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India's Inclusive Growth is Powered by Technology

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India's inclusive growth is powered by technology

The Economic Review published by the Ministry of Finance, government of India could well have been written by the officers in charge of technology policy. The just over 60 page paper mentions technology on nearly every other page.

Almost every ministry's policy and sectors strategy now leans heavily on technology.

In the national statement of accounts in February, Finance Minister Nirmala Sitharaman has announced a corpus of Rs 1 trillion for artificial intelligence based solutions.

"For our tech-savvy youth, this will be a golden era. A corpus of ₹1 trillion will be established with fifty-year interest free loan. The corpus will provide long-term financing or refinancing with long tenors and low or nil interest rates. This will encourage the private sector to scale up research and innovation significantly in sunrise domains.," she said in her speech.

A national deep tech policy was announced in late 2023. "The National Deep Tech Startup Policy serves as a comprehensive framework to address the challenges faced by deep tech startups and provide definitive policy interventions to enhance the ecosystem. India's deep tech Vision encompasses four key pillars: securing India's economic future, progressing towards a knowledge-driven economy, bolstering national capability and sovereignty through the Atmanirbhar Bharat imperative and encouraging ethical innovation," the policy note states. "It aims to enhance technology commercialisation through (a) creating seamless partnerships between academic institutions, research labs and industry and (b) platforms and technology commercialisation offices within academic institutes and research labs and providing (c) a set of guidelines for commercialisation of publicly funded research. The policy promotes setting up an Open Science and Data Sharing platform for encouraging collaboration and knowledge sharing among the stakeholders to promote deep tech innovations.

The focus on technology is not just about such emerging initiaves or developing a chip manufacturing ecosystem or promoting the traditionally strong IT sector. India is making technology egalitarian and bringing it to citizens and farm workers.

Take for example, agriculture. One of the least industrialized sector in the economy, the farm sector now has a drone policy. The government has been encouraging, incentivizing and subsiding the use of drones for farmers.

Various institutions that support farming can get grants of Rs 1 million for acquiring drones. "The Farmers Producers Organizations (FPOs) would be eligible to receive grant up to 75% of the cost of agriculture drone for its demonstrations on the farmers' fields. A contingency expenditure of Rs.6000 per hectare would be provided to implementing agencies that do not want to purchase drones but will hire drones for demonstrations from Custom Hiring Centres, Hi-tech Hubs, Drone Manufacturers and Start-Ups. The contingent expenditure to implementing agencies that purchase drones for drone demonstrations would be limited to Rs.3000 per hectare," according to a policy statement. The policy has prepared Standard Operating Procedures (SOPs) for use of Drone application with pesticides for crop protection in agricultural, forestry, non-cropped areas, etc. and for Drone Application in Spraying for Soil and Crop Nutrients.

In a related policy effort more than 15000 rural women are being trained to become drone operators to support farming. "This addresses the need to modernise our agricultural practices and increase agricultural productivity by placing cutting-edge technology in the hands of rural women. This makes them the epicentre of the rural economy, spearheading the new agricultural revolution. The scheme also opens up new opportunities for the country's young and dynamic start-ups to enter the emerging field of drone aeronautics, which has huge untapped potential," writes National Minister Mansukh Mandaviya. "The automation of the spraying system by means of agri-drones provides a time-saving and efficient application system. Drone manufacturing activity has created tremendous employment opportunities for the youth. Going further, this new field will also create opportunities for rural women pilots, mechanics, and spare-part dealers."

Another industry which has been known for being fragmented and reliant on outdated systems is the logistics sector. Here again the government has created a new platform. After the roll out of GST India became a single tax market. This required reforms and infusion of technology in logistics as well. "The Unified Logistics Interface Platform (ULIP), under the National Logistics Policy, is integrated with 35 systems of 8 different Ministries and has 699 industry players registered on it. The platform intends to simplify and improve the efficiency of logistics processes for registered users," the Economic Review states. "GST data is also being integrated with ULIP to provide multi-modal cargo tracking and demand-supply mapping for trade." The review quotes an NCAER Study published in December 2023 which shows that shown that the logistics cost in the economy has declined by 0.8 to 0.9 percentage points of GDP between FY14 and FY22-23 .

