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5G : Developing Countries

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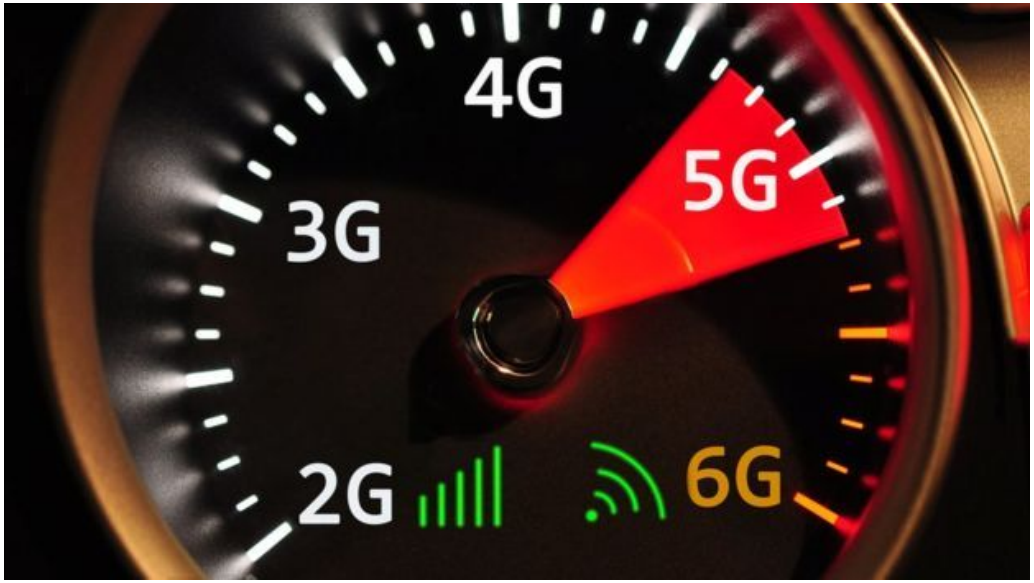
Summary

1. Introduction
2. 5G in China
   - 5G Trials and Technology
3. 5G in India
   - Vision
   - 5G Trials and Technology
   - Roadblocks
4. Conclusion

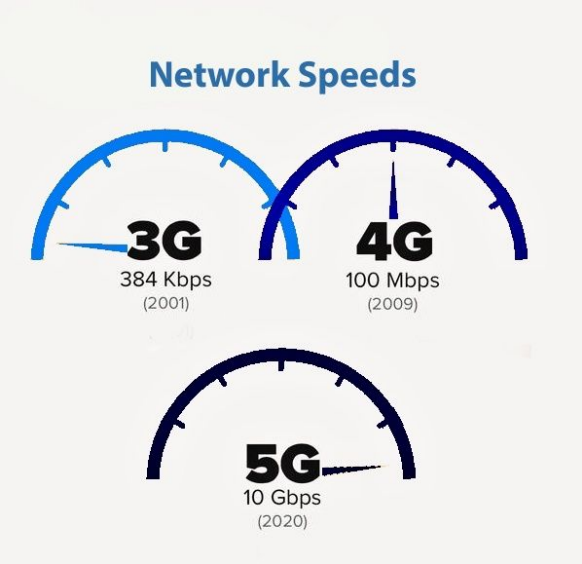
What is 5G?

The fifth generation of wireless technology



What will it enable us to do?

- Downloading movies in seconds



- Networks that connect millions of new devices

If ‘big data’ is the new oil of the digital era then 5G is the next set of pipes that will deliver it.

