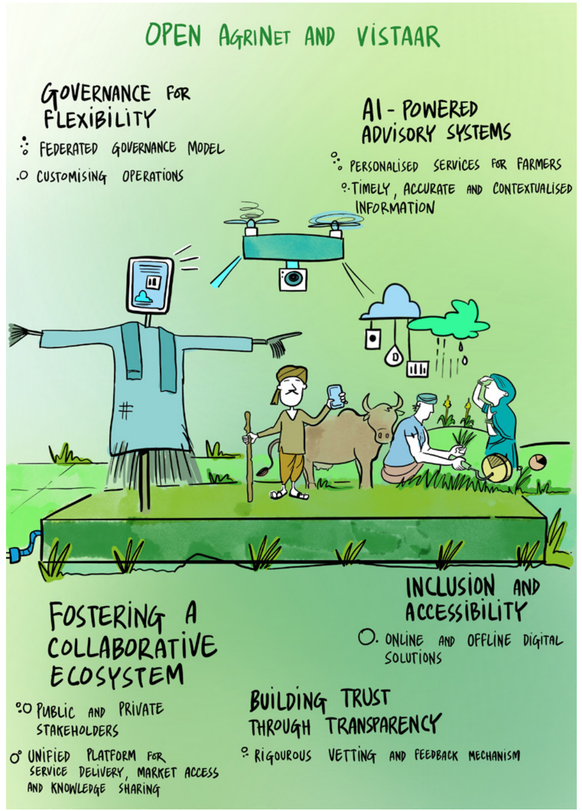
By establishing a shared standard, these platforms simplify the user experience, eliminating the need for farmers to manage multiple incompatible systems. This interconnectedness enhances efficiency and enables greater resource sharing among stakeholders, from small cooperatives to state government bodies, thus driving a more cohesive agricultural network.

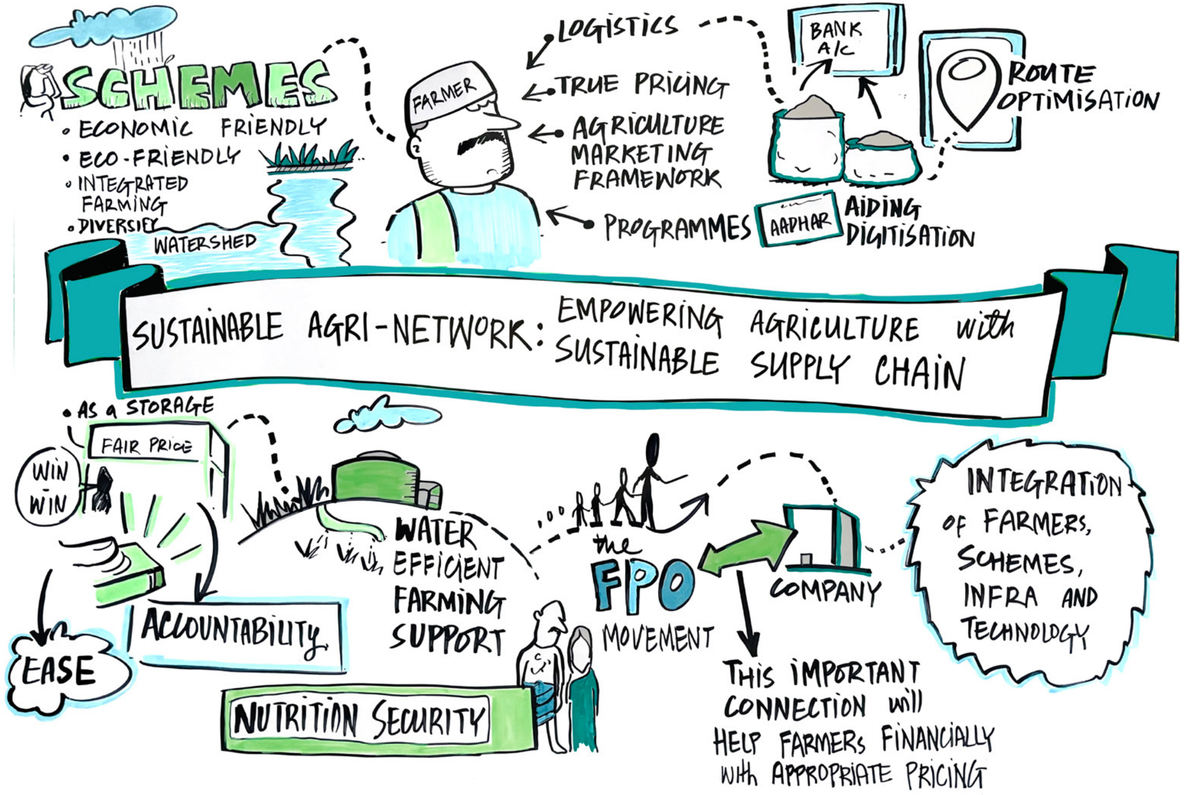
Ārohaṇa (आरोहण) | Growth with impact

Key takeaways

- **Watershed management:** Sustainable agriculture starts with adequate water and soil conservation practices, as demonstrated by successful initiatives that have increased farmer incomes and agricultural productivity in degraded lands.
- **Technology for supply chain efficiency:** Digital platforms and Aadhaar-based systems are improving market access, increasing transparency and optimising logistics to make the agricultural supply chain more inclusive and efficient.
- **FPOs and farmer empowerment:** FPOs are critical to giving small farmers collective power, enabling them to access better markets, negotiate higher prices and integrate into global supply chains.
- **Climate resilience through innovation:** Investments in new technologies, such as hydrology studies and climate resource management, are key to creating resilient agricultural practices that can withstand climate change and drought conditions.
- **Nutrition security:** Encouraging the cultivation of millets and other sustainable crops supports food security and environmental sustainability by promoting water-efficient, nutritious alternatives to traditional grains.
- **Minimising post-harvest losses:** AgriTech solutions address inefficiencies in logistics and storage that lead to substantial post-harvest losses, saving farmers significant amounts and improving price realisation.
- **Data-driven agriculture:** Digital platforms are essential for collecting and sharing real-time data on stock levels, market prices and consumer demand, allowing for more informed decision-making.
- **Quality standardisation:** AgriTech platforms help ensure farmers receive fair prices for their produce while building trust in the agricultural value chain by offering grading and assaying services.
- **Improved access to finance:** Electronic warehouse receipts give farmers access to credit, enabling them to store their produce and wait for favourable market conditions without financial pressure.
- **Enhanced market access:** Digital platforms such as eNAM allow farmers to sell directly to buyers, reducing their dependence on intermediaries and improving market transparency.
- **Decentralised, federated open networks:** Open networks for agriculture, built on decentralisation, interoperability and inclusivity, can drive sustainable farming, empower farmers and enhance food security. Open AgriNet and VISTAAR use a federated model to ensure local relevance while maintaining a unified network across regions.
- **Personalised AI-driven advisory:** VISTAAR's AI-enhanced network offers farmers tailored, real-time advisory services, helping them make informed decisions based on regional data, crop needs and peer insights.
- **Standardised governance for trust:** By implementing standardised content vetting and feedback mechanisms, VISTAAR builds trust among farmers, ensuring they receive accurate, reliable information and services.
  - **Inclusive, interoperable networks:** Open AgriNet and VISTAAR connect seamlessly with digital platforms, lowering access barriers for smallholder farmers and enabling rural entrepreneurs to offer services within a self-sustaining ecosystem.
- **AI-powered insights:** Using local data, the networks deliver tailored, sustainable farming advice, addressing pests, weather and soil conditions.


