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India Mobile Broadband Index 2021

About Nokia MBiT Index

Nokia MBiT Index is a report on mobile broadband performance in India. It aims to provide valuable insight, data and analysis on mobile broadband and traffic growth in India, by co-relating these trends with various demand and supply-side drivers of the connectivity ecosystem such as handsets, devices, content, subscriber usage patterns and network investments by mobile operators.

As India is gearing up to embrace 5G, demand for robust mobile and data connectivity amid COVID-19 has led technologies such as fixed wireless access (FWA) to emerge as a cost-efficient broadband alternative driving digitalization.

This edition of the MBiT Index evaluates 4G, 3G and overall data traffic growth trends at a pan-India and circle category level, and data consumption per user on 4G and 3G for 2020. It highlights the current device ecosystem for 4G and VoLTE devices in India as well as users' data usage patterns in terms of type of content being consumed and its key drivers.

The report also outlines the impact of COVID-19 on broadband performance, particularly fixed broadband which is changing the overall consumption patterns. It highlights how emerging technologies are likely to revolutionize the overall broadband connectivity supplemented by Govt initiatives and the growing opportunities for consumers, CSPs and enterprises.

MBiT Index has been created based on Nokia's analysis of data obtained from various sources. It analyses mobile broadband traffic trends only at a consolidated level and does not intend to provide a comparative analysis of data growth for different operators.

With ~60x traffic growth in last 5 years and 13.5 GB avg. data usage per subscriber per month, India stands tall amongst the mature markets

Massive increase in content consumption amid COVID-19 coupled with rising smartphone users, leading to increase in 4G data traffic

1. Overall data traffic increased by **36%** in 2020 due to continued 4G consumption, while 3G data traffic showed its highest ever **decline of 56%**

2. 4G constituted **98.7%** of total data traffic consumed across the country; category A & B circles accounted for **76%** of total data traffic

3. Overall avg. data usage per month registered a CAGR of **76%** from 2015-2020 reaching **13.5 GB** in December 2020

4. 4G device base reflected a continuous growth of **20%** in 2020. VoLTE handsets support grew to **93%** of unique 4G devices

5. With ~**5 hours** of daily time spend on smartphones, India is one of the highest consumers of data per day, surpassing China; short videos have emerged as the fastest growing content category

6. With only **22 mn** fixed broadband subscribers, India poses significant growth opportunities both in terms of FTTx and FWA to generate a new revenue stream for operators