The achievements of the country in using technology for economic growth are well articulated in the economic review.

> The harnessing of technology for inclusive growth is an example. Internet penetration in India, as per the 'Internet in India' report 2022, crossed the 50 per cent mark in 2022, growing more than three-fold since 2014. Aadhar has been a major game changer across domains in India. It has facilitated the transfer of over 34 lakh crores to more than 1167 crore beneficiaries under the Direct Benefit Transfer, and on average, more than 200 crore Aadhaar-based authentications are happening every month25 . India has seen a leapfrogging in the financial inclusion space. Total beneficiaries under the Prime Minister's Jan Dhan Yojana were at 51.5 crore as of January 10, 2024, which is a 3.5- fold growth since March 2015. What is particularly noteworthy about this progress is that nearly 56 per cent of Jan Dhan account holders are women, and two-thirds of these accounts are in rural and semi-urban areas26. Technology was also key in enabling India to successfully deal with the scourge of the Covid pandemic. With the CoWin app, India has been successful in implementing one of the world's largest vaccination programs, with 221 crore vaccination doses administered to the population aged 18 years and above. Up to July 2023, India had launched 431 foreign satellites, out of which 396 had been launched since June 2014.

It has been several decades delayed, but India's moment may be arriving soon as it strives to become the world's third largest economy.

Though India was a thriving global economy a millennium ago, its success drew colonisers exploited the country for its riches until its political independence in 1947.

India's economic independence is still a work in progress. The post 1947 economic journey of India can be broadly defined into three phases. The first phase was from 1947 to 1991, India had a command and control economy where the government dictated business decisions to licensed industrialists. This was also the phase when the foundation of industrial economy was laid mostly by government run companies.

The second phase began with the delicensing of industry from 1992 onwards led to a series of reforms which brought in FDI in phased manner. This phase enhanced private investment in diverse sectors like pharmaceuticals, insurance, automobile and retail. Infrastructure was improved but the investments were not commensurate with the needs of the economy. Roads and airports were opened to private sector while telecom sector blossomed.

The Third phase began from 2014 onwards when India embraced the fourth industrial revolution and its suite of technologies. Foundational reforms were implemented that improved tax administration and significantly reduced the debt crisis in banking. The launch of Goods and Services Tax made India a single tax market in most products triggering a huge shift in business practices while boosting national revenue. The Insolvency and Banking Code (IBC) gave teeth to creditors who could unseat promoters who had willfully defaulted on credit. As a consequence, gross and net non-performing assets (NPA) ratios have fallen from a high of 11.5 per cent and 6.1 per cent in March 2018 to 3.9 per cent and 1.0 per cent in March 2023 respectively.

The debilitating presence of crony capitalism was severely dented after bankers and promoters were held accountable under the IBC laws.

India is now the fastest growing large economy of the world. A decade of political stability and deepening economic reforms has propelled India to a position of strength. From being among the fragile five economies in 2014, India is among the top five economies of the world. US, China, Germany and Japan are still bigger, though the third slot is not too far away for India.

Quoting S&P Global Ratings, Reuters reported that India will remain the fastest-growing major economy for at least the next three years, setting it on course to become the world's third-largest economy by 2030.

S&P expects India, currently the world's fifth-largest economy, to grow at 6.4% this fiscal and estimates growth will pick up to 7% by fiscal 2027. In contrast, it expects China's growth to slow to 4.6% by 2026 from an estimated 5.4% this year. "A paramount test will be whether India can become the next big global manufacturing hub, an immense opportunity," S&P said in its Global Credit Outlook 2024 report, dated Dec. 4.

In the current phase of growth, India's rise to the third spot will be fuelled by digital technologies. Across sectors, digital technologies are allowing India to leapfrog ahead with innovative new policies.

Harnessing Technology for Informed Policy-Making

The notable success of the 'India stack' over the years has given India a prominent and well-deserved status as - the hub of social and technological innovation. India Stack, also known as the Digital Public Infrastructure (DPI) is a collection of open Application Programming Interfaces (APIs) that has been aiming to make identity, data, and payments easy and viable for all while transforming the core dynamics of governance in the country. Several countries have signed up with the government of India in a bid to replicate the model in their own countries. Coupled with the

India Stack the government of India is also offering a series of other platforms such as UPI, Modular Open Source Identity Platform (MOSIP), CoWIN as well as the Digital Health Stack[2], while many countries have shown interest in the Digital Infrastructure for Knowledge Sharing (DIKSHA) and National Digital Education Architecture (NDEAR)[3].

