Indian Telecom Industry: "Where is the Industry and where it is going"

Rajan S. Mathews

Director General

COAI

Telecom Industry: Contribution to India

COAI

Lowest voice & data rates in the world (ARPU Rs. 84)

Over 500,000 villages covered

Contributes 6.5% to India's GDP

Among Highest contributors in FDI in last two decades – INR 130,729 crores

Contributes directly to 22 Lakh employment and indirectly to 18 Lakh jobs

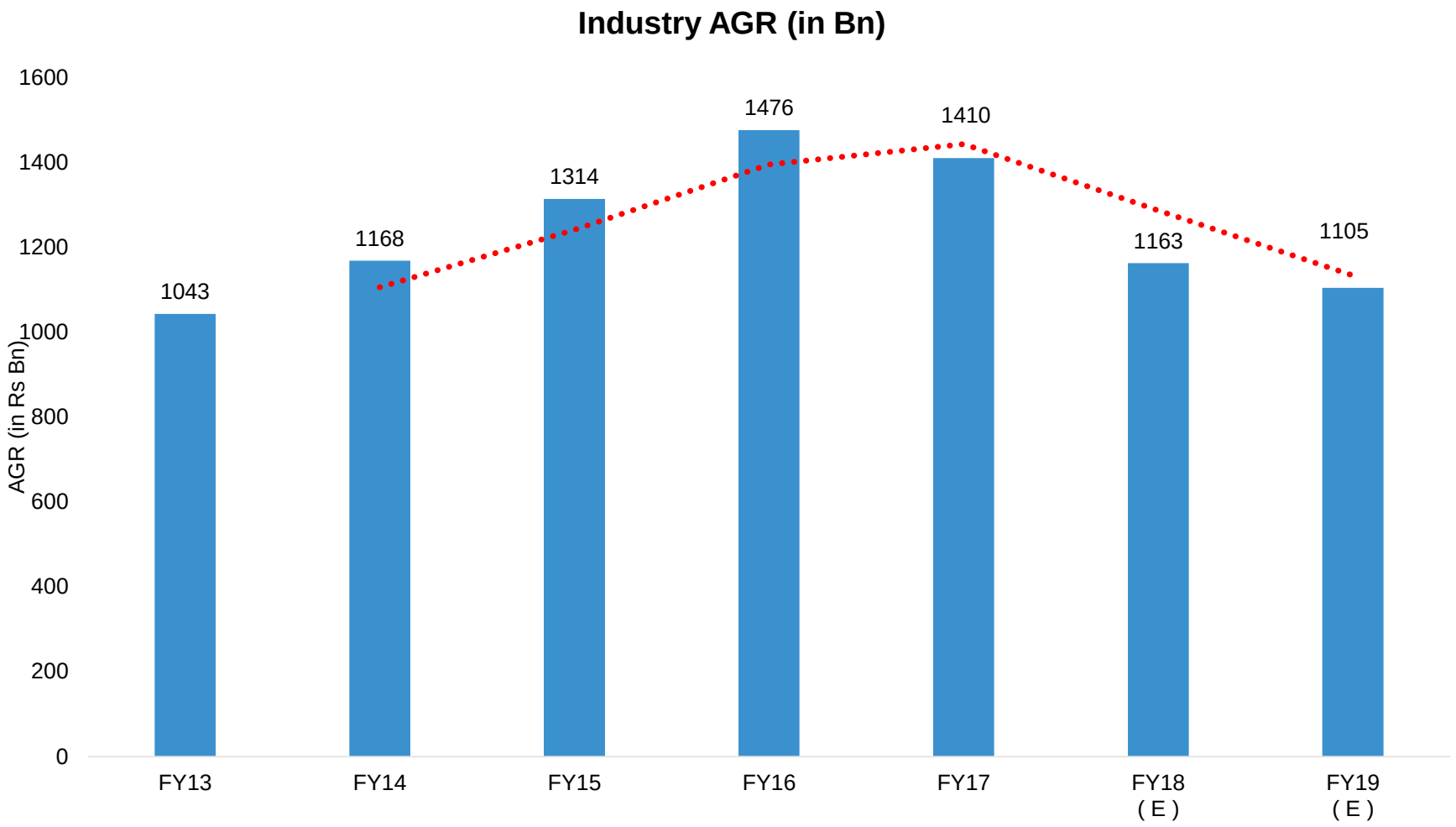
Investment in Spectrum Auctions since 2010: INR 3,48,000 crores

