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

01 The 5G services were launched in India in October 2022. As 5G is gaining momentum with rollout progressing at a fast pace across the country, it is expected to accelerate data consumption, revenue growth & 5G smartphone sales.

02 The 10th edition of the report assesses 4G and 5G data traffic growth and trends across India, including circle categories. It also captures data consumption per user and highlights the current device ecosystem in India.

03 The report highlights how 5G is enabling private wireless network for Industry 4.0 applications. It also gives insights into 5G/4G adoption in various sectors, including Manufacturing, Utilities, Transportation, etc.
CAGR of 50% in the last 6 years for mobile data, 19.5 GB avg. data usage per subscriber per month.

Mobile data traffic per month in 2022:
- 14.4 Exabyte
- 14% y-o-y

Growth in 5 years mobile data traffic:
- 3.2x
- 2018 to 2022

4G + 5G contribution in mobile data traffic:
- ~100% across all circle categories in 2022

Average monthly data traffic per user:
- 19% CAGR growth
- 19.5 GB
- 9.7 GB
- 2018 to 2022

Investment to the tune of US$250 mn by 2027 in private wireless

Data usage:
- 5G
- 43.7 Exabyte

5G devices shipped to India in 2022:
- 70 mn

Majority adoption across:
- Transport
- Manufacturing
- Utilities
Mobile data traffic jumped 3.2x in the last five years

Pan-India mobile data usage – Exabyte (EB*) per month

14% y-o-y growth**
Includes 5G data

<table>
<thead>
<tr>
<th>Year</th>
<th>Exabyte (EB*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>4.5</td>
</tr>
<tr>
<td>2019</td>
<td>6.9</td>
</tr>
<tr>
<td>2020</td>
<td>9.6</td>
</tr>
<tr>
<td>2021</td>
<td>12.6</td>
</tr>
<tr>
<td>2022</td>
<td>14.4</td>
</tr>
</tbody>
</table>

1 EB = 1000 PB
**Represents y-o-y growth for Dec-21 to Dec-22

- 4G remained dominant with ~99% data share in 2022. 5G data contribution started December 2022 onwards.
- New 5G driven application and services to drive further data growth.
- ~20% (y-o-y) data growth reported in major service providers.

Major 5G uptake is expected starting 2H 2023. Expected 5G data usage by 2024: (per annum): 43.7 EB.3

4G data subscribers (mn)

<table>
<thead>
<tr>
<th>Year</th>
<th>4G data subscribers (mn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>432</td>
</tr>
<tr>
<td>2019</td>
<td>598</td>
</tr>
<tr>
<td>2020</td>
<td>702</td>
</tr>
<tr>
<td>2021</td>
<td>742</td>
</tr>
<tr>
<td>2022</td>
<td>773</td>
</tr>
</tbody>
</table>

4G subscriber addition stabilizing after ~5 years of solid growth
Further subscriber addition to be driven by 5G and existing 2G subscribers (350 mn)^1 migrating to 5G/4G.

Expected subscribers by 2024 -
- 5G: ~150 mn^3
- Combined (4G + 5G): ~990 mn^3

Source: 1. Nokia Analysis 2. Operator Quarterly Reports, TRAI 3. OMDIA
^1EB=1000 PB **Represents y-o-y growth for Dec-21 to Dec-22
With 5G gaining momentum, 4G & 5G data combined accounts for near 100% of the total mobile data traffic

4G + 5G payload by category¹ (in Exabyte), per month

<table>
<thead>
<tr>
<th></th>
<th>Metro payload</th>
<th>Category A</th>
<th>Category B</th>
<th>Category C</th>
<th>Pan India</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>1.3</td>
<td>5.2</td>
<td>5.5</td>
<td>2.4</td>
<td>14.4</td>
</tr>
<tr>
<td>Y-o-Y Growth</td>
<td>▲ 8.9%</td>
<td>▲ 15.1%</td>
<td>▲ 11.3%</td>
<td>▲ 22.2%</td>
<td>▲ 14.2%</td>
</tr>
<tr>
<td>2021</td>
<td>1.2</td>
<td>4.5</td>
<td>5.0</td>
<td>2.0</td>
<td>12.6</td>
</tr>
</tbody>
</table>

• Category A & B circles constitute 75% of overall data in India.
• Category C witnessed the highest growth (20%)¹ in data owing to aggressive rural deployments in 4G.
• 5G was launched in October 2022. Infrastructure build-up and rollout is still underway.
• Service providers are aiming for pan India 5G availability in next 12-15 months.

5G has started picking up across circles, e.g. 5G traffic in Metro is 3% – 5% of total data traffic (as of December 2022)

Source: 1. Nokia Analysis

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Average data per user per month grew 2x in the last five years

Cumulative 5G smartphone shipments to cross the 100 mn mark in Q2 2023, surpassing 4G smartphone shipments by the end of 2023²

Average monthly data traffic per user grew 13.6% (y-o-y) in 2022.

- With a CAGR of 19.02% in the last five years, mobile data consumption reached 19.5 GB per user per month.
- Data consumption to further grow with new 5G driven applications and services.

India will continue to rank amongst the top data consuming countries

- India’s forecasted MBB penetration ~82%³ in 2027.
- Average usage/user/month to grow 136% from 19.5 GB¹ in 2022 to 46 GB⁴ in 2027.


