

5G India 2022



Manoj Gurnani
Sept 08 2022

Together with our customers, we create the world's networks



Communications service providers

7bn+ Subscriptions supported by our mobile networks

500m+ Fixed broadband lines and ports shipped



Industry and public sector

2,200+ Mission-critical customers

485+ Private wireless customers



Licensing opportunities

20,000+ Patent families

4000+ Patent families declared essential to 5G

Building technology leadership across the industry



Mobile Networks

- Radio Access Networks
- Microwave Radio Links
- Related network management software and services



Cloud and Network Services

- Business applications
- Core network solutions
- Cloud and cognitive services
- Enterprise solutions



Network Infrastructure

- IP networks
- Optical networks
- Fixed networks
- Alcatel Submarine Networks

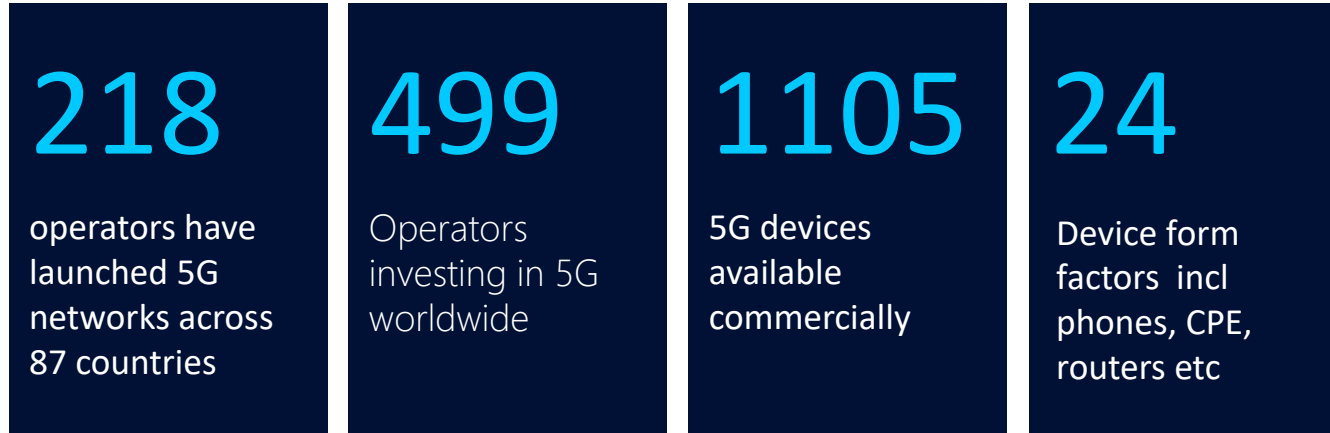


Nokia Technologies

- Brand licensing
- Patent licensing
- Technology licensing

5G subscription growth continues

1.2 B subscribers expected by end of 2022

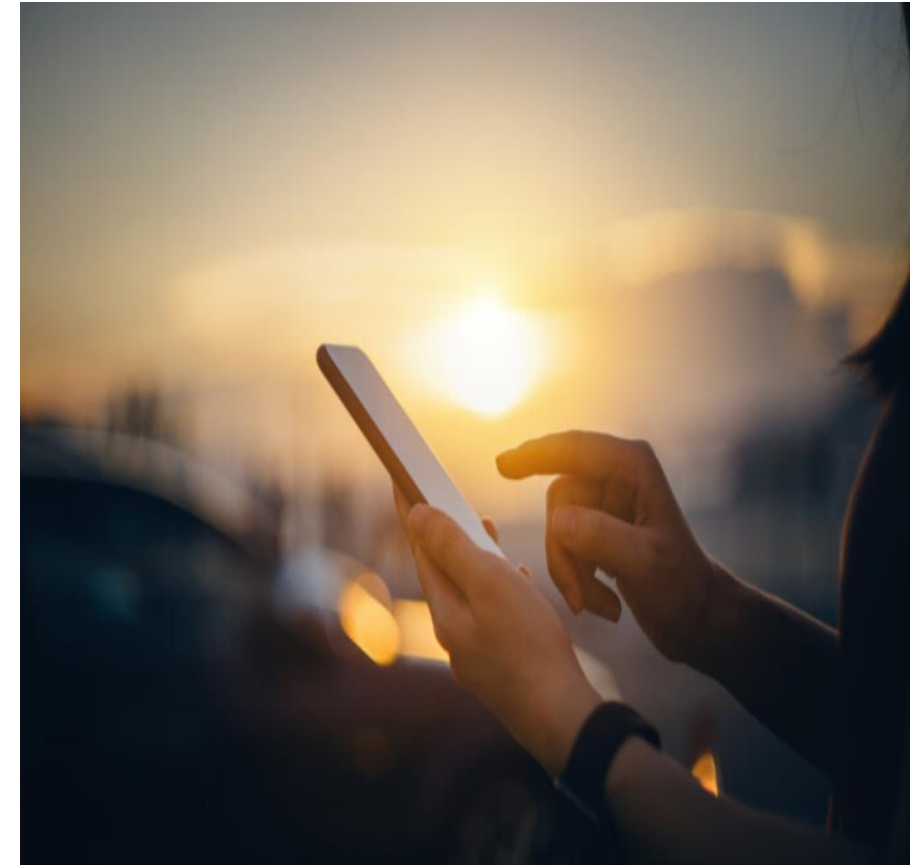


Source: GSA, July 2022



Source: Omdia, July 2022

Source: GSMA, Mobile Economy 2021



5G mobile subscription penetration