Among the highest contributors to Govt.: nearly INR 70,000 crores p.a

2nd largest private sector investment in infrastructure – INR 10,44,000 crores

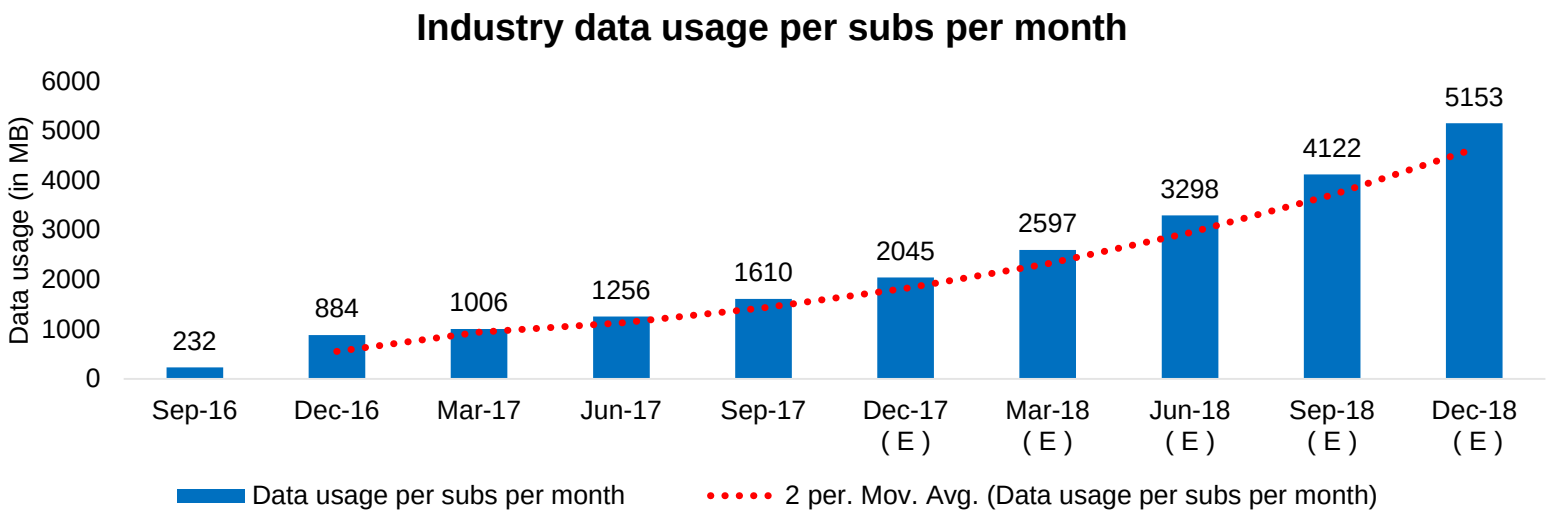
Source: GSMA The Mobile Economy India Report, 2016, DoT, Industry Estimates, TRAI

