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# FTTH + WI-FI = SOLUTION FOR INDIA'S DIGITAL ECONOMY

India must explore FTTx and modern Wi-Fi solutions to address 5G monetisation challenges and create an inclusive, sustainable, digital society

In the rapidly evolving digital landscape, India strives to lead the global digital revolution by making significant progress in high-speed Internet connectivity. India has made commendable strides in deploying cutting-edge 5G mobile technology, covering approximately 10,000 towns and deploying 3.4 lakh stations by August 2023. Despite this achievement, the lack of 'killer' use cases poses significant monetisation challenges globally and in India.

Since a base station could have three or more cells, one could do a marketing stroke by stating that over a million cells have been set up. While this is indeed admirable, one must pause and note that it is also an open secret, globally and in India, that there are huge monetisation challenges in 5G due to a lack of 'killer' use cases.

## NEED FOR A BALANCED DIGITAL ECONOMY

India can ill afford to waste its financial resources on projects with nil or negative returns and hence, alternative technological solutions need to be considered for digital progress. It needs to also be appreciated that a good digital economy needs to be a balanced one by technology.

A lopsided economy, with over-dependence on fixed broadband, mobile broadband, or any other technology, would not be adequately efficient or sustainable for the modern era. There needs to be balanced and holistic development of all elements of digital infrastructure including fixed networks, mobile, satellite, Wi-Fi, data centres, CDNs, etc. to ensure optimum results.

As is well known, mobile technology is subject to the characteristics of RF engineering. The speed delivered, the reliability, and the consistency are dependent on multiple variables like distance from the tower, foliage and/or thickness of walls between handset and tower, number of subscribers logging onto the tower at that time, as well as the speed of movement of the subscriber.

These factors are outside the control of the operator or the subscriber and hence result in quite variable and unpredictable quality. However, both fibre and Wi-Fi are less subject to variables and hence the combo of Fibre-to-the-home/ building (FTTH/B) and Wi-Fi can provide far more reliable and consistent quality.

## ADVANTAGES OF FTTX AND WI-FI INTEGRATION

Implementing 5G infrastructure requires significant investment in expensive towers, network equipment and electronics. In contrast, FTTx can leverage existing infrastructure like utility poles, power lines and underground ducts, which can significantly reduce deployment costs. This makes FTTx a more cost-effective solution for a country like India with budget constraints and a price-sensitive market.

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Fibre can have nearly infinite capacity and by optical characteristics, can deliver much higher speeds than even 5G. When seamlessly integrated with Wi-Fi technology, these speeds transcend barriers, offering users an unparalleled online experience. This high-speed connectivity becomes the catalyst for various technological marvels, from seamless video conferencing and real-time data analytics to immersive virtual reality experiences.

Also, noteworthy is the situation as regards China, where at the end of August 2022, there were 622 million fixed-line broadband users, up 32.1 million from the start of the year as against mobile broadband users of about 1 billion by December 2022. Recent data reveals that 22% of broadband customers in China have access to downlink speeds of at least 1 Gbps. Media reports indicate that out of the total broadband users in China, 94% have a connectivity of 100 Mbps and above. However, even in China, 5G has not generated economic returns for the operators.

On the other hand, India, as of July 2023, clocked 832.5 million wireless broadband subscribers and 35.7 million wired broadband subscribers. This is a highly unbalanced digital situation and quite undesirable for achieving a healthy growth of Digital India. No wonder then, the country needs to step up fast to match and excel in the uptake of FTTH/B in comparable regimes. The Estimated additional FTTH/B connections during the January-March 2023 period stands at 1.36 million for Brazil, 14.6 million for China, and 1.75 million for the USA. In contrast, India stands at just 0.81 million.

## EMBRACING MODERN WI-FI TECHNOLOGIES

An FTTH/B connection with a good wireless router at the endpoint makes for a compelling broadband connection and is particularly relevant for India. As earlier pointed out, this type of connection provides very good speed, and bandwidth as well as reliability and consistency in the home or building. Unfortunately, since the start of mobile communication in India, Wi-Fi did not get the importance it deserved and hence this segment languished completely until NDCP 2018 brought it to the fore and stipulated a goal of 10 million public Wi-Fi hotspots by December 2022. However, the achievement against this target has not been more than about 0.5 million.

It is noteworthy that the Bharat 6G Vision Document released by the Prime Minister of India in March 2023 emphatically restated an augmented goal of 50 million public Wi-Fi hotspots by 2030. Both NDCP and the 6G Vision Document thus clearly underscore the need for adequate public Wi-Fi backup to support the advanced technologies of 5G and 6G. India now needs to install at least seven million public Wi-Fi hotspots every year to meet the 6G Vision by 2030.