5G is steadily becoming mainstream

40-50%

China*

30-40%

South Korea

10-20%

Australia, Taiwan, major US, some
Hong Kong and Japan operators,
few European operators

Data: December 2021

(* Actual 5G device connections fewer than 50% of subscriptions)

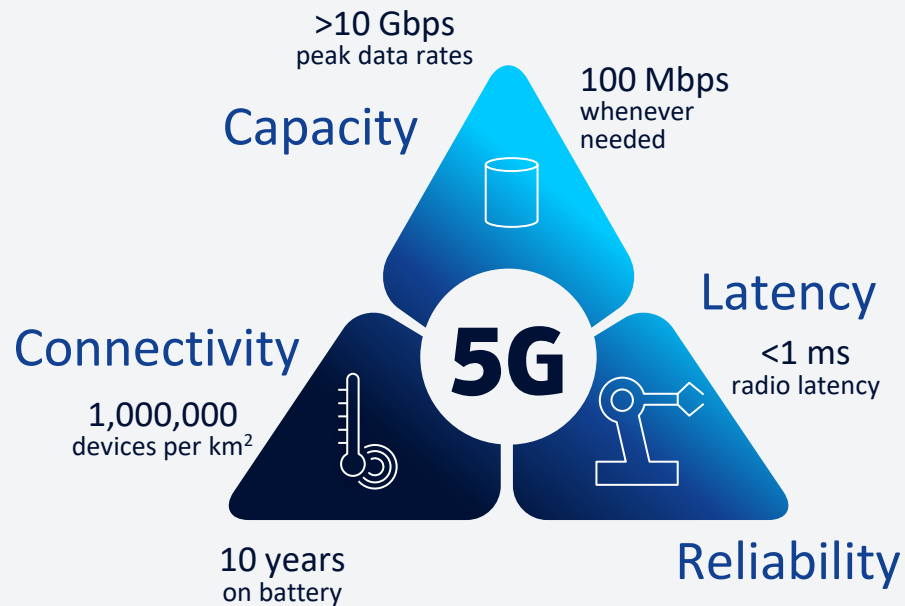


5G is a giant leap powered by a set of new technologies

Endless possibilities

New technologies

Requirements



New 5G technology building blocks

New spectrum options

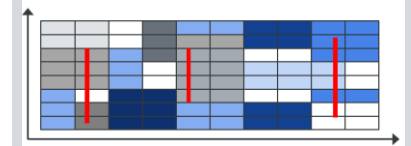


<3 GHz, 3-6 GHz, cm/mmWave

Massive MIMO & beamforming



Flexible air interface

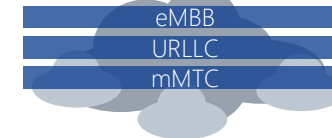


Multi-connectivity



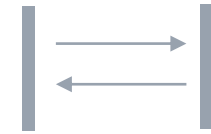
Aggregation and duplication

Cloud native & network slicing



Centralized and distributed

Connectionless communication

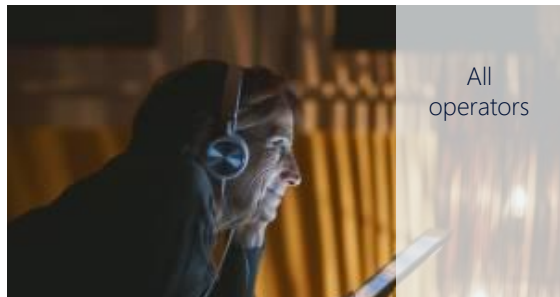


Efficient massive IoT

5G use cases in the spotlight

Examples of what's generating industry interest for consumers

● Commercial
● Trials



All operators

Evolved Mobile broadband

Consistently great video streaming and social media experience



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ZAIN

OPTUS

Fixed Wireless Access (FWA)