AgriTech
DATA AVAILABILITY, QUALITY AND DIGITAL TRANSFORMATION
PROCESS STREAMLINING via BLOCKCHAIN, AI AND IoT
IMPROVE TRACEABILITY
FACILITATE FINANCIAL INCLUSION
INFRASTRUCTURE DEVELOPMENT
STORAGE FACILITIES
TRANSPORTATION NETWORKS
DIGITAL INFRASTRUCTURE
POLICY AND REGULATORY FRAMEWORK
IMPLEMENTATION OF INNOVATIVE SOLUTIONS
ADDRESSING EXISTING BOTTLENECKS
COLLABORATION AND PARTNERSHIPS
GOVERNMENT AGENCIES, PRIVATE SECTOR AND FARMERS


OPEN AGRINET AND VISTAAR
GOVERNANCE FOR FLEXIBILITY
FEDERATED GOVERNANCE MODEL
CUSTOMISING OPERATIONS
AI-POWERED ADVISORY SYSTEMS
PERSONALISED SERVICES FOR FARMERS
TIMELY, ACCURATE AND CONTEXTUALISED INFORMATION
FOSTERING A COLLABORATIVE ECOSYSTEM
PUBLIC AND PRIVATE STAKEHOLDERS
UNIFIED PLATFORM FOR SERVICE DELIVERY, MARKET ACCESS AND KNOWLEDGE SHARING
INCLUSION AND ACCESSIBILITY
ONLINE AND OFFLINE DIGITAL SOLUTIONS
BUILDING TRUST THROUGH TRANSPARENCY
RIGOUROUS VETTING AND FEEDBACK MECHANISM


SCHEMES
ECONOMIC FRIENDLY
ECO-FRIENDLY
INTEGRATED FARMING
DIVERSIFY
WATERSHED
FARMER
LOGISTICS
TRUE PRICING
AGRICULTURE MARKETING FRAMEWORK
PROGRAMMES
BANK A/c
ROUTE OPTIMISATION
AADHAR
AIDING DIGITISATION
SUSTAINABLE AGRI-NETWORK: EMPOWERING AGRICULTURE with SUSTAINABLE SUPPLY CHAIN
AS a STORAGE
FAIR PRICE
WIN WIN
EASE
ACCOUNTABILITY
WATER EFFICIENT FARMING SUPPORT
NUTRITION SECURITY
the FPO MOVEMENT
COMPANY
INTEGRATION of FARMERS, SCHEMES, INFRA AND TECHNOLOGY
THIS IMPORTANT CONNECTION will HELP FARMERS FINANCIALLY with APPROPRIATE PRICING

9c. Nature-first initiatives

The vision for *Viksit Bharat 2047* places a strong emphasis on sustainable urban development. The government is focused on creating resilient cities while also improving the quality of life for its residents. Urban development, focusing on energy-efficient, water-conserving infrastructures, incorporating renewable energy sources and developing intelligent transportation systems, is being prioritised to ensure sustainable urban growth.

The *Manthan* on sustainability was structured in two parts, with a focus on India's resilience to challenges, urban vulnerabilities and infrastructure issues. It highlighted the importance of corporate disclosure, ecosystem collaboration and inclusive development. Esteemed speakers discussed issues such as socioeconomic inequalities, climate change impacts and urban design flaws, offering strategies to overcome these challenges.

Manthan: Resilient Cities

Participants:

Parikshat Kadan, IFS, GoI; Aanchal Garg Karanth, Senior Economics Officer, ADB; Karan Shah, COO (India), Artha Global; Priya Vedavalli, Principal, Artha Global; Neelanjan Sircar, Director, Centre for Rapid Insights, Artha Global; Dr Gyanendra Badgaiyan, Resident Senior Fellow, Artha Global; Santosh Tiwari, Chief Accountant, Vadodara Municipal Corporation; Anup Kumar, Head - Channels, Alliances & Inside Sales - India, ESRI; Sakshi Gudwani, Senior Programme Officer, Gates Foundation; Dr Aniruddha Roy, CTO, Genesys; Arturo Cadena, Advisor, Sustainable Urban Development - Smart Cities II, GIZ; Nicholas Boehlke, Cluster Advisor, GIZ; Samrat Banarjee, ICT and Digitalisation Advisor, GIZ; Shriman Sai, Technical Expert, Sustainable Urban Development - Smart Cities II, GIZ; Punit Gandhi, Policy and Research Lead, India Climate Collaborative; Prof. Vishal Garg, Plaksha University; Sathyanarayanan Shankaran, Urban Strategy Lead, Rainmatter Foundation; Chandra Kishore Yadav, RITES; Dr Anshu Sharma, Co-Founder, STS Global; Jasmeet Khurana, Lead, India for Climate Tech, WEF; Colonel Vijay, Indian Army; Kuntal Shah, Director, Deloitte India; Vikash Chandra, Director, Deloitte India; Sumit Mishra, Executive Director, Deloitte India; Sudeep Kumar Sinha, Partner, Deloitte India; Vivek Mittal, Executive Director, Deloitte India; Murali Thimmapuram, Director, Deloitte India

Gurus:

Viral, Thakkar, Partner and Sustainability and Climate Leader, Deloitte South Asia; Debashish Biswas, Partner, Deloitte India

This *Manthan* focused on overcoming challenges to build a resilient and future-proof India. It was divided into two parts, with participants discussing urban vulnerabilities and infrastructure challenges based on surveys by Artha Global.

Part 1: Addressing urban vulnerabilities

The first session focused on urban vulnerabilities. The Artha Global survey on trends in Asia-Pacific and global regions highlighted the importance of corporate disclosure and ecosystem collaboration.

By pooling resources and working together, neighbouring communities and organisations can share the costs of climate adaptation more effectively.