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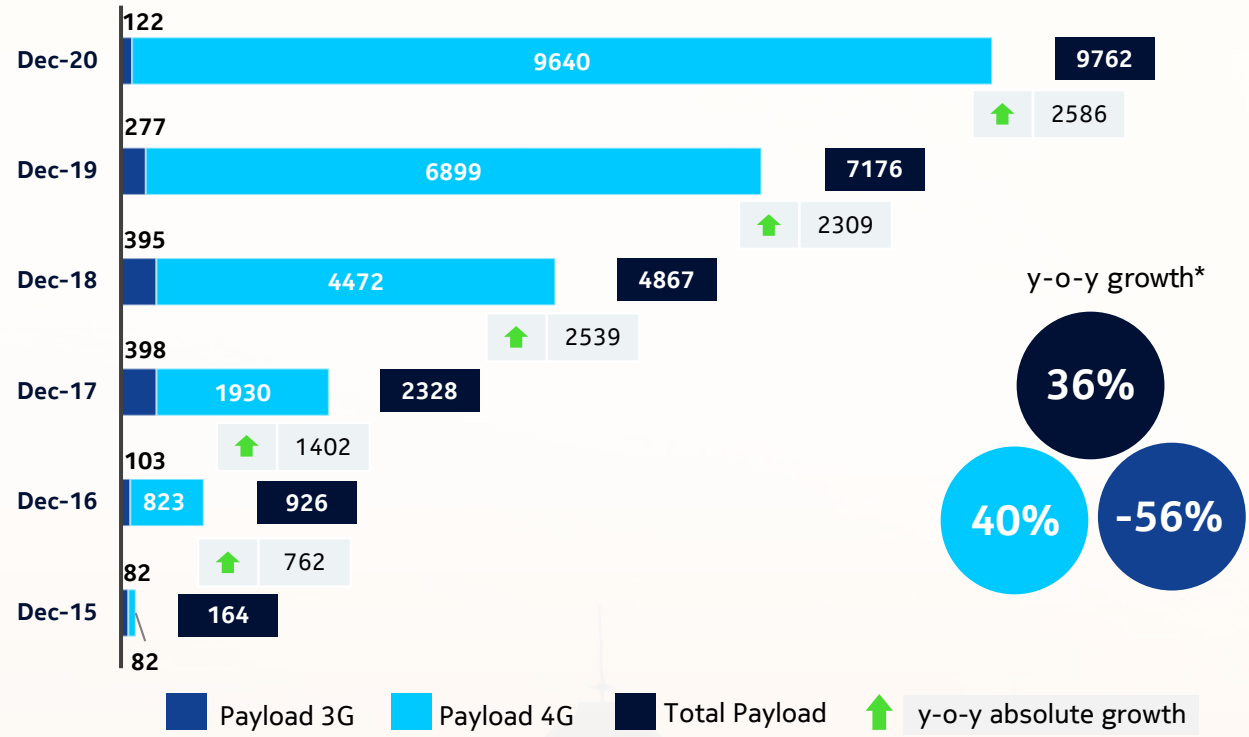
With 100 mn new additions, 4G subscribers surpassed 700 mn, consuming ~99% of overall mobile data traffic

Pan-India mobile data usage – in Petabytes (PB**) per month, December[1]



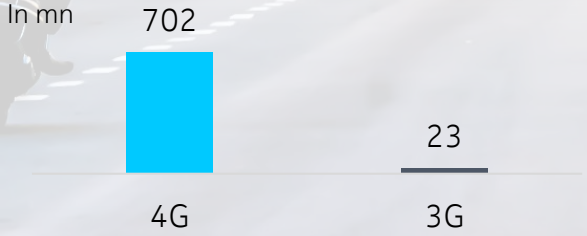
4G traffic is 98.7% of overall mobile data traffic. Continued upgradation to 4G & increased online traffic due to COVID-19 have driven higher data consumption.

Post introduction of 4G services in 2016, total data traffic increased by ~60 times (2015-2020), one of the highest in the world.

Majority of the data traffic in 2020 was driven by movement from 3G to 4G due to continuous network upgradations and closure of 3G services.

Increased online education, remote working for professionals and higher OTT viewership have also contributed to the data traffic growth.

Data subscribers by technology, December 2020[2]



- 4G data users have increased by 17% (y-o-y) with 4G penetration in the country reaching to 61%
- 3G subscribers exhibited a steep decline of 56% in 2020 due to shut down of 3G services by major operators

Source: 1. Nokia Analysis 2. Operator Quarterly Reports, TRAI
* Represents y-o-y growth for Dec-19 to Dec-20 ; **1PB=1000 TB