* Avg. data per user/month (GB)
India’s total spend on private wireless network to reach around US$250mn by 2027

- Private wireless network is experiencing a lot of traction across the globe: Western Europe, APAC, and North America are among the front runners.
- India’s market is evolving as future enterprise business revenues are pegged at almost 40% of overall 5G revenues.

How big is the private wireless network opportunity?

Global: Private wireless network 5G & LTE (Capex & Opex) spend

<table>
<thead>
<tr>
<th>Year</th>
<th>Capex</th>
<th>Opex</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>0.7</td>
<td></td>
<td>0.7</td>
</tr>
<tr>
<td>2027</td>
<td>7.7</td>
<td></td>
<td>7.7</td>
</tr>
</tbody>
</table>

- Global private 5G/LTE (Capex & Opex) spend projected to reach US$7.7bn by 2027, increasing at a CAGR of 48% (2021-2027).

Global: Private wireless network (5G & LTE) revenue

<table>
<thead>
<tr>
<th>Year</th>
<th>5G</th>
<th>LTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>2.5</td>
<td>0.5</td>
</tr>
<tr>
<td>2023</td>
<td>3.7</td>
<td>1.3</td>
</tr>
<tr>
<td>2024</td>
<td>4.9</td>
<td>2.6</td>
</tr>
<tr>
<td>2025</td>
<td>6.0</td>
<td>4.3</td>
</tr>
<tr>
<td>2026</td>
<td>6.9</td>
<td>5.8</td>
</tr>
<tr>
<td>2027</td>
<td>7.5</td>
<td>6.9</td>
</tr>
</tbody>
</table>

- Global private LTE/5G revenues projected to reach US$7.5bn by 2027, increasing at a CAGR of 23.5% (2022-2027).

Globally, operators are addressing the opportunity via a mix of technologies and it is expected that the private 5G market will eclipse the private LTE market in 2024 as enterprises leverage 5G as a foundational platform for digital transformation.

India: Total NON-DIY (SPaaP and others) and DIY (enterprise owned) spend

- Total spend on private wireless networks in India will reach around US$250mn by 2027 (including managed services, equipment leasing and direct CAPEX by enterprises).
- The NON-DIY managed services model will be the primary deployment model used in India.

**Non-DIY spend includes "managed service" utilizing telco-owned spectrum or through a leasing arrangement for dedicated spectrum and equipment. Spending on Private wireless networks in this DIY category would cover the costs of spectrum acquisition and commercialization, equipment/software purchase and network operations.
India to have 2,000+ sites for private wireless network by 2027¹

Globally, the number of private LTE/5G wireless network to grow at a CAGR of 65% between 2021 (1,900) and 2027 (39,000)².

India’s private wireless network sites rollout projected to be ~6% of the global deployment³.

India: Number of private wireless network sites and base stations (deployed/planned/trial)¹

India to have 372 base stations¹ (BTS) for 4G LTE in 2027 and 2,090¹ for 5G overall across sub-6 GHz and mmWave.

Manufacturing, Utilities and Transportation to constitute the majority of private wireless network deployment\(^1\)

Global: Manufacturing, Energy and Utility, Transport and Logistics, and Healthcare to constitute over 76% of the total private wireless network market revenue by 2027\(^2\).

Private (LTE and 5G) wireless network market revenue by industry\(^2\) (in US$bn)

![Graph showing the revenue by industry from 2022 to 2027.](image)

*Others include: Public sector – Government, Education, Arts, media, and entertainment, Retail and real estate and other verticals

India: Manufacturing, Utility, and Transport to constitute over 44% of the total private wireless network sites by 2027\(^1\)

<table>
<thead>
<tr>
<th></th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>20</td>
<td>52</td>
<td>87</td>
<td>133</td>
<td>169</td>
<td>205</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>42</td>
<td>72</td>
<td>125</td>
<td>194</td>
<td>280</td>
<td>380</td>
</tr>
<tr>
<td>Utilities</td>
<td>-</td>
<td>85</td>
<td>127</td>
<td>141</td>
<td>197</td>
<td>315</td>
</tr>
<tr>
<td>Healthcare</td>
<td>6</td>
<td>13</td>
<td>28</td>
<td>53</td>
<td>94</td>
<td>157</td>
</tr>
<tr>
<td>Others</td>
<td>31</td>
<td>104</td>
<td>211</td>
<td>359</td>
<td>598</td>
<td>971</td>
</tr>
</tbody>
</table>

*Others include: Government, Education, Resource and construction and other industries

2023 should see a significant spurt in activity with scaled-up deployments and increasing ecosystem maturity.

Source: 1. Mandala Insights 2. OMDIA
India marching ahead into the digital era

1. Mobile data in India will grow more than double by 2024, with 5G as the new accelerator

2. Private 5G networks to play a crucial role in driving efficiency, productivity and sustainability as enterprises evolve to Industry 4.0

3. India to evolve as a global manufacturing and supply chain hub for ICT - 5G/4G driven Industry 4.0 adoption and government push to boost manufacturing as key factors

4. 5G will be the foundation for a greener economy - No green without Digital
At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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