Karan Shah
COO (India), Artha Global

The survey revealed that urban areas are becoming more vulnerable due to infrastructure gaps, socioeconomic disparities and poor governance, often shaped by pre-existing conditions, such as poverty, poor health and inadequate access to resources.

The survey on urban vulnerabilities highlights the impact of heat stress on productivity. It reveals that 60 percent of people missed work in May due to heat, with 40 percent missing over five days.

Preexisting socioeconomic disparities, poor planning and lack of preparedness exacerbate urban flooding. In public transport, short commutes (less than 30 minutes) were typical, while walking or cycling and longer commutes were not considered problematic.

Below are the highlights of the first session.

Socioeconomic disparities and lack of preparedness

As citizens, we need to take responsibility and lead efforts to better prepare ourselves, contribute to development and mitigate the impacts of climate change.

Socioeconomic status, urban design and governance are critical to understanding vulnerabilities. Socioeconomic inequalities, poor urban planning and lack of information or preparedness amplify disaster impacts. A lack of policy participation persists. Additionally, ineffective implementation of disaster response often adds to the problem. The marginalised and underprivileged groups suffer the most from these vulnerabilities. To address the issue, there should be a focus on inclusive development. Marginalised and vulnerable communities must be empowered with knowledge to better respond to the consequences of climate change.

We need to create more human-centred projects. It is essential to establish conditions that facilitate effective responses to climate-related challenges.

Health issues

An individual's health plays a crucial role in their ability to respond to vulnerabilities and climate-related changes. Health and urban planning must be linked, with access to nutritious food, greenery and open spaces integrated into urban infrastructure.

A gender-responsive approach is crucial to ensure that no one is left behind. If we plan cities or open infrastructures without involving disadvantaged groups, we won't create resilient systems.

Rapid migration and increased susceptibilities

Rapid migration from rural to urban areas leads to other vulnerabilities. Efforts must be made to increase employment opportunities in rural areas. Enhanced awareness and planning are needed across levels, from individuals to communities to government bodies. Rural employment opportunities can lead to reverse migration.

Strengthening institutions at each level, including individual, community and government, is crucial for addressing migration-related issues.

Part 2: Overcoming infrastructural challenges

The second session focused on infrastructural challenges. Based on surveys by Artha Global, the following points were highlighted.

Water management and road connectivity

Over 60 percent of India's population now has piped water, yet many households still rely on supplemental sources due to inadequate supply or poor water quality. Additionally, more than 50 percent of people with limited access to transportation commute for less than 30 minutes, reflecting economic constraints.[40]

Bangalore has the highest percentage of people who commute short distances. Meanwhile, cities such as Delhi and Kolkata often report longer commutes due to different infrastructural setups.

About 60 percent of respondents had not adopted energy-saving technologies, with the highest disinterest found among the most vulnerable groups, often linked to a lack of knowledge rather than refusal.

Procurement and project efficiency

A well-defined technical scope is critical to avoid issues later in the project lifecycle. Material procurement must be prioritised based on quality rather than price. More attention must be given to the planning and design phases rather than rushing into implementation. Prioritising maintenance is of utmost significance.

In our country, resources often lead us to prioritise low costs at the expense of quality, which is critical.

City resilience plans and climate adaptation

The implementation of resilience plans needs to be more robust. As cities can only be modified by 10–20 percent, designing escape models for current threats and raising public awareness is essential. Guidance on eco-friendly construction materials and ensuring climate resilience features in urban projects is important.

Climate budgeting is essential. Regular audits of climate budgeting and its impact should be performed.

Financing and nature-based solutions

Municipalities must play an important role in infrastructure planning and should have easy access to finance. Adopting nature-based solutions and low-cost green infrastructure is crucial for climate resilience.

Multilateral banks and financial institutions should consider projects contributing to climate adaptation and mitigation rather than just focusing on traditional funding models.

Key takeaways

- **Climate adaptation:** Corporate disclosure and ecosystem collaboration are needed to address climate adaptation.
- **Urban vulnerabilities:** These vulnerabilities are increasing, particularly in infrastructure, socioeconomic disparities and governance, with heat stress and urban flooding significantly affecting productivity.
- **Health-centred resilience:** A health-centred approach and inclusive development are essential to improving resilience, especially for marginalised communities.
- **Water access gaps:** Issues persist, with many relying on supplemental water sources.
- **Commuting challenges:** These issues were highlighted in the survey, showing that limited transportation options result in shorter commutes.
- **Energy-saving technologies:** Adoption of energy-saving technologies remains low, particularly among the most vulnerable populations, due to a lack of awareness.
- **Procurement efficiency:** Improving procurement processes, project efficiency and city resilience plans are critical.
- **Municipal funding:** Direct access to funds for municipalities is essential to implement nature-based climate solutions.

[40] Data obtained from discussions during the "Ārohaṇa: Growth with Impact," in September 2024

9d. Energy efficiency

India's energy sector stands on the brink of transformative change, spurred by increasing demand, clean energy goals and advancements in digital infrastructure. Innovative solutions such as the Unified Energy Interface (UEI) and strategies for managing energy transition are paving the way for a resilient, inclusive energy ecosystem.

Designed on an open, interoperable protocol created by the foundation of interoperability in the digital economy, UEI connects various energy services and resources. These include EV charging, peer-to-peer trading and the discovery of energy units that are to be shared among DISCOMS and consumers. This approach enables real-time access, flexibility and control over energy usage.

By decentralising control and increasing market access, UEI empowers consumers, democratises energy access and fosters market-driven innovation, propelling India closer to its clean energy goals. Simultaneously, the challenge of managing the energy transition requires a modernised approach to utilities. With urbanisation and energy-intensive sectors growing rapidly, peak demand has become increasingly complex to manage. Together, UEI and peak demand management strategies are driving India's energy transition, building a sustainable future that supports the nation's growth and green energy objectives. UEI tries to bring the energy ecosystem together and focuses on market expansion, in which more and more energy and energy service providers, big or small, can contribute to and fulfil the ever-increasing energy demand for consumers and countries.