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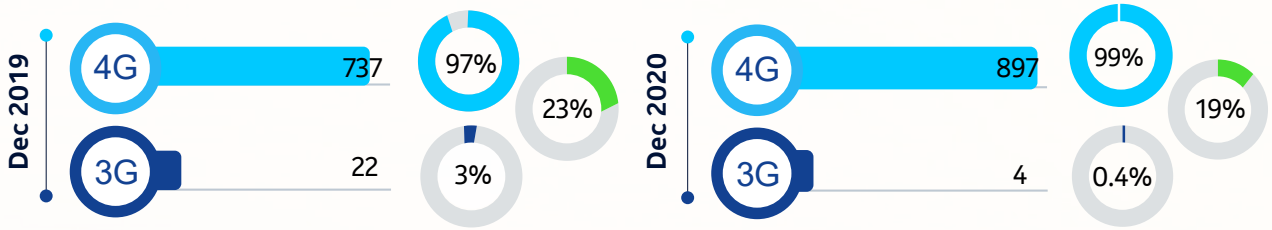
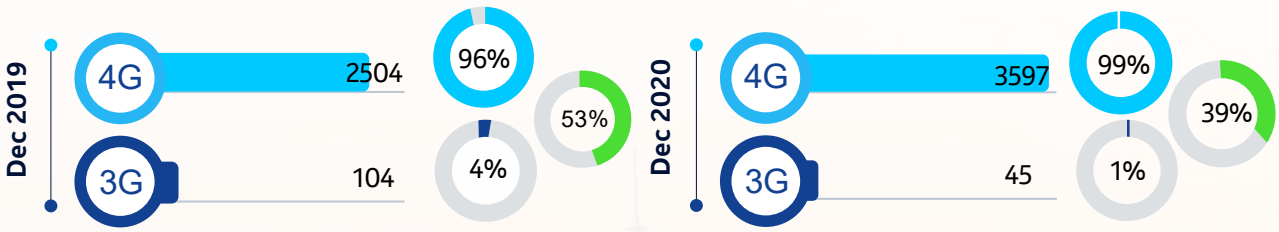
4G constitutes ~99% of total data traffic across all categories

4G | 3G | 4G contribution% | 3G contribution% | y-o-y Growth (3G+ 4G)[2]

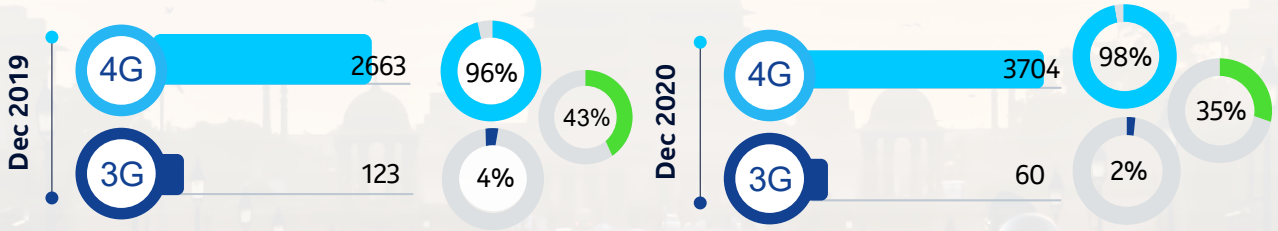
Metro payload[1] (contributed to 9% of overall 4G payload)



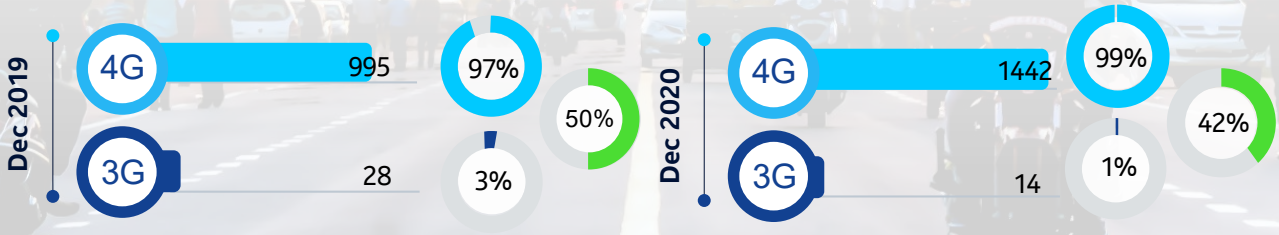
Category A payload[1] (contributed to 37% of overall 4G payload)



Category B payload[1] (contributed to 39% of overall 4G payload)



Category C payload[1] (contributed to 15% of overall 4G payload)



Circle categories A & B constituted 76% of Pan India traffic.
Category A, B and C saw higher growth rates in 2020 than metros due to operator focus on 4G in these circles.