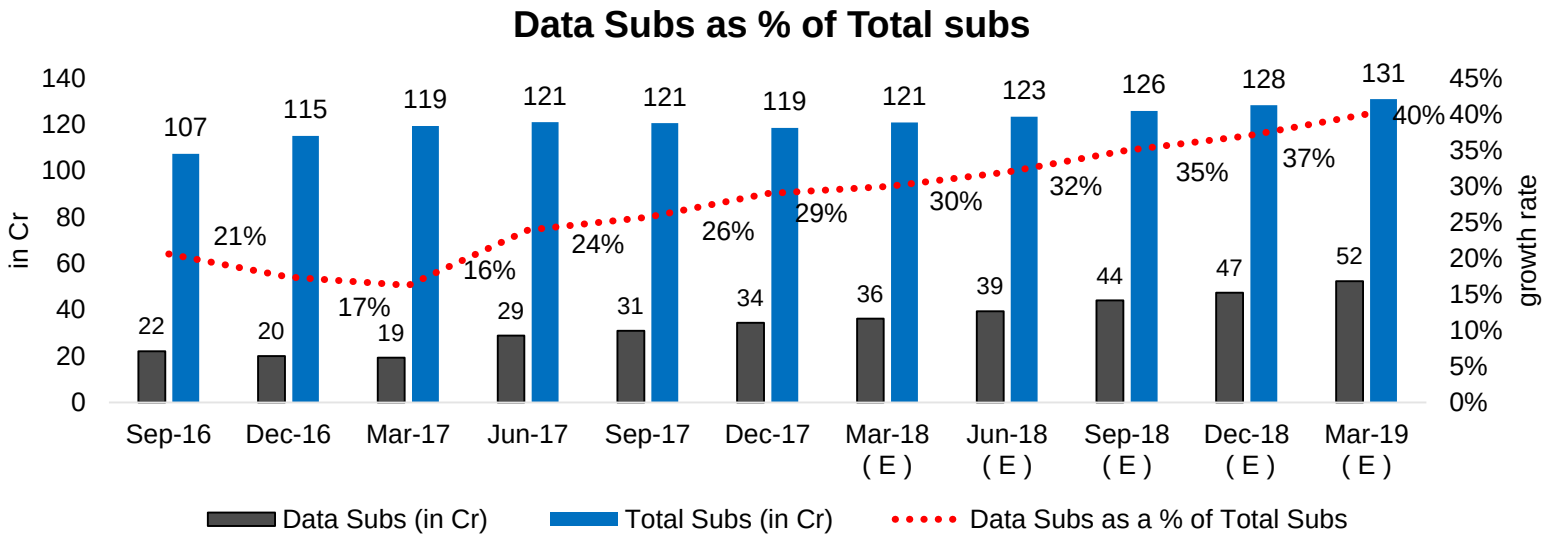
Revenues of Telecom Sector remains under pressure…