Manthan: Unified Energy Interface

Participants:

Sainath Bandhakavi, Head - Solutions Architecture for EdTechs & Prototyping - Public Sector, Amazon Web Services; Col. Sunil Kumar, Engineer-in-Chief, IHQ, MoD (Army); Reena Suri, Executive Director, ISGF – India Smart Grid Forum; Gowtham Injamuri, Senior Product Manager, Pulse Energy Technologies Pvt Ltd; Ankit Mittal, Co-Founder and CEO, Sheru; Abhishek Modi, Lead for Digital Platforms at SKI (UEI Alliance Member), Sattva Knowledge Institute (SKI); Arjun Gupta, Manager, RMI India Program (DER Policy), Rocky Mountain Institute (RMI); Mirambika Sikdar, AI & Energy Policy - Data Scientist, Council on Energy, Environment and Water (CEEW); Dr Sumit Choudhury, Founder, CEO, Green EarthX; Milind Deore, Secretary, Bureau of Energy Efficiency, Girja Shankar, GM, Corporate Driven Programmes, Energy Efficiency Services Limited (EESL); Prateek Aggarwal, Programme Lead, CEEW; Vishal Tripathi, Consultant, CEEW; Avinash Dubedi, World Resources Institute (WRI), Prashant Kumar, Chief General Manager (Technical) - Corporate Driven Programmes, EESL; Soumya Garnaik, India Country Representative, Global Green Growth Institute (GGGI); Vivek Goel, Chief Engineer - Distribution Planning and Technology Division, Central Electricity Authority; Arturo Cadena, Advisor Smart Cities for Sustainable Urban Development, GIZ GmbH; Punit Gandhi, India Climate Collaborative, India Climate Collaborative

Gurus:

Sreeram Ananthasayanam, Partner, Deloitte India; Viswanathan Ravichandran, Partner, Deloitte India; Anujesh Dwivedi, Partner, Deloitte India

UEI is transforming energy access in India, creating an open, interoperable network where consumers have the power to choose and transact seamlessly.

India's move to cleaner, greener energy needs a solution that can be made more accessible, more affordable and more attuned to the needs of India's rural population. Conceived as a decentralised, interoperable energy network within India, the UEI, often compared to the Open Network for Digital Commerce (ONDC), is a much-lauded undertaking in this sphere of digital expansion. The UEI is built on open protocols, which foster smooth energy transactions and empower consumers and providers alike to enter the energy market through a unified system. With UEI, India is moving closer to a flexible, resilient energy system that democratises energy access for millions.

Decentralisation and interoperability

The key feature of UEI is its open, decentralised framework that promotes interoperability and the discovery of various energy services. These services include EV charging stations, peer-to-peer energy trading and others within the demand response system. The platform allows demand to be addressed by multiple service providers, giving the end consumer the freedom to choose from available options. Using the Beckn Protocol, UEI connects multiple energy service providers, allowing consumers to access various options. This decentralised structure empowers consumers by giving them choice and flexibility while reducing dependency on singular, monopolistic platforms.

Real-time energy trading and access

UEI supports real-time energy trading, enabling consumers and providers to buy and sell energy as an asset. This feature helps balance demand and supply more efficiently and promotes renewable energy usage through microtransactions. SMEs especially benefit from UEI, as they gain access to hyperlocal markets to engage in last-mile transactions. This shift creates a more resilient energy market, encouraging smaller players to enter and innovate within the sector.

Government and policy support

Bridging the gap between policy and technology, UEI promotes clean energy accessibility by uniting government support with innovative digital infrastructure.

For UEI to realise its full potential, supportive government policies and regulatory frameworks are essential. By fostering an open energy ecosystem, government entities at both the central and state levels play a critical role in enabling UEI to scale. Policies promoting clean energy, data sharing and PPPs will be essential in bridging technological and regulatory gaps. A national registry to track energy transactions could further enhance transparency and support the evolution of a sustainable, decarbonised energy system.

Manthan: Managing the Energy Transition through a Period of Surging Peak Demand

Participants:

Ghanshyam Prasad, Chairperson, CEA; Gaurav Angira, Director, Deloitte India; Anujesh Dwivedi, Partner, Deloitte India; Anish Mandal, Partner, Deloitte India; Shubranshu Patnaik, Partner and GPS Industry Leader, Deloitte India and others

Guru:
Eashwar Rao, Director, Deloitte India

Considering current commitments and anticipated trends, we explored a projection of India's energy landscape in 2070. This analysis focused on future electricity demand and the strategies needed to meet it.

Anujesh Dwivedi

India's energy demand is rising rapidly, with peak consumption increasingly putting pressure on the existing power grid. With urbanisation, economic growth and a surge in cooling demands, managing this energy landscape is critical for ensuring a stable and reliable power supply. The push for clean energy adds to the challenge as utilities struggle to balance intermittent renewable sources, such as solar and wind, with surging peak demands, especially during non-solar hours.

To meet these demands, India's energy sector is modernising its utilities. This involves using data-driven strategies, investing in innovative energy storage utilities and enhancing the coordination between state and central agencies. This *Manthan* session discussed at length the foundational tenets driving this modernisation imperative and the strategic interventions required to meet India's energy challenges head-on.

The peak demand challenge

Time-of-Day (ToD) pricing models empower consumers to reduce costs while helping utilities manage demand surges more efficiently, creating a win-win situation for India's energy landscape.

One of the most pressing challenges for utilities today is managing surging peak demand, particularly as energy-intensive sectors grow and urbanisation accelerates. Cooling demands are a significant driver, especially when solar power generation is unavailable at night. In recent years, India's peak demand has exceeded general energy demand growth, indicating a shift in consumption patterns. For example, experts project a 35–40 GW shortfall during non-solar hours by 2032, highlighting the need for robust solutions to stabilise the grid.

The rising energy demand highlights the importance of ToD pricing and demand response programmes, both of which encourage consumers to shift their usage away from peak hours. By offering incentives or dynamic pricing, utilities can better manage grid stress and flatten the load curve, leading to a more stable and efficient energy system.

Energy storage solutions

Energy storage has emerged as a game-changer for balancing intermittent renewable sources with consistent peak demand. With the integration of technology such as lithium-ion and pumped hydro storage, utilities can store excess energy produced during off-peak hours, which can then be discharged when demand is at its peak. These storage solutions act as a buffer during high-demand periods, allowing renewable sources to support grid stability even when solar or wind generation is low.

However, scalability remains a challenge. Large-scale storage solutions require substantial investment and policy support. A shift towards decentralised energy storage systems, where storage assets are distributed across the grid, can help utilities achieve the necessary capacity without overburdening any single infrastructure.

Enhanced coordination and planning

The key to sustainable energy management lies in enhanced coordination, structured planning and predictive insights, which are essential ingredients for a reliable power grid.

Effective demand management requires coordination among government bodies, state electricity regulators and private entities. The absence of consistent planning frameworks has historically hampered the ability of utilities to respond to peak demands efficiently. To address this, the central government has introduced the Renewable Purchase Obligation (RPO) framework, mandating states to procure a certain percentage of energy from renewables. However, implementation varies widely, with states facing challenges related to financing, regulatory oversight and infrastructure.