Source: Nokia Analysis
1. Payload in PB/ Month 2. Represents y-o-y growth; Dec-18 vs Dec-19 and Dec-19 vs Dec-20

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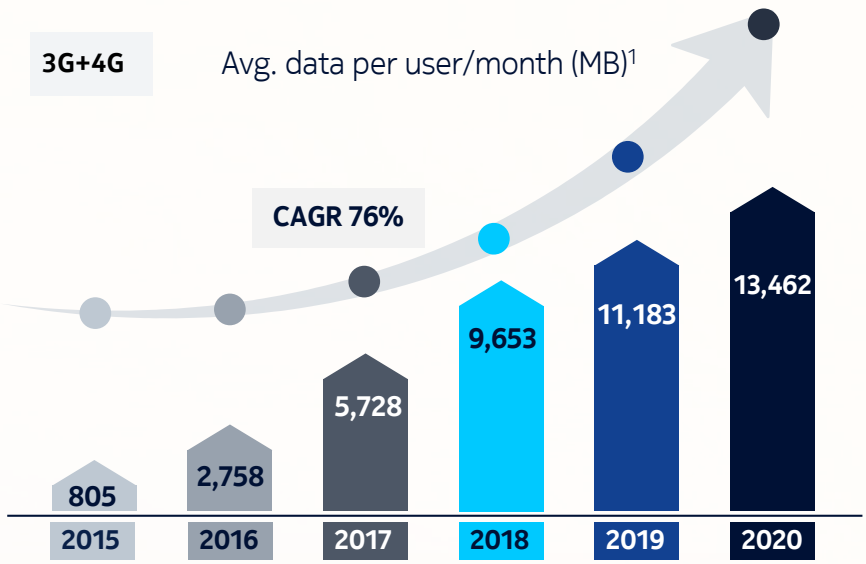
Avg. monthly data usage per user has increased almost 17 times over last five years

Avg. monthly data traffic per user increased by 20.4% (y-o-y) in 2020 driven by increase in data subscribers and mobile video consumption.

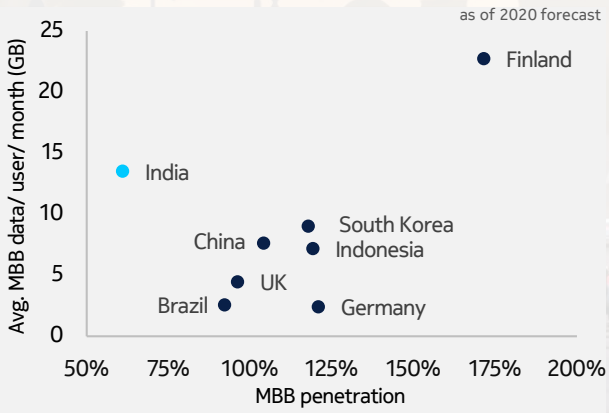


Continued increase in data consumption has resulted in exponential growth in avg. data usage per month; a CAGR of 76% over the last five years.

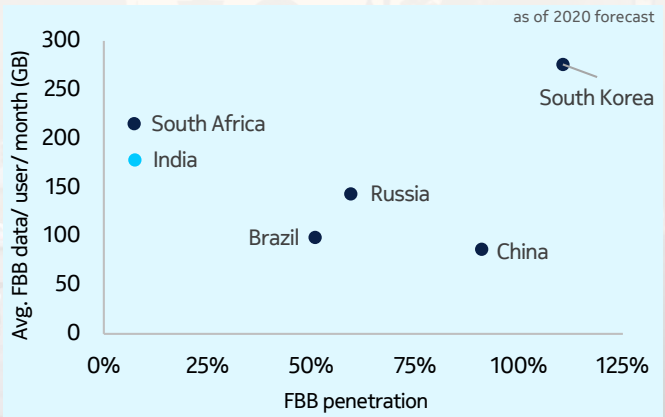
The combined (3G+4G) avg. data usage per month is at 13.5 GB and 4G data usage has reached to 13.7 GB[1].