Source: TRAI, COAI Analysis

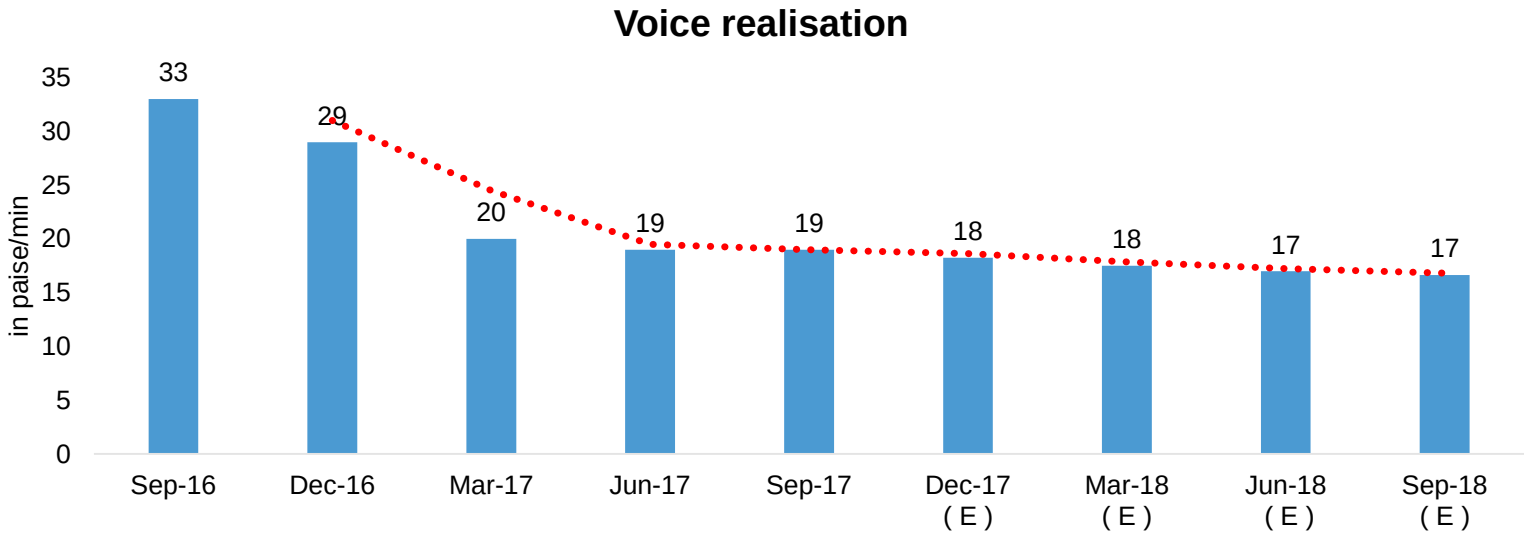
Although Data usage has increased…

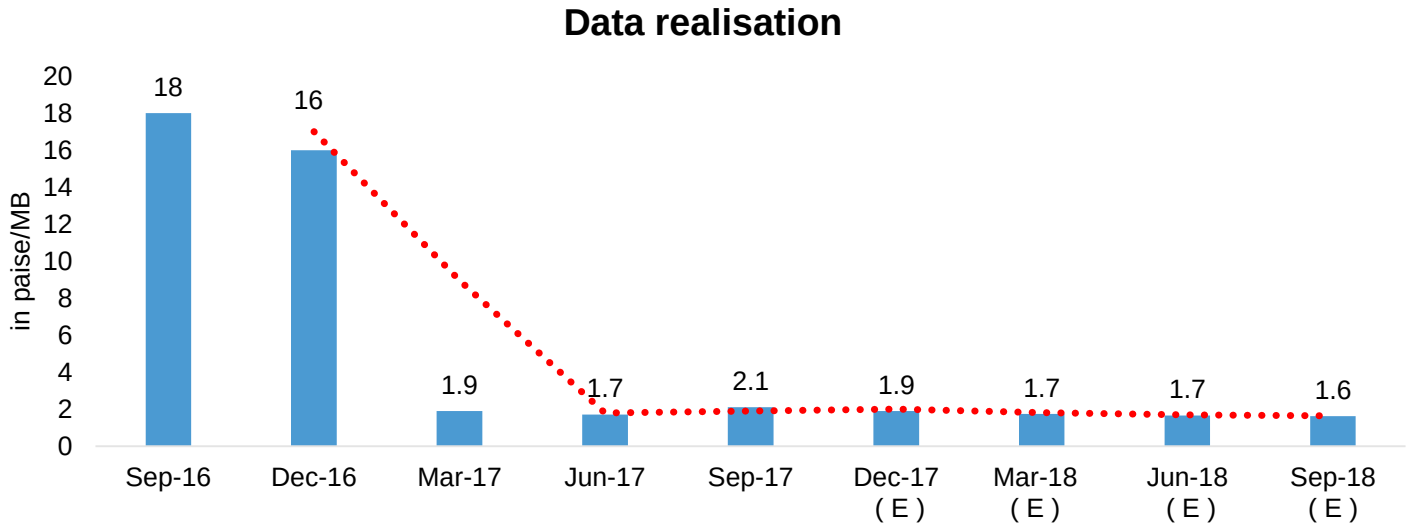