Capacity planning at the state level, backed by robust demand forecasting, is essential for scaling renewable energy while avoiding supply shortfalls. The Regulatory Asset Securitisation (RAS) model offers a structured approach for states to manage peak demand by incentivising investments in renewable generation and storage. As this model gains traction, state-level planning can become more standardised, fostering a national energy framework that is both resilient and adaptable to future growth.

Advanced data and demand forecasting

From real-time smart metering to AI-powered demand forecasting, modern utilities are becoming smarter and more responsive to shifting consumption patterns.

Data-driven approaches are crucial for accurately forecasting demand patterns and predicting surges. AI and ML technologies are being integrated into the energy sector to enhance demand forecasting capabilities. These tools can analyse historical consumption data, weather patterns and other relevant variables to provide predictive insights. Such granular data helps utilities better understand the nuances of peak demand, enabling more precise load forecasting and reducing the likelihood of unexpected shortfalls.

For instance, smart metering technology provides real-time data on consumption, allowing utilities to implement targeted demand response strategies. As smart meters become more prevalent, utilities can better manage peak loads by deploying tailored incentives and programmes to consumers, ensuring grid stability.

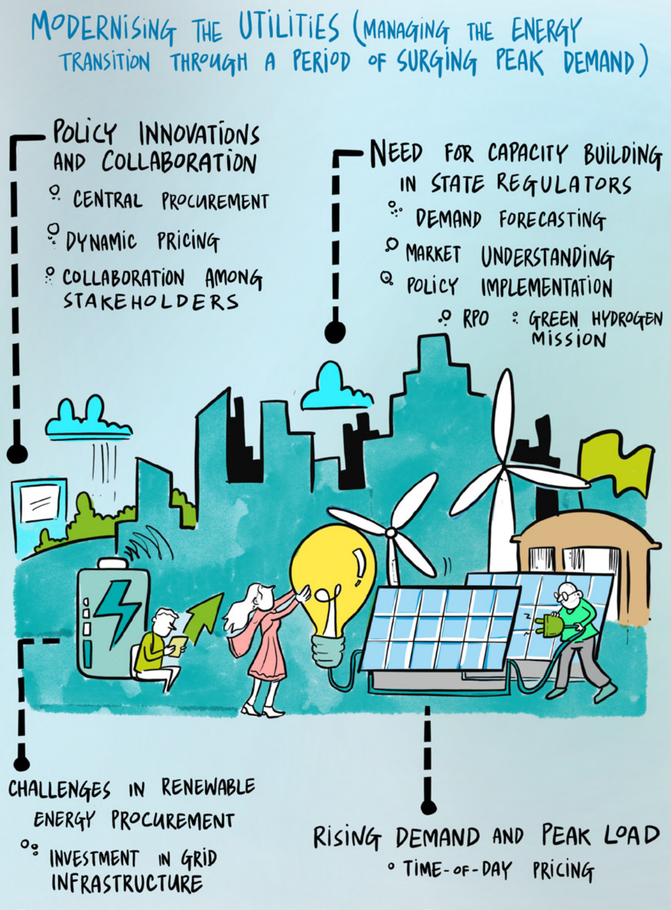
Policy and regulatory support

Policy plays a pivotal role in supporting utility modernisation efforts. From renewable energy targets to incentives for energy storage, regulatory frameworks are necessary for driving investments and innovation. The Indian government has recently been exploring ToD tariffs, designed to reflect the actual cost of energy supply during peak hours. By shifting consumption to off-peak times, TOD tariffs help alleviate grid stress, making it easier for utilities to handle peak demand surges.

Another regulatory intervention under consideration is providing states with greater autonomy to set and manage energy pricing based on local demand and supply dynamics. Such policies can encourage states to adopt dynamic pricing models, which could significantly reduce peak demand by promoting flexible consumption patterns among industrial and commercial consumers.

Key takeaways

- **Decentralised open network:** UEI provides a decentralised, interoperable network that enables seamless interaction among diverse energy providers and consumers and brings demand and supply together. This can further help allow the data to predict and manage demand and supply availability.
- **Real-time trading capabilities:** UEI allows real-time trading, increasing market flexibility and providing opportunities for SMEs and local providers to enter the energy market.
- **Government policy collaboration:** Supportive government policies are crucial for scaling UEI, from regulatory frameworks to data-sharing protocols and PPPs.
- **Clean energy accessibility:** UEI promotes sustainable energy practices, supporting the clean energy transition by making renewable energy more accessible and affordable.
- **Time-of-Day (ToD) pricing:** Implementing TOD pricing incentivises consumers to shift their energy use away from peak times, helping flatten demand spikes and easing grid stress.
- **Energy storage:** Investment in both centralised and decentralised energy storage solutions is essential to balance intermittent renewable generation with surging peak demand.
- **Coordination and planning:** Improved coordination among central and state entities, along with structured frameworks such as the RPO and RAS models, is vital for standardised capacity planning across states.
- **Data-driven demand forecasting:** AI and ML technologies, alongside smart metering, provide actionable insights, allowing utilities to predict and manage peak demand more effectively.
- **Policy support:** Regulatory frameworks, such as TOD tariffs and dynamic pricing models, are instrumental in reducing peak demand and driving investments in utility modernisation.



10 | Bridging language barriers: The impact of the digital India Bhashini Mission

Bhashini and Deloitte collaborate for impactful progress at Ārohana: Growth with Impact

Digital India Bhashini Mission was launched by Prime Minister Shri Narendra Modi in 2022. BHASHINI is an AI-powered language translation platform, bridging the literacy, language and digital divides. Bhashini is redefining communication through innovative voice and text solutions. Its mission is to make language and technology accessible to everyone by providing voice-first multilingual solutions that enable seamless communication. Bhashini also hosts one of the largest co-creation AI platforms, fostering collaboration and innovation.

Bhashini and Deloitte signed an MoU during *Ārohaṇa: Growth with Impact*. This collaboration aims to work with central and state governments to improve citizen experiences and engage private sector companies across sectors such as BFSI, consumer and retail to enhance customer and employee experiences.

Amitabh Nag, CEO, DIBD, shared that the Bhashini platform is constantly being enhanced. India, with its rich linguistic diversity and ancient languages spanning thousands of years, can significantly benefit from Bhashini in overcoming language barriers and addressing communication challenges.

Aditya Sudhindranath, Partner, Deloitte India, spoke about Bhashini and described it as a remarkable solution for tackling complex challenges collaboratively. For instance, it can significantly assist migrant workers who are trying to book tickets or order gas cylinders online in their native languages, helping them become more comfortable with technology. Furthermore, he highlighted the potential impact of integrating the DIKSHA (Digital Infrastructure for Knowledge Sharing) platform with Bhashini, which could greatly enhance the learning experience for students.