New users from rural areas, contributed to the rising monthly data usage. Rural consumption accounts for ~45% of overall mobile data usage[2].

Avg. mobile data/ user/ month vs mobile broadband (MBB) penetration[3]



Avg. fixed broadband (FBB) data/ user/ month vs FBB penetration[4]



India's current MBB penetration is ~63% with avg. usage of 13.5 GB. The usage is expected to grow exponentially with 5G.

India's current FBB penetration stands only at dismal 7.5% of households with avg. fixed data/ user/ month of 178 GB[1].

There is a headroom for growth in data as well as penetration across mobile and fixed domain.

Source: 1. Nokia analysis 2. Press 3. GlobalData, GSMA, Nokia analysis 4. Ovum, Deloitte

4G capable devices grew 1.2 times with 77% penetration in 2020; ~2 million active 5G devices

Growth drivers

2021 promises to witness double-digit growth for the smartphone industry as people embrace hybrid work models, binge on web series and other e-learning needs.

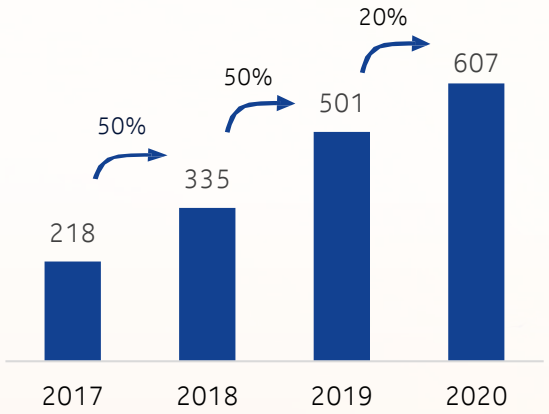
Further, launch of low cost 4G smartphones will provide the necessary headroom for growth with a significant chunk of 2G/3G subscribers to upgrade to 4G smartphones.

4G capable device base in India[1]

Despite COVID-19 restrictions, ~150 mn smartphones shipped in India. The nation registered highest ever shipment of +53 mn units[2] in Q3'20.

~100 mn subscribers having LTE capable devices are still on 2G/3G services.

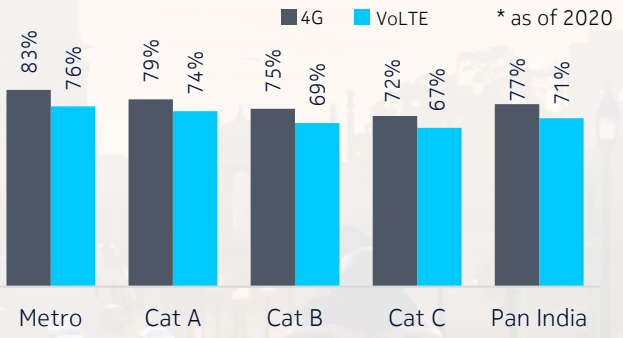
563 mn VoLTE capable devices (93% of total LTE capable device base).



4G/ VOLTE capable device penetration by circle category (% of active subscriber base)[1]

4G capable device penetration reached 77% at a pan-India level in 2020.

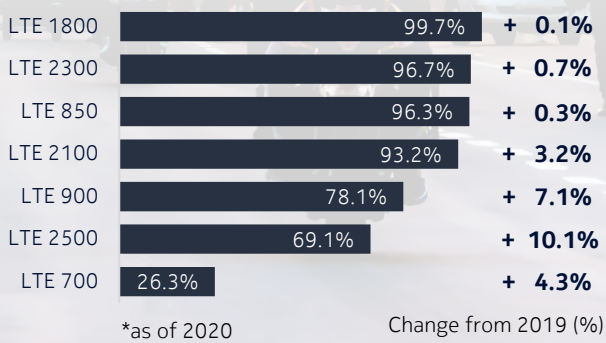
Metros reported the highest 4G capable device penetration at 83%.