Source: TRAI, COAI Analysis

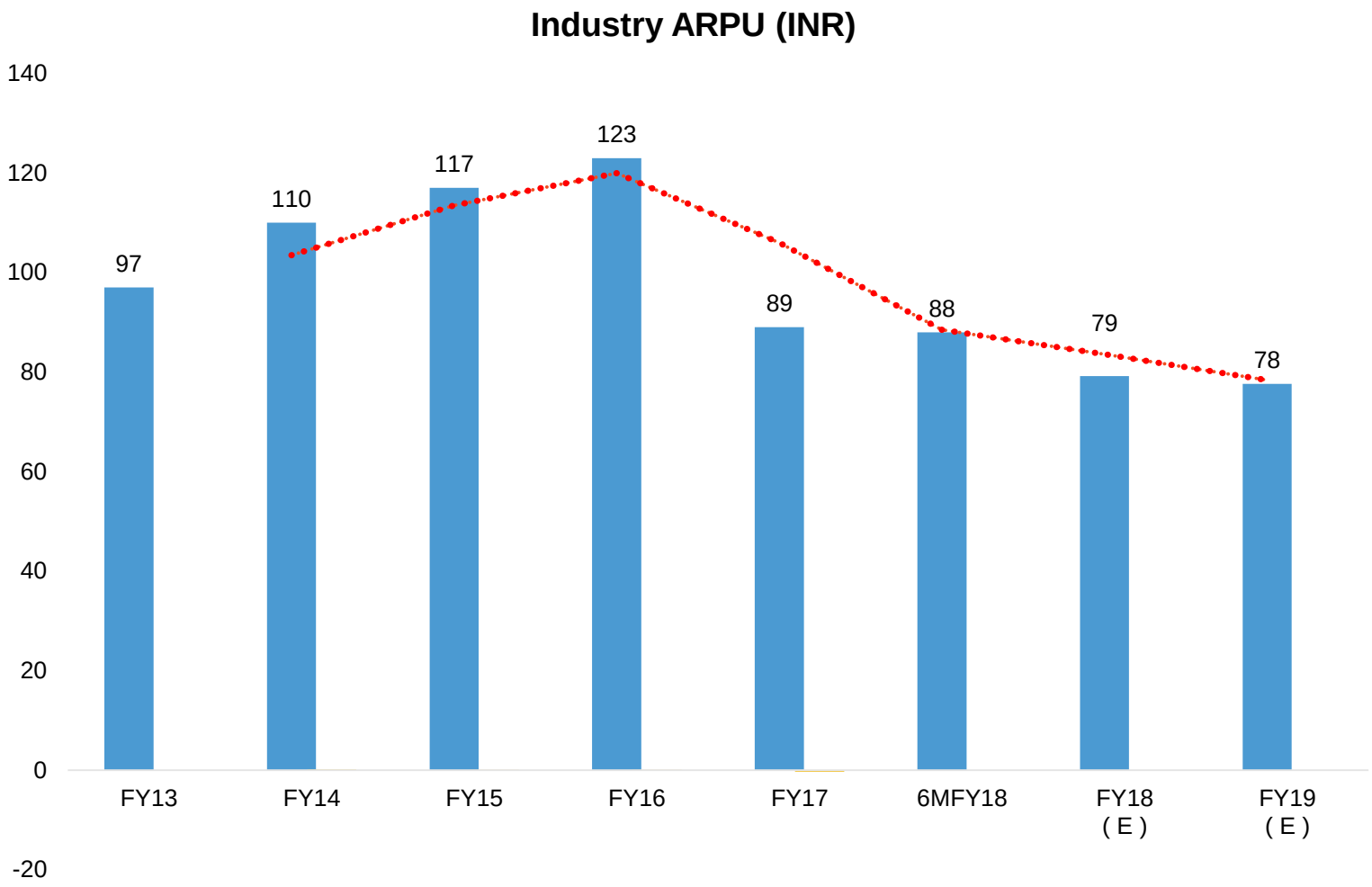
Voice and data realisation has fallen significantly…