The journey of digital governance in India began way back in 2009 with the Aadhaar digital identity. It has ever since consistently added services and witnessed great success, such as in the case of Co-WIN, among others. According to a paper from the Bank for International Settlements, digital initiatives in India have helped the country achieve 80 per cent financial inclusion in just six years, which otherwise may have taken upto 47 years. The key layers of the India stack include a presence-less layer, a paperless layer, a faceless layer, and a consent layer.[4] The consent layer is the final layer ensuring Data Empowerment and Protection Architecture (DEPA). It represents India's attempt at creating 'a secure consent-based data sharing framework' to accelerate the financial inclusion of its citizens.[5] It primarily gives the Indian citizens a series of rights to their data.

The Government of India has been progressively digitising its interface with citizens and making it easier to get licenses, certificates, payment of taxes and bringing efficiency in governance outcomes. The transformation is allowing the government to not just streamline administrative processes but also share information more readily, and involve citizens in decision-making. These services are not just restricted to digital identity and financial inclusion anymore; they now extend to various significant sectors such as health, education, and sustainability. Furthermore, the Champions of Change (COC) Dashboard, by NITI Aayog under the Aspirational Districts Program (ADP), monitors and tracks key development indicators across 5 sectors every month. These include education, health & nutrition, Infrastructure, Agri and Water Resources, and Financial Inclusion.

Recent initiatives in the digital policy-making space

One of the recent major achievements is the digitalisation of procurement of goods and services. Done by creating a centrally managed marketplace - Government eMarketplace (GeM), is now one of the largest procurement platforms with an annual gross merchandise value of US$14.2b.[6] Other key initiatives include;

- **Aviation** – **DigiYatra is** a paperless and contactless service entry at airports allowing passengers to travel without a boarding pass. DigiYatra uses a facial recognition system (FRS) to verify the identity of passengers linked to their boarding passes.[7]
- **Education – For digital education** in India **PM E-Vidhya** is targeting almost 25 crore school students across the country and DIKSHA is working towards the dream of 'One Nation, One Digital Platform. Other initiatives include; VidyDaan, E-Pathshala and Swayam Prabha TV. [8]

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- **Healthcare - Ayushman Bharat Health Account**, a building block of Ayushman Bharat Digital Health Mission (ABDM), is a 14-digit unique identification number that identifies you as a participant in India's digital healthcare ecosystem.[9]
- **Railways and infrastructure,** The PM Gati Shakti aims to reduce the logistics costs in India by providing seamless transportation of goods and people in the country. It is expected to cut the cost of logistics to GDP to 8 per cent from 14 per cent.[10] It will leverage technology for intelligent wagons and freight trains, digital automatic couplers as well as digital twinning of infrastructure. The Gati Shakti master plan includes design and development of railway stations as multimodal hubs and centres of urban development multi-modal freight and logistics hubs around railway goods sidings, and railway connectivity to ports and inland waterways and airports.
- **Power Sector** – The newly launched 'Mission on Advanced and High-Impact Research (MAHIR)' in the power sector aims to expedite indigenous research, development, and demonstration of cutting-edge technologies in the power sector. MAHIR fosters industry-academia-government collaboration to create an ecosystem for innovation and research in the power sector. Planned for an initial period of five years from 2023-24 to 2027-28, the mission will follow the technology lifecycle approach of idea to product.[11]
- **Agriculture** – According to Frost and Sullivan, drone adoption in India's agriculture sector would rise at a CAGR of 38.5% and reach $121.43 million by 2030, accounting for 2% of all expenditures on agricultural machinery.[12] With drone technology in the agriculture, sector farmers can bring high levels of efficiency in managing their crops and improve their yields. Although there are challenges such as concerns about job loss and a lack of knowledge and training, there are also initiatives to support to farmers and promote the use of this technology.
- **Manufacturing**: To enhance India's Manufacturing capabilities and Exports, the Production Linked Incentive (PLI) Schemes for 14 key sectors were announced with an outlay of Rs. 1.97 lakh crore (over US$26 billion). The goal is to attract investments in key sectors and cutting-edge technology to ensure efficiency and make Indian manufacturers globally competitive by inducing economies of size and scale in the manufacturing sector.