The South China Morning Post

5G in China

Investment

2013

national research group **IMT-2020 (5G) Promotion Group**

2017

first 5G **test base station** in Guangzhou

2018

5G **trials** in 20 cities

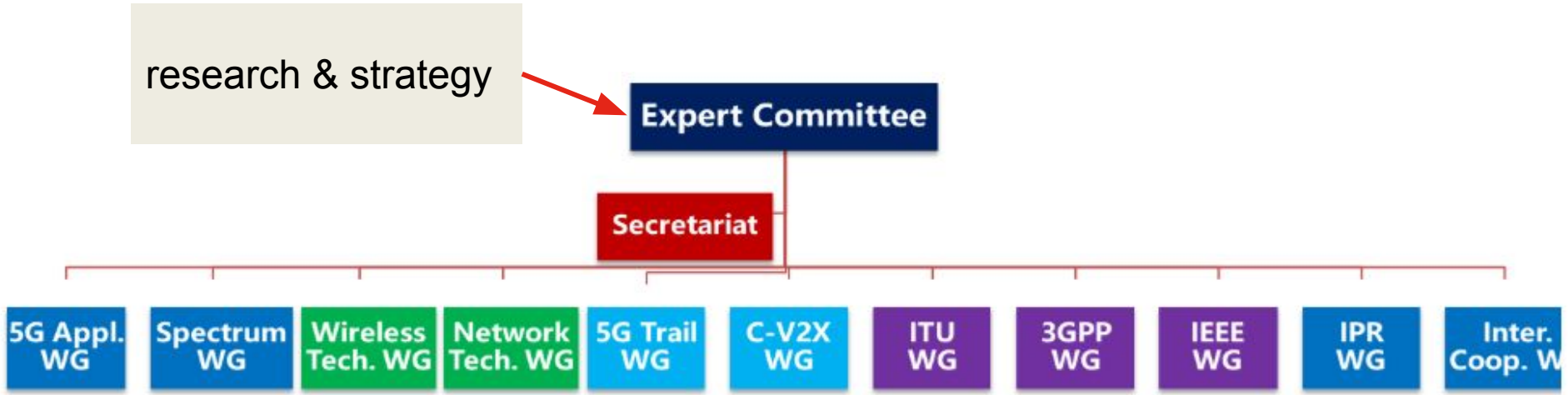
2020

5G **commercial use** in main cities

IMT-2020 (5G) Promotion Group

three ministries in China

the Ministry of **Industry** and **Information Technology**
the National **Development** and **Reform** Commission
the Ministry of **Science** and **Technology**



Technology

Standard bandwidth : 3300-3400MHz, 3400-3600 MHz, 4800-5000 MHz

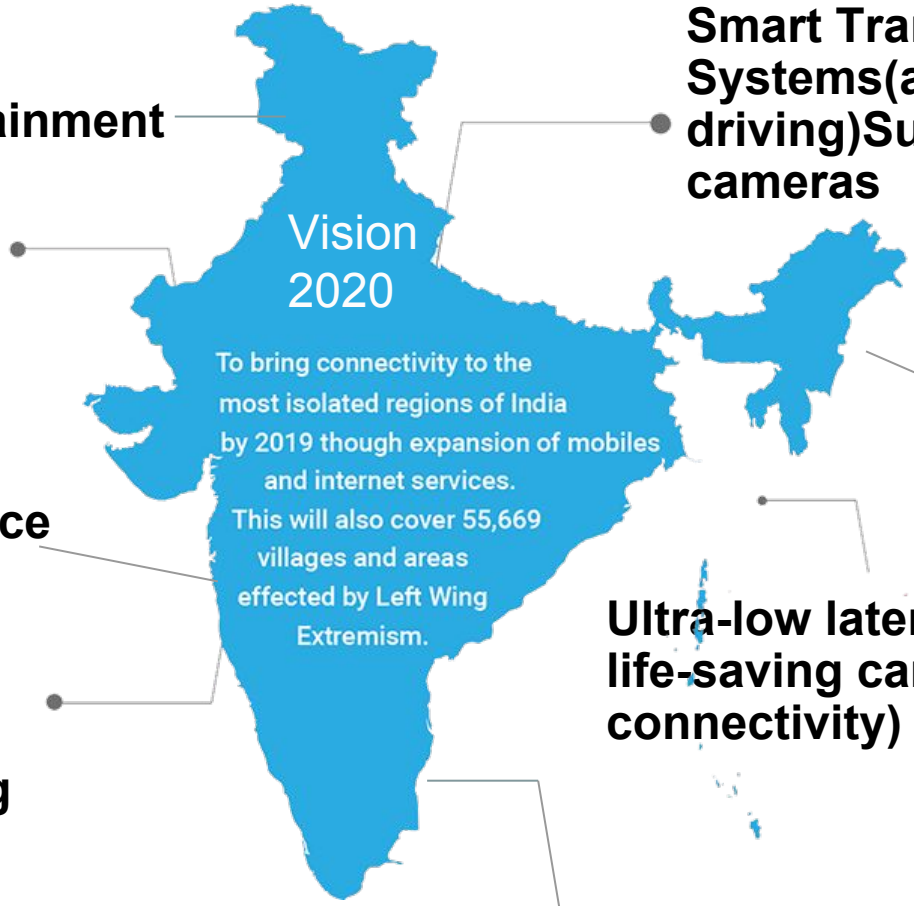
Antennas : Massive MIMO (Large-Scale Antenna Systems)

Coding : 5G New Radio Polar Coding

Multiple access : NOMA (Non-Orthogonal Multiple Access)

Network architecture : Central Unit (CU) and Distributed Unit (DU)

India & 5G Vision - Use Cases



Governance, Retail, Entertainment

Smart Transportation Systems(autonomous driving)Surveillance cameras

Water Management and Agriculture

E-Health

Public Safety: Surveillance cameras

Ultra-low latency (enabling life-saving car-to-car connectivity)