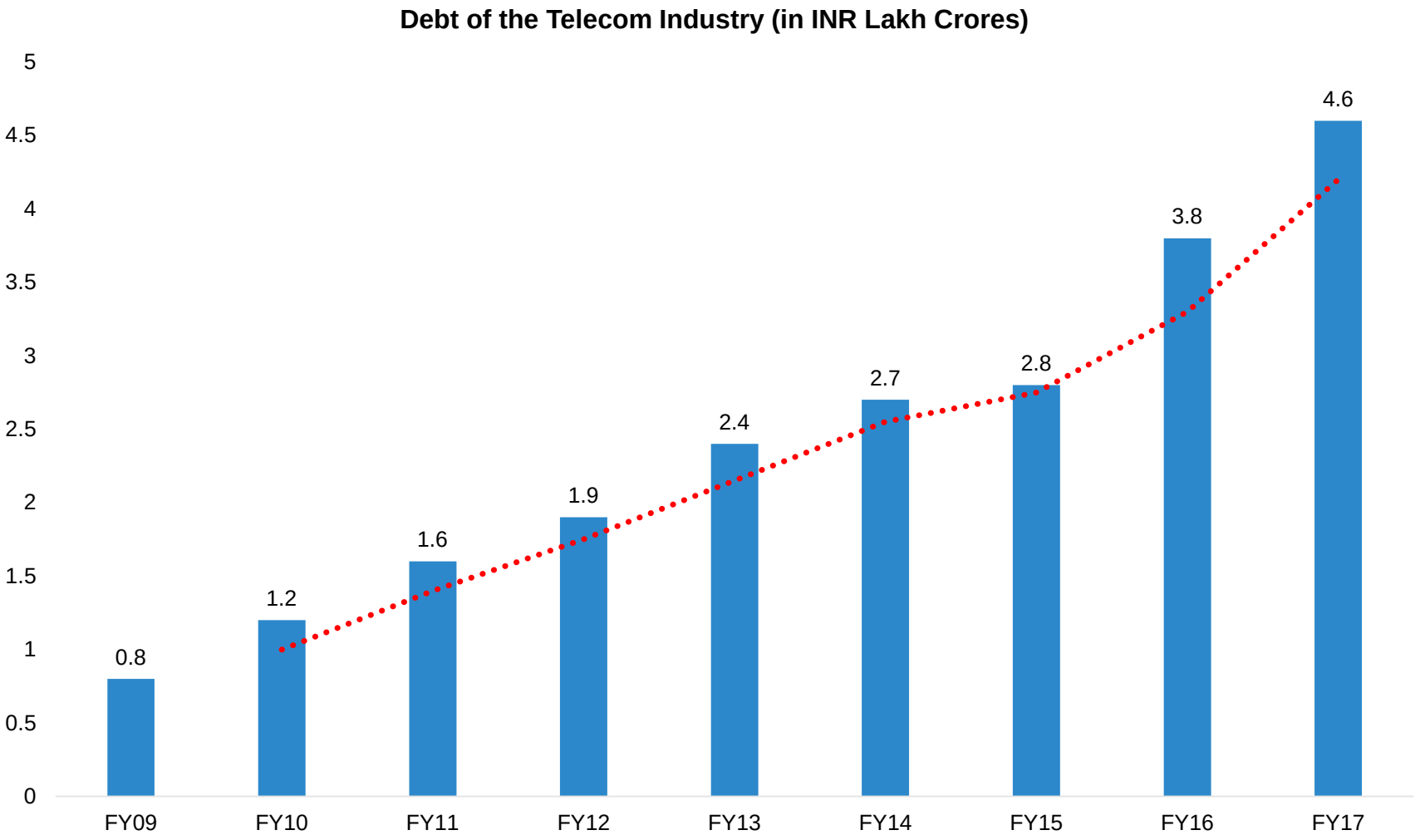
Source: TRAI, COAI Analysis

As a result ARPU continues to be depressed…