Gigabit broadband experience, rivalling FTTx



AT&T

kt

Cloud gaming

Leveraging 5G's high data rates and low latency

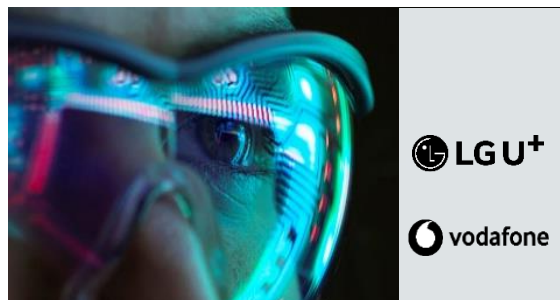


Bell

Bell

Immersive events

Multi-camera event experience with AR and social extensions



LGU+

vodafone

AR glasses

Opening up rich extended-reality consumer possibilities



SK telecom

vodafone

AR/VR-enabled tourism

Enriching the tourist experience



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Drone racing

High-speed sports action enabled by 5G's low latency



SK telecom

5G connected car

Enabling high-definition mapping and infotainment



CSP logos are examples, not an exhaustive list

We are leading the market in private wireless networks

Private wireless and IoT expand critical networks market into Enterprise

Transportation	Energy	Public sector	Manufacturing and supply chain	Mining	Ports
  	  	  	  	   	   
					

Private wireless networks sold to 485 customers directly or via CSPs – over 90 include 5G

86%

Lead Time
Reduction

IT infrastructure
Setup for new
production line

First 'real-world' Smart Manufacturing application of Industry 4.0 in India

31%

Labor Time
Optimization

Hardware Robotic
Automation

21%

Productivity
Improvement

SMT Operations

NOKIA

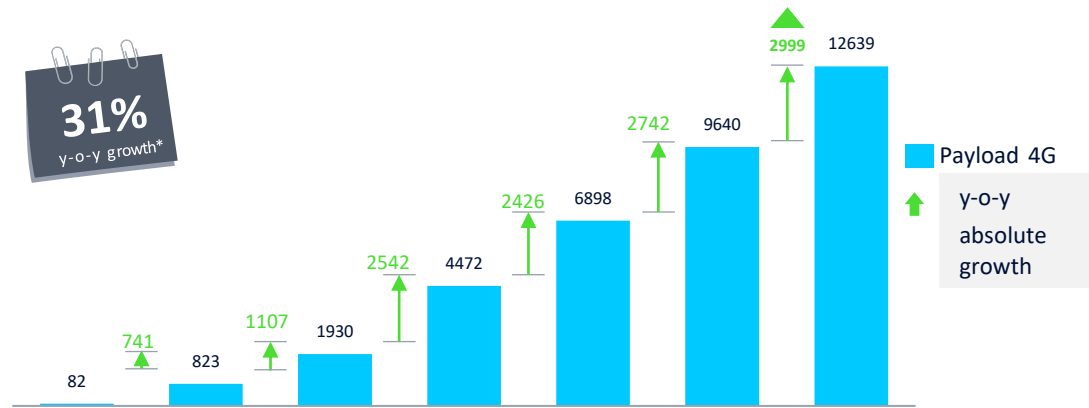
Nokia Solutions & Networks India Pvt. Ltd.

Data growth in India continues unabated: no sign of slowing down

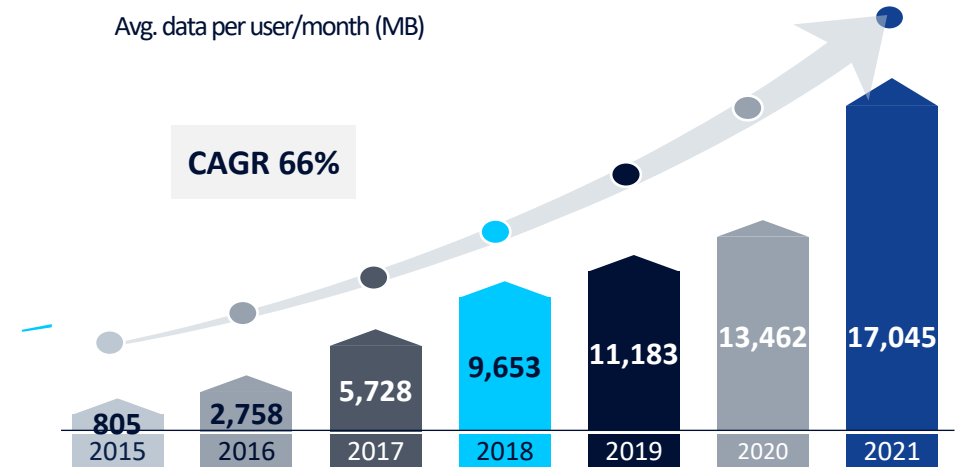
~66x 4G data traffic growth in last six years, India monthly data usage per user among the highest in the world