It should be noted that India needs to also ensure the use of the modern and advanced Wi-Fi technologies that are available. The country is, predominantly, still on Wi-Fi 5 (802.11ac) whereas the world has moved on to the advanced versions of Wi-Fi 6 and Wi-Fi 6E, and is on the verge of adopting Wi-Fi 7. Wi-Fi 6E is a powerful version of Wi-Fi 6 (802.11ax) offering several advantages, including wider channels of 160 MHz or even 320 MHz and lower latency making it ideal for applications like 4K and 8K streaming, sophisticated online gaming and other bandwidth-intensive tasks.

Many new devices and routers are now equipped with Wi-Fi 6E support to take advantage of these benefits. India can ill-afford to lag in this respect. Further, HFCL in India has already developed Wi-Fi 7 chips and is exporting them whereas the country is yet to adopt them. With such modern Wi-Fi versions on top of an FTTH/B connection, the possibilities are limitless.

## FTTX AND WI-FI IN RURAL CONNECTIVITY

The recent approval of Rs.1.39 lakh crores for BharatNet presents an opportunity to extend FTTx and modern Wi-Fi connections to every village. This is probably the largest funding globally for reaching broadband connectivity to rural areas. This can prove to be an excellent method of taking FTTx + modern Wi-Fi like Wi-Fi 6E to reach rural citizens, enhancing healthcare, education, and work opportunities, thereby bridging the digital divide and creating a more inclusive society.

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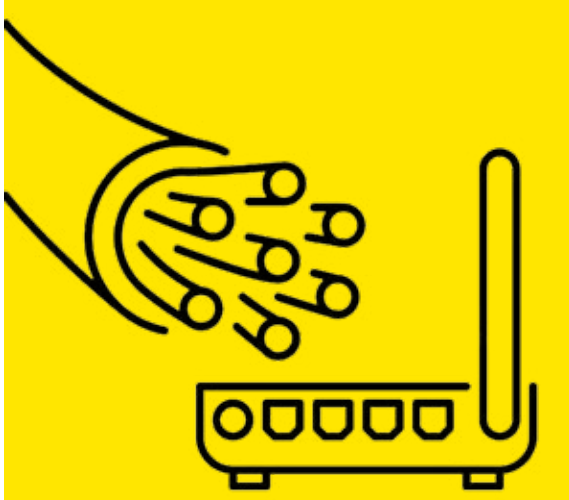

## IN BRIEF

- **Monetisation challenges in 5G:** Despite 5G deployment, the lack of 'killer' use cases globally and in India poses significant monetisation challenges.
- **Balanced digital economy:** India needs a balanced digital economy, avoiding over-dependence on specific technologies for sustainability and efficiency.
- **FTTx and Wi-Fi:** FTTx leveraging existing infrastructure and high-speed Wi-Fi integration offer cost-effective, reliable, and scalable solutions.
- **Evolving Wi-Fi Tech:** India must adopt Wi-Fi 6E and Wi-Fi 7 for seamless connectivity and to keep pace with global standards.
- **Rural connectivity:** Investment in BharatNet offers an opportunity to extend FTTx and modern Wi-Fi connections.
- **Environmental sustainability:** FTTx and Wi-Fi contribute to environmental sustainability by consuming less energy as compared to other technologies.

Fibre-enabled Wi-Fi networks can play a big role in smart cities and smart villages. From intelligent traffic management and energy-efficient infrastructure to connected public services, the synergy between fibre optics and modern Wi-Fi can remarkably transform urban, semi-urban and rural living. Additionally, FTTx + Wi-Fi is also vital for the expeditious growth of IoT, which is essential for India.

Unlike other competing technologies which consume significant amounts of energy and give rise to environmental concerns, FTTx + Wi-Fi also contributes to environmental sustainability since fibre optics require less energy to transmit data over long distances. WIK Consult has shown that FTTH networks are 2.5x times more energy efficient per megabyte transmitted than 5G. A 15% transfer of traffic from fixed to mobile networks could result in 16% higher energy consumption which would lead to 3.2 megatons of additional CO2 emissions in Europe per year by 2030.

It is undeniable that 5G technology has tremendous advantages in many 'mobile' applications but a vast and diverse country like India demands other complementary approaches as well. FTTx + Wi-Fi presents a compelling alternative that can effectively address the nation's unique challenges. Fibre and Wi-Fi combo offers a cost-effective, reliable and scalable solution to bridge the digital divide and provide high-speed Internet to nooks and corners of India. There is also the unique opportunity of deploying the innovation of PM WANI public Wi-Fi architecture which enables hassle-free movement from one public Wi-Fi hotspot to another for accessing broadband without repeated KYC authentication, verification etc.

Leveraging the landmark Cabinet decision, we now have an opportunity to take a giant stride towards a more inclusive society. Indeed, in the race for digital transformation, FTTx plus modern Wi-Fi might well prove to be India's winning combination.

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*Views are personal.*

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