Smart Learning

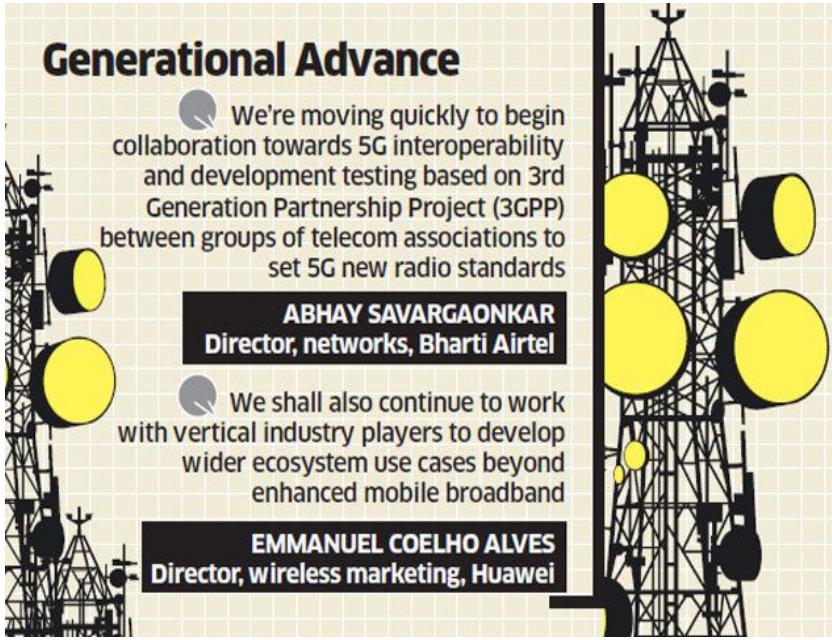
Massive M2M communications (for IoT applications)

5G Trials and Technologies

1. Feb. 2018

first 5G Trial at Airtel's Network Center in Manesar, Gurgaon

- Throughput > 3 GBPS
- Frequency Band - 3.5 GHz
- Network Latency - approx.1 msec



2. Sept. 2018

The Bharati Airtel Forged Strategic Partnership with South Korea's SK Telecom

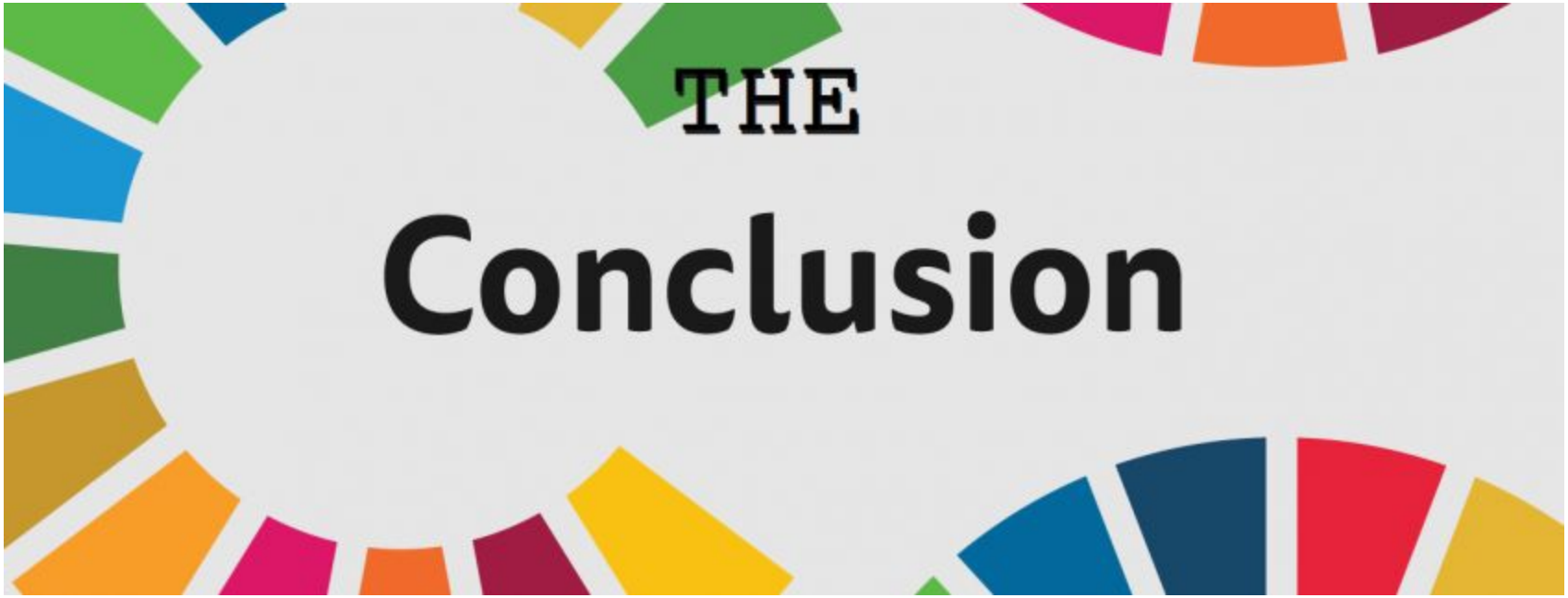
3. Sept. 2018

Airtel announced deployment of Massive MIMO - Multiple-Input Multiple-Input ("pre-5G technology") in Bengaluru and Kolkata.

5G in India

- **Technologies**
  - MIMO - Multiple-Input Multiple-Input
  - A cloud-like architecture
  - Software-defined networking (SDN)
  - Network functions virtualization (NFV)

- **Roadblocks**
  - Cost
  - Regulatory Policies
  - Diverse geography
  - Disparate populations
  - Unequal economic distribution
  - Cut-throat competition


THE
Conclusion

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Thank you for listening!

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Any questions?