Average data/user/month grew 6x in six years and reached to 17GB per user in 2021

Pan-India mobile data usage – in Petabytes (PB) per month, December¹ (1PB=1000 TB)



Avg. data per user/month (MB)



~40%
Smartphone users



High
Adoption in rural India



8hrs/day
Online

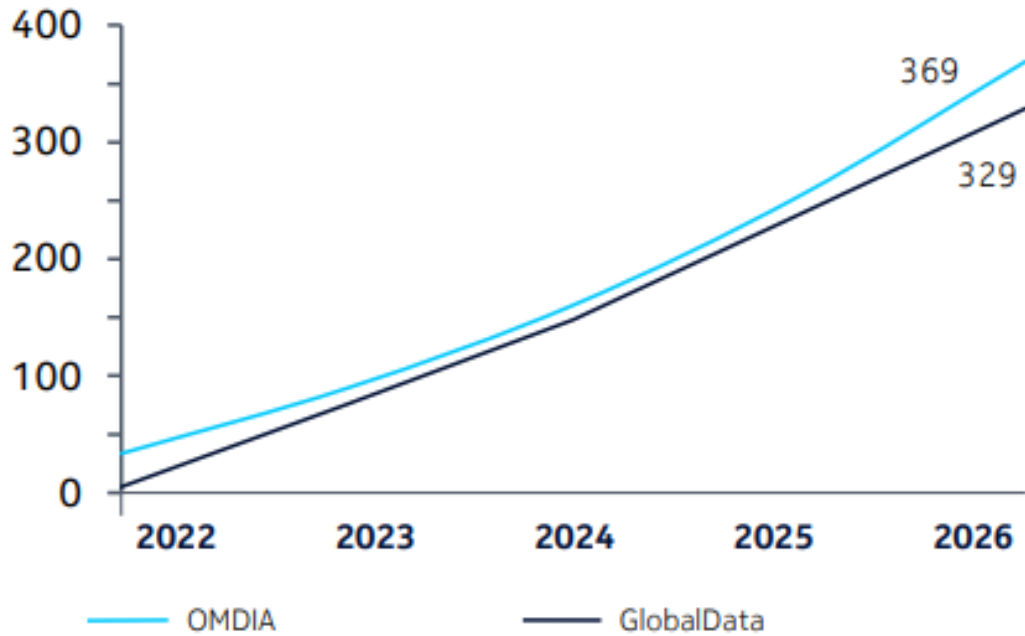


~40%
Time on regional videos

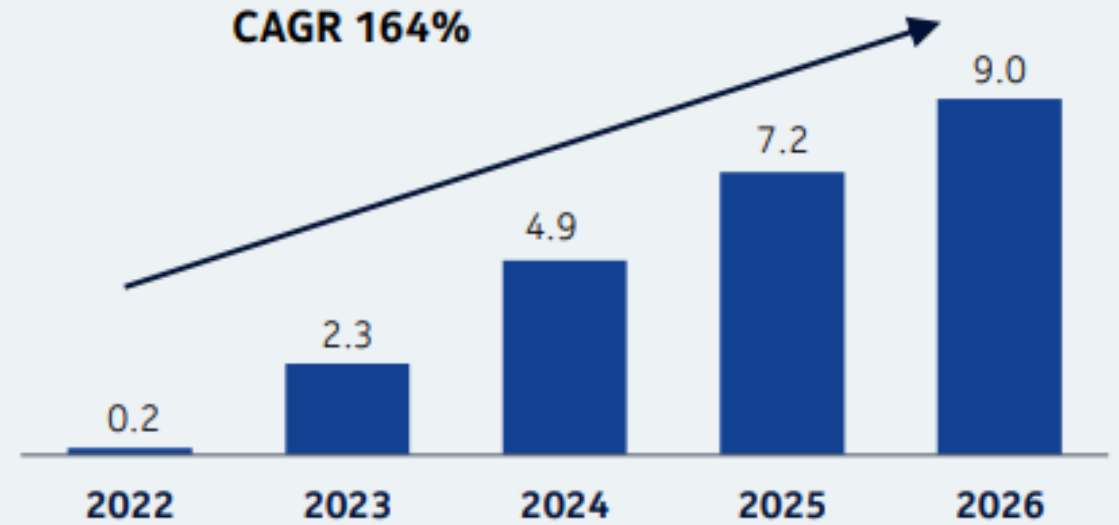


5G in India: market projections

India 5G subscriptions (mn)