LTE band ecosystem (% LTE-capable devices)[1]

Majority of the LTE devices are across spectrum bands of 1800, 2300, 850 and 2100 MHz.

LTE 2500 showed the highest annual growth among all bands.



 Source: 1. Nokia Analysis 2. Counterpoint Research

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4x increase in smartphone usage to ~5 hrs per day enabling mobile data as primary means for productivity and entertainment

Multi-fold growth in internet users to 970 mn by 2025

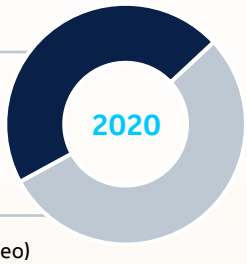
With surging internet users, total time spent/ month on short content to grow by 4x by 2025

9x

Growth in avg. MAU for short video content since 2016

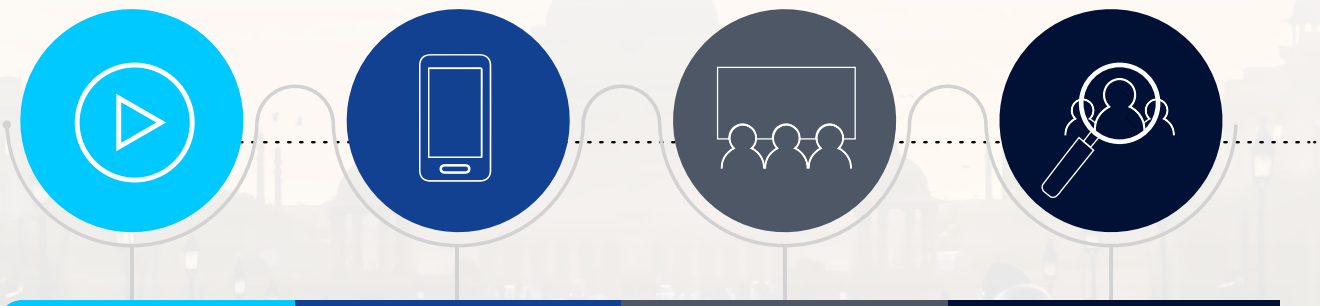
46% Others
(Fitness, Fin-Tech, Ed-Tech, E-Tailing eB2B)

54% Content
(Youtube, Social Media, OTT Video)



Indians
spend a highest total of
4hrs 48 mins
per smartphone per day, globally

Key Drivers



Short Videos	Smartphones	Millennials & GenZ	Regional content
Short curated videos establishing high attention of the viewers.	Rise in smartphone sales (9%, y-o-y in Q3'20) owing to increasing middle and rural spent on data consumption and digitalization.	Shorter attention spans of millennials and GenZ are enlarging visibility for creators to invest on entertainment and huge dialect libraries.	Enhanced personalization and regional content moderation, leading to augmented daily engagement.

With the advent of 5G, in the next few years, India will see significant growth in short videos enabled by richer content, consumer curated content and enhanced peer to peer communication.

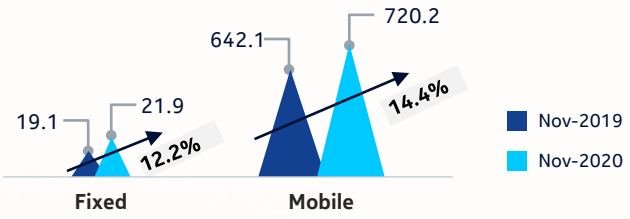
Source: Reedseer Consulting, Press , Nokia Analysis

Fixed broadband revenue forecast to grow 1.5 times by 2025[1]

Indian broadband market is largely dominated by mobile owing to affordable smartphones, low data prices and ease in the provisioning of services, similar to other developing countries.

