5G As a Transformational Force

- *Amitabh Kant*

The government announced yesterday the rollout of the transformational 5G services, which will bring about a revolutionary change in communication, with benefits spanning sectors. Besides spurring economic growth, 5G is essential for industry 4.0, enabling rapid digitalization in India.

In 2015, the Digital India programme had outlined three visions: (i) Digital Infrastructure as a Core Utility to Every Citizen; (ii) Governance and Services on Demand; and (iii) Digital Empowerment of Citizens. Subsequently, the National Digital Communications Policy in 2018 had envisaged embarking on three missions, Connect India, Propel India, and Secure India, to realize the vision of a digitally empowered economy and society. The 5G is the key to achieving these visions in key sectors—such as education, healthcare, fintech, agriculture, and transportation—and for social transformation.

The pandemic underscored the enabling nature of digitalization in most sectors, but more so in education and skilling. With the enhanced mobile broadband (eMBB) feature of 5G, the full potential of digital education can be unleashed. Expanding on PM eVidya, it can deliver high-quality educational content through mobile applications to every student in the country. The 5G will also provide a major impetus to digital universities. Vocational training programmes, delivered in the phygital mode, can improve the employability of youth and women by providing hands-on experience and reducing on-job training time.

In healthcare, the ultra-reliable low-latency communication (URLLC) feature of the 5G will enable user-friendly point-of-care diagnostics and the creation of much-needed connected ambulances—both of which will ensure speedier and timely treatment. Along with m-Health, the 5G will also significantly improve access to world-class medical advice, resulting in better follow-up care. A hospital-run private 5G network will enable even a handful of doctors and nursing staff

to provide quality care to hundreds by monitoring their vitals while simultaneously maintaining electronic health records.

For financial inclusion and the banking sector, both eMBB and URLLC features will play significant roles. India has already become a world leader with the Unified Payment Interface (UPI)—an innovative API-based open solution for instant real-time payments. With the help of Geospatial Information Systems, we can reach the next level of simple, seamless, and secure payments—such as 'one-tap payment' and 'cashierless store' models. Similarly, the payments bank model can be expanded through incremental steps towards a completely mobile formal banking system. This will enable citizens to securely access various bank facilities through a virtual branch experience, thereby enhancing the banking population of India.

In transportation and mobility, the massive machine-type communication (mMTC) feature of 5G can prove to be a game-changer. A network of EVs and charging stations can be created, optimizing the availability of the charging infrastructure, and thereby enhancing the cost-effectiveness of the electric vehicles' ecosystem. Integrating initiatives across transit systems, like FASTag for toll and entry tax, can not only improve efficiency within the transportation sector but also reduce our carbon footprints. Alongside the launch of the drones-as-a-service ecosystem in India, the URLLC feature will be crucial for navigation and drone traffic control.

In commerce and logistics, there is a massive opportunity to improve the operational efficiency of air and seaports. Ports across the globe struggle with long waiting times and inventory congestion. Using the mMTC and URLLC features, we can turn these challenges into opportunities. The deployment of machine vision with software-enabled automatic-guided vehicles can help in better port-space management. This will lead to highly optimized cargo handling and take the industry to the next level of growth.

In agriculture and renewable energy, farms can be equipped with a diverse range of sensors to continuously monitor the factors impacting the health of crops. Even small farmers, with little virtual training, can improve irrigation efficiency as well as crop yields through the 5G. Renewable energy farms (especially wind and solar) already deploy numerous sensors, but because they are in remote regions, there is a delay in the response. With 5G, their response time and efficiency can be radically improved.

In manufacturing and industry, the impact of 5G will be most visible and tangible. Here, 5G private networks will be the cornerstone of industry 4.0. These networks connect an array of IoT sensors and devices and automate the scheduling of various processes based on intelligent algorithms. In manufacturing factories, such networks can improve efficiency by an estimated 2–4 times while reducing carbon emissions. However, these gains are not limited to the manufacturing sector. Any industry that is able to digitize and schedule processes will be able to leverage the many benefits of 5G.

In governance and public safety, service delivery and citizen-engagement efforts can be improved with faster and safer digital identity verification. This will in turn enable faster implementation of direct benefit transfers and other such schemes. Real-time automated monitoring of public spaces and traffic using city-owned private 5G networks will improve public safety and congestion in India's metro cities. Deployment of IoT-based systems on similar networks, using the network function virtualization feature of the 5G, will improve the efficiency of the projects under the Smart Cities Mission.

Technological leapfrogging in sunrise sectors of growth is key to India's rapid growth and advancement. Every feature of the 5G has numerous use cases across key developmental sectors of India. India needs to embrace and leverage the 5G to realize the vision of a vibrant, dynamic and technologically savvy new India.

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