In addition to its efforts in various key sectors, The Swachh Bharat Mission (SBM) in India, has integrated technology as a crucial foundation to realize its ambitious goal of ensuring cleanliness and sanitation nationwide. According to PIB India, the Swachh Bharat Mission-Urban 2.0 places a strong emphasis on attaining 'Garbage Free Cities' within the next five years. The initiative encompasses several aspects of waste management, including addressing legacy dumpsites, handling construction and demolition waste efficiently, and managing plastic waste effectively. Technologies like the Swachhata App and the integration of SBM toilets on Google Maps have played a pivotal role in the success of the Swachh Bharat Mission-Urban.

The rapid evolution of technology has significantly transformed the governance landscape, offering unprecedented possibilities to improve efficiency, transparency, and accountability. Emerging technologies such as artificial intelligence, blockchain, and big data analytics are revolutionizing governance by offering tools for predictive analysis, secure data management, and real-time decision

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support. These advancements play a critical role in fostering more informed policy-making and delivering responsive public services. Innovations like smart cities, decentralized governance structures, and advanced data-driven decision-making have the potential to redefine the core principles of good governance.

AI and related technologies are predicted to be ahge boost for India's economy according to a report by consulting firm EY. "Given the immense capability of Gen AI with respect to its productivity and efficiency enhancing effects, its adoption has the potential to accelerate India's growth trajectory. It is, therefore, necessary to increase investment in Gen AI, education and upskilling to fully capitalize on the demographic dividend," the report says. "Our study indicates that India could experience a substantial boost in its GDP over seven years (2023-24 to 2029-30). Over a period of seven years (2023-24 to 2029-30), Gen AI's contribution would translate to US$1.2 trillion to US$1.5 trillion cumulated GDP impact." This represents an additional 5.9% to 7.2%of GDP in 2029-30.

The EY report has further policy advice for the country. "The Indian government recognizes the economic potential of AI and some public figures have called for a sharper India strategy for AI development. In line with the development of Digital Public Infrastructure such as the India Stack, Aadhaar, UPI, etc., the government can consider developing Gen AI systems as Public Goods. The development of indigenous training data sets (especially for local Indian languages) will be very important. The government may invest in creation of structured and unstructured datasets, which can be opened to the public," the report says.

Attendant efforts on boosting hardware capabilities to support all digital initiatives are also underway. A policy note says, "A comprehensive program for the development of semiconductors and display manufacturing ecosystem in India was approved by Government of India with an outlay of ₹ 76,000 crore (>10 billion USD). The Programme has various schemes to attract investments in the field of semiconductors and display manufacturing."

Several chip companies have announced their investment plans for India. Micron Technology has announced an investment of $825 million for chip assembly and testing. "Phase 1, which will include 500,000 square feet of planned cleanroom space, will start to become operational in late 2024, and Micron will ramp capacity gradually over time in line with global demand trends. Micron expects Phase 2 of the project, which would include construction of a facility similar in scale to Phase 1, to start towards the second half of the decade," its statement says. "Micron's investment will be up to $825 million over the two phases of the project and will create up to 5,000 new direct Micron jobs and 15,000 community jobs over the next several years." Foxconn and Reliance group have also planned their chip making enedevours.

REAL ECONOMIC INDEPENDENCE

Despite many initiatives, India will need time in boosting its manufacturing capabilities in various sectors including electronics, hardware and defence. Investments in shipping and ports needs more effort. Education sector needs more schools and colleges while healthcare needs more doctors and hospital beds. While technology will bridge the gaps, basic investments will still be needed. The initial results of the production linked incentive schemes have allowed global companies like Apple Inc to begin manufacturing iPhones in India. Other advanced sectors like drones are growing.

As India improves its capabilities in such key sectors, its path to becoming the third largest economy will be powered with new digital and emerging technologies.

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