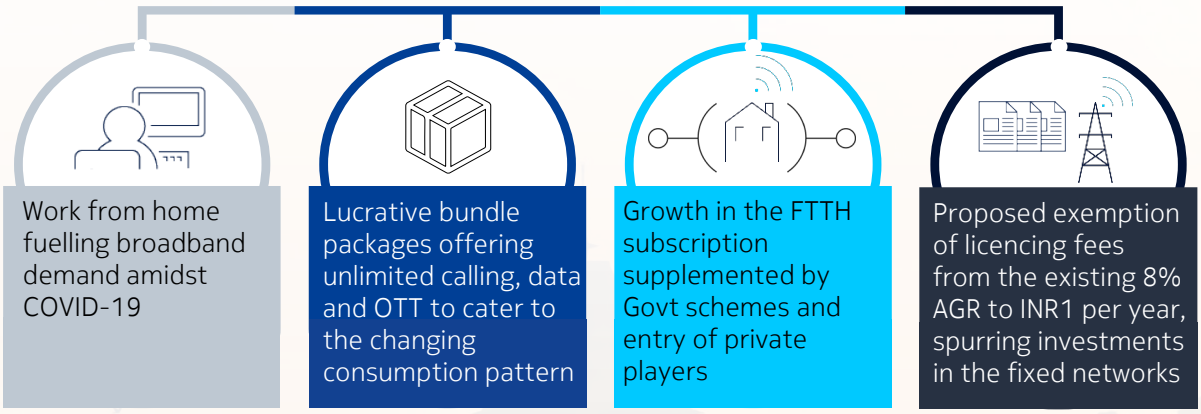
Just 22 mn FBB subscribers[2] present a significant opportunity for growth

Broadband subscribers[2] (mn)



FBB revenues will increase at a CAGR of 8.6% during 2020-25[1], mainly driven by adoption of higher value broadband plans, digitalisation and inflated OTT usage, e-learning, and virtual working.

Some of the key trends driving fixed network growth



COVID-19: ushering a new era of broadband, particularly fixed broadband[3]

Amid COVID-19, digital services such as e-commerce, online education and entertainment, and e-payments witnessed a sizeable increase in consumption across the nation.

E-commerce	Work from home	Content consumed
• Order-volume growth of 17 % as of June 2020 compared to February 2020	• The initial phase of lockdown witnessed a 30% increase in data traffic. • Demand for FBB in tier 2-3 cities increased drastically with customers demanding for higher speed and more data allocation in their plans	• 30% increase in time spent on education apps and a 265% increase in April 2020 OTT traffic since February 2020

Although, India has marked a sizeable broadband growth in recent years, FBB accessibility through FWA and FTTx will offer significant growth opportunities and help generate a new revenue stream for operators.

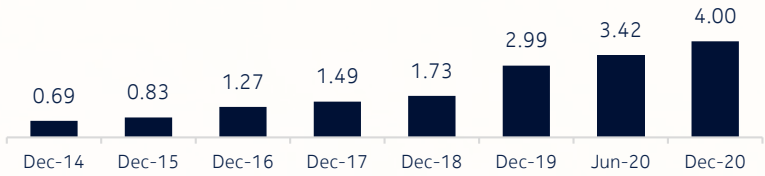
Source: 1. GlobalData 2. TRAI 3. Deloitte

FTTx and FWA – boosting broadband connectivity for digital India

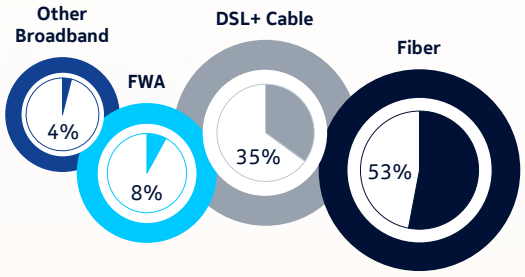
Growth in FTTx is essential to improve the quality of telecom services and support surging data demand.