The vision of our strategic collaboration is to ensure that every Indian stakeholder across the country stays connected and that language never becomes a barrier to communication.

Bhashini and Deloitte collaborate for impactful progress at Ārohaṇa: Growth with Impact

11 | New releases

India has reached a significant milestone, crossing one billion mobile phone users.[41] This digital surge has made data services indispensable, powering our access to information, communication and entertainment. Cloud computing also plays a pivotal role in our digital journey, enabling us to store and process data for various digital services. As our reliance on technology deepens, cybersecurity becomes increasingly crucial to protect our digital infrastructure. However, this rapid digital adoption also brings new cybersecurity challenges. We need innovative solutions, robust infrastructure and skilled professionals to safeguard our critical digital assets.

Recognising this urgent need, Deloitte India and Google have come together to launch Cyber Surakshit Bharat – Protecting the Digital Frontier for Viksit Bharat. This comprehensive whitepaper sheds light on the best ways to strengthen India's cybersecurity framework. This initiative underscores the importance of cybersecurity in safeguarding our expanding digital ecosystem and aligns with our collective vision of a secure and self-reliant digital future.

Parallelly, Deloitte's exploration of AI within DPI aims to revolutionise public service delivery. By using AI's power, we can address risks, foster innovation and promote sustainable growth.

Paper launch: Cyber Surakshit Bharat – Protecting the Digital Frontier for Viksit Bharat
Presenters:
Gaurav Shukla, Partner, Deloitte India; Igors Garis Koni, Head of EMEA Partnerships and Strategic Business Development, Google Cloud Security

We truly believe that Cyber Surakshit Bharat is Viksit Bharat. If we want to become atmanirbhar, it is very important to be cyber-safe.

Gaurav Shukla

Paper launch: Cyber Surakshit Bharat – Protecting the Digital Frontier for Viksit Bharat

In a significant stride towards India's digital future, Deloitte India and Google Cloud launched this first-of-its-kind whitepaper. This collaborative effort aims to empower the public sector with the tools and knowledge necessary to counter emerging cyberthreats.

[41] https://www.forbes.com/sites/sarithara i/2016/01/06/india-just-crossed-1-billion-mobile-subscribers-milestone-and-the-excitements-just-beginning/

Cyber Surakshit Bharat emphasizes the crucial role of cybersecurity in India's journey towards becoming a global economic leader.

The need for strong cybersecurity services in digitised India was underscored by the esteemed presenters from Deloitte India and Google Cloud. The whitepaper is grounded on the development of a comprehensive framework for protecting critical infrastructure, data and services, emphasizing the importance of cyber resilience and preparedness.

The initiative aims to enhance insights into both governance and cybersecurity threats by using Google's extensive global experience in cybersecurity collaborations. The ambition is to improve India's cybersecurity defences and position it as a forerunner in cybersecurity services worldwide.

And so our view on that particular topic is that it's all about providing the latest information about threats to the government sector. And helping the government sector to be more adept in responding to those threats. And you know how our vision at an Indian scale is to connect the state level with the agency and regulator level, ultimately.

Igors Garis Koni
Head of EMEA Partnerships and Strategic Business Development, Google Cloud Security

The idea of Cyber Surakshit Bharat also aligns with India's vision of becoming a developed and self-reliant nation. Proactively mitigating cyberthreats will enhance India's digital ecosystem, ensuring a safe and prosperous digital future.

Paper launch: Artificial Intelligence – The Next Frontier in Digital Public Infrastructure

Paper launch: Artificial Intelligence – The Next Frontier in Digital Public Infrastructure

Released by Romal Shetty, Chief Executive Officer , Deloitte South Asia

Authors: Priyanka Yadav, Associate Director, Deloitte India, Aishwarya Dixit, Senior Consultant, Deloitte India; Kanika Kishore, Senior Consultant, Deloitte India

In 2023, Deloitte launched a comprehensive DPI playbook that was designed to help countries implement and optimise DPI for their unique needs. We believe that a nation's future starts with empowering governments to provide direct, measurable and scalable benefits for their citizens. Technology plays a transformative role in achieving this mission, especially when designed to be interoperable, thereby creating network effects.

This leads us to the next frontier, which is the integration of AI into DPI. This initiative aims to examine the transformative potential of AI-powered DPIs by focusing on the following objectives:

- **Envisioning AI-integrated DPI** by defining what AI-driven DPI could look like in the real world
- **Highlighting the advantages of combining** AI with DPI to enhance efficiency and accessibility, thereby improving public service delivery
- **Identifying potential risks** and ensuring informed decision-making for safe AI adoption
- **Inspiring innovation** by showcasing use cases to drive public sector innovation
- **Clarifying stakeholder roles and responsibilities** to foster collaboration and innovation

This PoV delves into how AI can elevate DPI to unprecedented levels of efficiency, inclusivity and adaptability. However, it also assures a balanced and informed approach by addressing the issues of risks associated with introducing AI to DPI.

As a global leader in nation-building initiatives, Deloitte is committed to helping governments harness the power of AI and DPI for public services. These initiatives aim to deliver public services that are more data-driven, scalable and indicative of the outcome of the public future that would be more imaginative, inclusive and responsive.

Key takeaways

- **A strong digital future:** Deloitte India and Google Cloud's whitepaper, *Cyber Surakshit Bharat* – Protecting the Digital Frontier for Viksit Bharat, outlines a roadmap to bolster India's cybersecurity defences. This initiative aligns with India's vision of becoming a global tech leader.
- **AI in public infrastructure:** Deloitte's *Artificial Intelligence – The Next Frontier in Digital Public Infrastructure* paper explores how AI-powered DPI can revolutionise public services. By using AI to analyse vast amounts of data, we can improve the efficiency, equity and responsiveness of government initiatives.
- **Staying ahead of the curve:** Both papers emphasize the need for proactive risk management. We can safeguard our digital infrastructure and protect our citizens by anticipating and addressing emerging threats.
- **Innovation and inclusion:** These collaborative efforts foster innovation, enhance citizen experiences and drive sustainable digital growth. We can build a more secure and prosperous India by embracing technology and working together.

Scan this QR code to read more .

Cyber Surakshit Bharat – Protecting the Digital Frontier for Viksit Bharat

Artificial Intelligence – The Next Frontier in Digital Public Infrastructure

12 | Thank you!

In the transformative journey towards *Viksit Bharat 2047,* technology collaborations serve as vital bridges between vision and reality. The convergence of public sector expertise and technological innovation has become the cornerstone of India's digital evolution.

At *Ārohaṇa:* Growth with Impact, our alliance partners demonstrated exceptional commitment to this vision, bringing forward solutions that promise to reshape citizen services, enhance governance and drive inclusive growth across the nation.

