

# Telecom infra must rest on strong fibre network

In terms of reliability, capacity, affordability and long-term resilience, it scores over mobile-based networks

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India today stands tall as the world's fourth-largest economy and among the fastest-growing major economies. It is also a digital powerhouse — leading the world in mobile data consumption, scaling digital public infrastructure such as UPI, and connecting hundreds of millions of citizens to the internet. Yet beneath this remarkable digital story lies a structural imbalance. India is the only major global economy where broadband access is overwhelmingly dependent on mobile networks. In most advanced economies strong GDP growth has been accompanied by deep and widespread fixed broadband infrastructure. Fibre networks reach homes, businesses, schools and hospitals at scale, providing the stable backbone on which digital economies operate. Mobile networks play a vital role, but primarily as a complement to this foundation rather than a substitute for it.

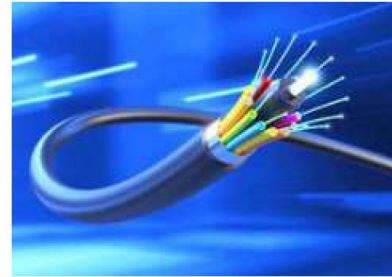
India, by contrast, has largely inverted this model. India's fixed broadband penetration remains in the low single digits per hundred population. Much of the country's digital ecosystem rests on mobile broadband — an achievement in affordability and scale, but also a structural compromise in reliability, capacity and long-term resilience.

International experience offers useful lessons. In advanced European economies such as France and the UK, fixed broadband penetration exceeds 40 connections per 100 people, and fibre-to-the-home is rapidly becoming standard infrastructure. In East Asia, China has built the world's largest fibre network even while expanding 5G at scale. The lesson is not one of mobile versus fibre, but rather fibre first, with mobile layered on top.

## INFRA DEPTH LACKING

India's mobile-first trajectory undoubtedly delivered significant benefits. Competitive markets and low tariffs democratised internet access and brought hundreds of millions online. However, connectivity reach is not the same as infrastructure depth.

This imbalance carries major challenges: Firstly, there is the issue of network strain. Mobile networks operate within finite spectrum resources and are inherently variable and suited for mobility and intermittent, light-to-medium demand. As India digitises manufacturing, education, telemedicine, cloud services and emerging AI applications, sustained high-capacity demand is increasingly shifting into homes and enterprises. Relying predominantly on mobile networks in such circumstances risks congestion and inconsistent



**FIBRE.** Consumes less energy per unit of data GETTY IMAGES/ISTOCKPHOTO

performance. In effect, spectrum is being asked to do work that fibre infrastructure is better suited to deliver.

Secondly, there are implications for productivity and affordability. Fibre enables ultra-low latency, symmetric high-speed connectivity and high reliability — capabilities essential for Industry 4.0 manufacturing, remote diagnostics, smart logistics, cloud computing and advanced research. Importantly, fixed broadband also delivers data at significantly lower usage cost. In India, the effective cost per gigabyte on fixed networks is often a fraction of that on mobile networks — one-fourth or one-fifth, making it a more sustainable platform for large-scale digital activity and digital inclusion.

Third, resilience becomes a challenge. Robust digital ecosystems are layered:

fibre backbones, last-mile fibre access, Wi-Fi offload, satellite redundancy and mobile connectivity for mobility. When one layer dominates excessively, vulnerabilities can emerge. Climate events, spectrum constraints, back-haul congestion or power disruptions can have disproportionate impact in a mobile-heavy architecture. Fixed broadband is not merely another access technology; it represents long-term digital capital formation. This calls for a rebalancing of infrastructure priorities.

The required tools are already available. These include expanding fibre-to-the-home and fibre-to-enterprise networks, increasing the fibreisation of mobile towers, strengthening public Wi-Fi ecosystems such as those enabled by PM-WANI, enabling infrastructure sharing to reduce deployment costs, and integrating satellite broadband to improve connectivity in remote areas.

The economics is compelling. Fibre networks involve higher initial capital investment but offer far lower marginal cost per gigabyte over time. They consume less energy per unit of data transmitted than mobile networks and possess enormous bandwidth capacity, making them durable infrastructure for decades.

The writer is President, Broadband India Forum. Views are personal