FTTx connections are projected to increase from less than 15% of total FBB connections in 2019 to almost 48.3% by 2025.

FTTH broadband connections[1] (mn)



Fixed broadband technologies revenue share split[2]



% Revenue share by applications 2025

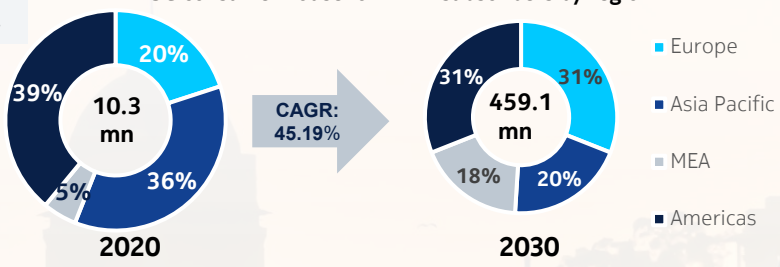
Currently, 32% of telecom towers are fiberized and is forecast to increase to 70% by 2024.

Government plans to connect 6,00,000 villages with the internet, escalating further growth of FTTH subscribers.

Similar to FTTx, mmWAve spectrum based FWA is also gaining a lot of traction, globally.

Global consumer 5G FWA is projected to reach over 50 mn connections by 2025 and increase to more than 450 mn by 2030.

5G consumer household FWA subscribers by region[3]



5G FWA proposed frequency bands[4]:

Frequency	Bandwidth	FWA - feasibility	Coverage	Throughput
700Mhz (Low band)	NA*	No	Excellent	Poor
3.4 – 3.8 GHz (Mid band)	100 Mhz	Yes	Good	Good
24.25-27.5 GHz (mmWave)	400 MHz	Yes	Poor	Excellent

* Not planned to be used in India currently.

- 5G spectrum auction in 3.3- 3.6 GHz band expected in H2'2021
- mmWave band will further boost FWA use cases

5G FWA[5] : A viable alternative to wired broadband, offering more choice, faster speeds and greater reliability

Consumers
- An alternative to fast, gigabit-capable broadband where fiber is not available
- Small lag for ultra-fast gaming and streaming experiences
- Easy self-installation

CSPs
- 5G FWA as a backup or enhancement for fixed-line services
- Mobile-only operators can use 5G-FWA to enter the fixed broadband market
- Faster time to market with existing RAN footprint

Enterprise
- Fast, reliable gigabit-capable connectivity for SMBs
- Very low latency for mission critical applications
- An alternative or backup to fixed broadband connectivity for remote campus locations

Source: 1. IDATE/ Digiworld 2. Omdia, Nokia Analysis 3.Counterpoint research 4.Opnet solutions 5.Nokia

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Way Forward

01 Pandemic has led to demographic shifts in demand while accelerating digitalization that include fixed broadband and significantly more data consumption

02 Demand for enhanced broadband and fixed access for more capacity and coverage would further establish the need for 5G in future

03 CSPs would transform into DSP's (Digital Service providers) by offering digital products and services towards consumers and enterprise

04 Industry 4.0 enabled by Private Networks with various IoT and Enterprise use cases would spur LTE, 5G growth and data usage*

05 Most attractive applications expected to skyrocket data usage would include video surveillance, video capture and detection applications, immersive applications experience (AR/VR), smart home, factory and public safety

 *Nokia MBiT 2020

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Document code: CID210321

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With our commitment to innovation and technology leadership, driven by the award-winning Nokia Bell Labs, we deliver networks at the limits of science across mobile, infrastructure, cloud, and enabling technologies.

Adhering to the highest standards of integrity and security, we help build the capabilities we need for a more productive, sustainable and inclusive world.

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