We are immensely grateful for the support and collaboration of our collaborators without whom this would not have been possible. It is our utmost pleasure to recognise those who shared their insights, resources and encouragement throughout this journey.

Our alliance partners

Reflecting on our journey, we acknowledge the crucial role of our strategic alliances. Our partners' steadfast support and expertise have been instrumental in our pursuit of excellence. The lessons learned and the relationships built will endure for a lifetime.

Through collaboration with **AWS,** Deloitte enables organisations to innovate rapidly with scalable and secure operations that align with the summit's goals for digital advancement.

Deloitte uses **Google Cloud's** infrastructure and services to help businesses in their digital transformation journeys. Our collaboration highlights the importance of cloud solutions in driving innovation and scalable operations.

As a key player in visual computing, Deloitte works with **NVIDIA** to promote advancements in AI and ML, equipping our collaborators with insights into future trends.

As a leader in cybersecurity, **Palo Alto Networks** collaborates with Deloitte to equip organisations with the necessary tools to protect their data against evolving threats, fostering a resilient digital ecosystem in India.

SAP Software and Solutions has enhanced our conversations with critical insights into how technology integrates with business processes, driving transformation in industries across India.

Through our collaboration with **ServiceNow,** Deloitte helps streamline workflows and automate processes, significantly enhancing organisational efficiency and supporting the objectives outlined during *Ārohaṇa:* Growth with Impact.

Our Manthan partners

These partners have significantly advanced our collective goals towards a more innovative and inclusive society. Their collaborative spirit and forward-thinking initiatives have laid a robust foundation for progress across various sectors in India.

Agami has been a driving force in advancing justice innovation in India, focusing on transforming the experience of justice by enabling networks that foster collective impact while building DPGs that enhance accessibility and innovation.

The **Centre for Open Societal Systems (COSS)** has spearheaded the development of DPI and played a pivotal role in the event by sculpting

compelling narratives for the adoption of DPGs, which is essential to achieving scalable societal transformation.

Data Security Council of India (DSCI) has brought essential expertise in cybersecurity to our discussions, helping to establish foundational principles focused on creating a secure digital ecosystem that prioritises user safety and protection.

Through our collaboration with **EdCil,** Deloitte highlights the role of technology in empowering the future workforce through education and skill development initiatives.

The **eGov Foundation** has played an invaluable role by championing the power of open digital infrastructure, which is crucial to enabling governments to deliver accessible, inclusive and transparent services to every citizen.

The **EkStep Foundation's** focus on improving education through technology resonates with Deloitte's commitment to empowering communities with effective learning solutions powered by data management and analytics.

The **International Chess Federation (FIDE)** has enriched the summit by contributing to discussions around enhancing strategic skills and personal development, which are crucial for youth engagement in technology and innovation.

The **National Institute of Urban Affairs (NIUA)** focuses on urban development issues through various projects designed to transform India's urban landscape. These projects address areas such as municipal finance, climate change and sanitation.

The **Power Foundation of India** has been pivotal in informing discussions around energy access and sustainability, emphasizing the important nexus between technology and sustainable development during the summit.

The **Agri Collaboratory (TAC)** seeks to address complex agricultural challenges by co-creating farmer-centric digital solutions, fostering an open, collaborative ecosystem that empowers farmers through technology.

The **Vaikunth Mehta National Institute of Cooperative Management (VAMNICOM)** offers valuable insights into community engagement and economic empowerment, enhancing our discussions about cooperative management and sustainable development.

The **Wadhwani Foundation** is dedicated to accelerating job growth and enabling millions to achieve a dignified living, influencing our discussions around innovation and economic growth in emerging markets.

As we wrap up this year's Government Summit 2024 book, we are grateful for the dedication and vision of our collaborators, allies and leaders. Your contributions have enhanced our summit and strengthened the foundation of India's digital future. Each collaboration and shared insight has created ripples of positive change across the nation's digital landscape.

Together, we have set in motion initiatives that will resonate across generations, driving us towards a more connected, inclusive tomorrow. As we move forward, these collaborations will remain the bedrock of our continued journey towards realising the vision of *Viksit Bharat 2047.*

13 | Parting note: A new horizon beckons

The journey to *Viksit Bharat 2047* is underway, guided by the pillars of resilience, digital innovation and a commitment to equitable progress.

Realising the vision of Viksit Bharat will take a collective effort, with each of us playing a crucial role, guided by the pillars of resilience, digital innovation and a commitment to equitable progress.

Ārohaṇa: Growth with Impact was a pivotal event in India's quest to *Viksit Bharat 2047*, marking substantial progress in this ambitious journey. It served as a powerful reminder of our collective ambition, shaping a vision that emphasizes sustainable growth, inclusivity and technological transformation. Through each panel discussion and *Manthan*, various government, industry and technology leaders explored innovative solutions for the challenges that lie ahead. The summit illuminated the importance of a digital-first approach, where technology becomes the backbone of efficient governance, enhanced public services and a green economy.

The *Government Summit 2024* and its vision for Viksit Bharat extend beyond just technological progress. It highlights the necessity of equitable access to the nation's resources, including education, healthcare and more. True progress for India can only be realised when digital inclusivity bridges the urban-rural divide, ensuring that every citizen experiences the benefits of development. India's path to global leadership demands growth that is both environmentally responsible and socially equitable.

As we look towards 2047, *Ārohaṇa: Growth with Impact* challenges each of us to actively participate in this journey, embodying the qualities of resilience, innovation and inclusivity. This is why the mantra of *"Growth with Impact"* resonates so strongly. It reinforces the need for development that drives economic advancement and positively influences the lives of citizens, fostering a society where everyone thrives.

Together, we can create a model of prosperity and unity where India leads and sets a global standard for sustainable growth, demonstrating that progress can have a meaningful impact.