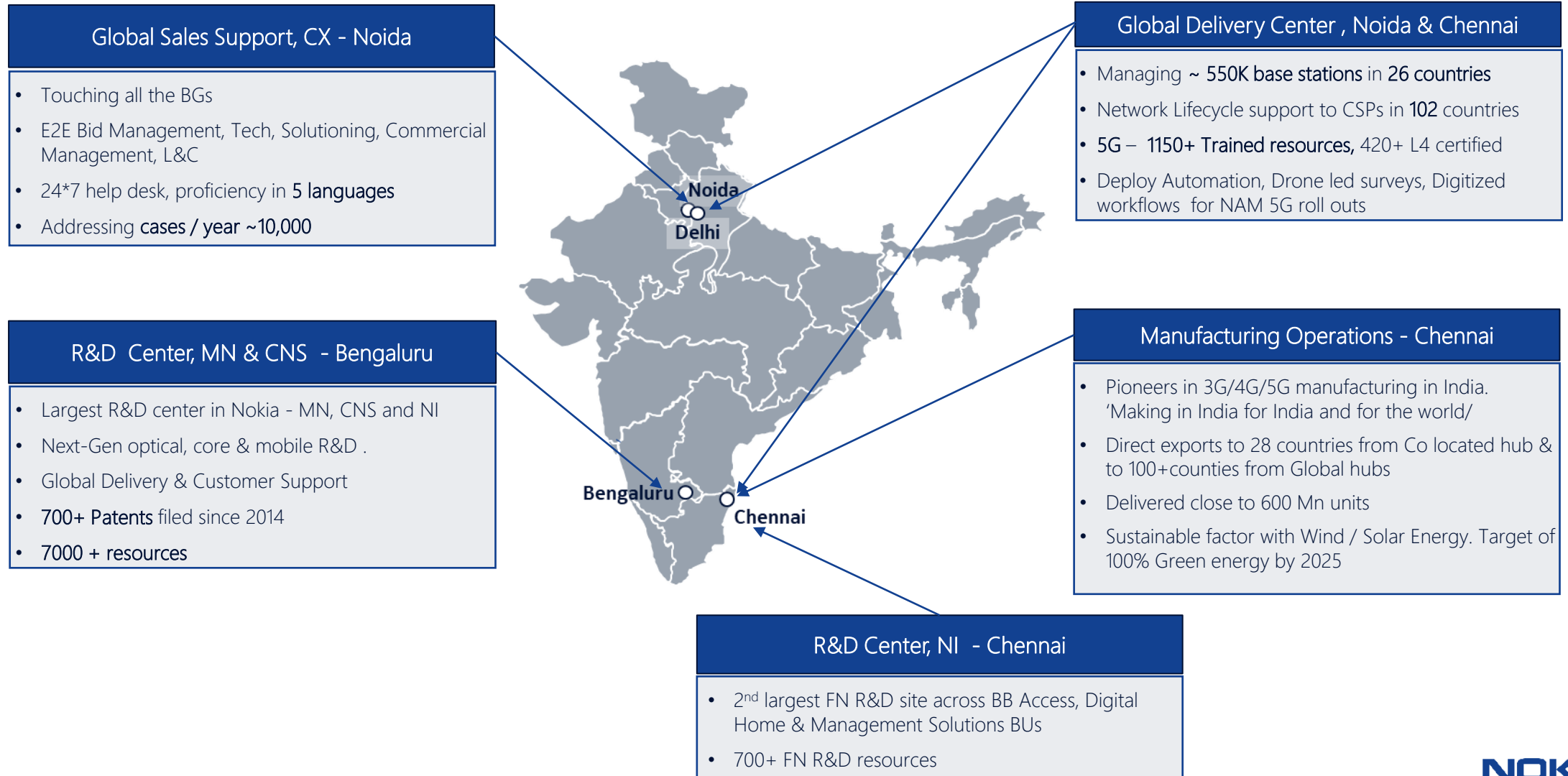


India 5G revenue (US\$bn)



Nokia's 5G readiness in India

16,000 + Workforce adding strategic Value to Nokia Globally



5 factors for 5G success in India

1. Backhaul: Rapid Fiberization, complemented by E band
2. Device ecosystem to suit India consumers
3. Easy Regulatory Compliances: RoW, Trusted products, Testing
4. Upskilling & 5G competence build up: Students, academia, start ups
5. India specific use cases, including enterprise & verticals



NOKIA