Lamp lighting and National Anthem

Opening remarks by Romal Shetty, CEO, Deloitte South Asia

Keynote by Nitin J Gadkari, Minister of Road Transport and Highways, Government of India

Leaders Speak: Vision for Viksit Bharat

Leaders Speak: Vision for Viksit Bharat

Leaders Speak: Vision for Viksit Bharat

Leaders Speak: Viksit Bharat – Balancing Inclusivity with Growth

Talk: Building for Bharat and taking it Global

Bringing the Power of Digital to Physical & Social Infrastructure Development

Fireside Chat: Future of Government

Leaders Speak: Viksit Telangana

Power Bytes: Driving DPGs as a National Agenda

Green Growth - Technologies for Energy Innovation and Climate Resilience

Leaders Speak: Law and Justice – A Transformation Story

Leaders Speak: Karnataka Growth Story

Leaders Speak: Building a Secure Bharat, A Viksit Bharat

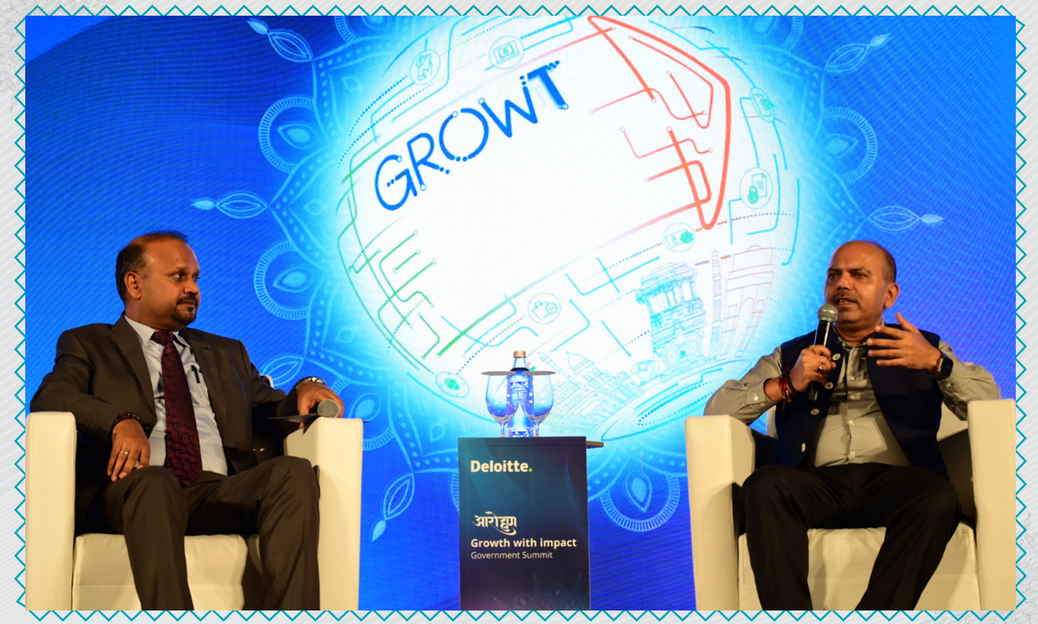
Leaders Speak: Building a Secure Bharat, A Viksit Bharat

Leaders Speak: Affordable and Accessible Education: Critical Pathways for Advancing Social Inclusion and Equity

The Power of GenAI: Driving Service Delivery Efficiencies for Citizens and Businesses

Fireside Chat: The Power of GenAI

Power of Digital in Creating Experience and Organisational Efficiency



Creating impact in Rural India

Fortifying Digital Infrastructure – Elevating Cyber Defence for a Secure, Resilient and Vibrant Nation

Fireside Chat: Transformative Solutions and Projects Showcase

Tech4Good: Building for Bharat

Sustainable Agri Network: Empowering Agriculture with Sustainable Supply Chains

ABDM for HealthTech

Digital Enablement of MSMEs via the ONDC

Envisioning a User-centric Justice System

GenAI

Open AgriNet and VISTAAR

Resilient Cities

ABDM for providers

Innovation in Policymaking to Realise the Vision of India @ 2047

Quality Education

AgriTech

Demystifying Modern SOCs in Hybrid and Hyperconnected Environments

Digital Cooperatives

Building Trust with Sovereign Cloud – Policy, Technology and Strategy

Unified Energy Interface

Measuring the Immeasurable

Urban Platform for Delivery of Online Governance (UPYOG)

Managing the Energy Transition through a period of Surging Peak Demand

Team Ārohaṇa (आरोहण): Growth with Impact 2024

Team Ārohaṇa (आरोहण): Growth with Impact 2024

Connect with us

NSN Murty
Partner and Leader,
Government and Public Services,
Technology & Transformation
Deloitte India
nsnmurty@deloitte.com

Shubranshu Patnaik
Partner and GPS Industry Leader,
Deloitte India
spatnaik@DELOITTE.com

Contributors

Abhishek Batra
Aditya Sudhindranath
Aditi Singhal
Aishwarya Dixit
Akash Negi
Akshay Dsouza
Alina Hasan
Amit Saxena
Anjum Shaikh
Ankit Bhardwaj
Ankita Vaiude
Anshuman Saikia
Arti Sharma
Ashish Suri
Brinda Sudan
C S Nithya Varma
Darshan Shah
Eashwer Rao
Jayita Mukherjee
Kanika Kishore
Komal Yadav
Kritika Giri
Kshiti Garg
Krishman Singh
Manika Khandelwal
Madhumita Mohapatra
Manu Tiwari
Meenakshi Rampati
Meghna Mittal
Navneet Agarwal
Neha Kumari
Nidhi Choudhury
Pallavi Das
Pankaj Chandna
Priyanka Sahai
Priyanka Yadav
Raavi Sharma
Ravindra Rathore
Richa Sharma
Rucha Deshpande
Sagar Raina
Sameer Sharma
Satish Kaushal
Sharanya Dhingra
Surajit Biswas
Somesh Rastogi
Trishal Kumar
Tulsi Kant Samal
Varun Kalra
Vijaya Lakshmi

Acknowledgements

The NetScribes team

Deloitte.

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited (“DTTL”), its global network of member firms, and their related entities (collectively, the “Deloitte organization”). DTTL (also referred to as “Deloitte Global”) and each of its member firms and related entities are legally separate and independent entities, which cannot obligate or bind each other in respect of third parties. DTTL and each DTTL member firm and related entity is liable only for its own acts and omissions, and not those of each other. DTTL does not provide services to clients. Please see www.deloitte.com/about to learn more.

Deloitte Asia Pacific Limited is a company limited by guarantee and a member firm of DTTL. Members of Deloitte Asia Pacific Limited and their related entities, each of which is a separate and independent legal entity, provide services from more than 100 cities across the region, including Auckland, Bangkok, Beijing, Bengaluru, Hanoi, Hong Kong, Jakarta, Kuala Lumpur, Manila, Melbourne, Mumbai, New Delhi, Osaka, Seoul, Shanghai, Singapore, Sydney, Taipei and Tokyo.

This communication contains general information only, and none of DTTL, its global network of member firms or their related entities is, by means of this communication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser.

No representations, warranties or undertakings (express or implied) are given as to the accuracy or completeness of the information in this communication, and none of DTTL, its member firms, related entities, employees or agents shall be liable or responsible for any loss or damage whatsoever arising directly or indirectly in connection with any person relying on this communication.

© 2025 Deloitte Touche Tohmatsu India LLP. Member of Deloitte Touche Tohmatsu Limited