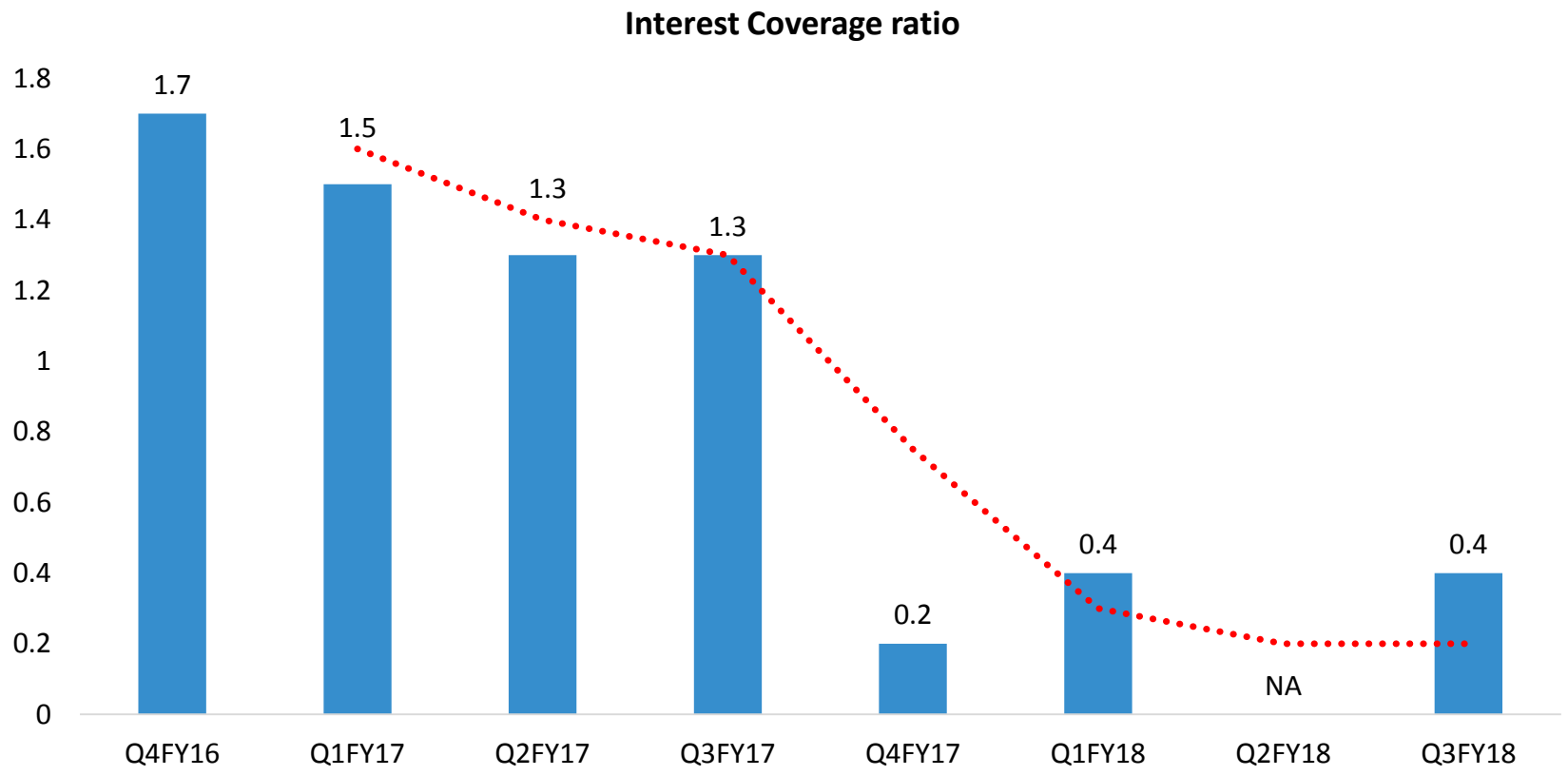
Source: TRAI, COAI Analysis

Sector continues to be highly indebted…



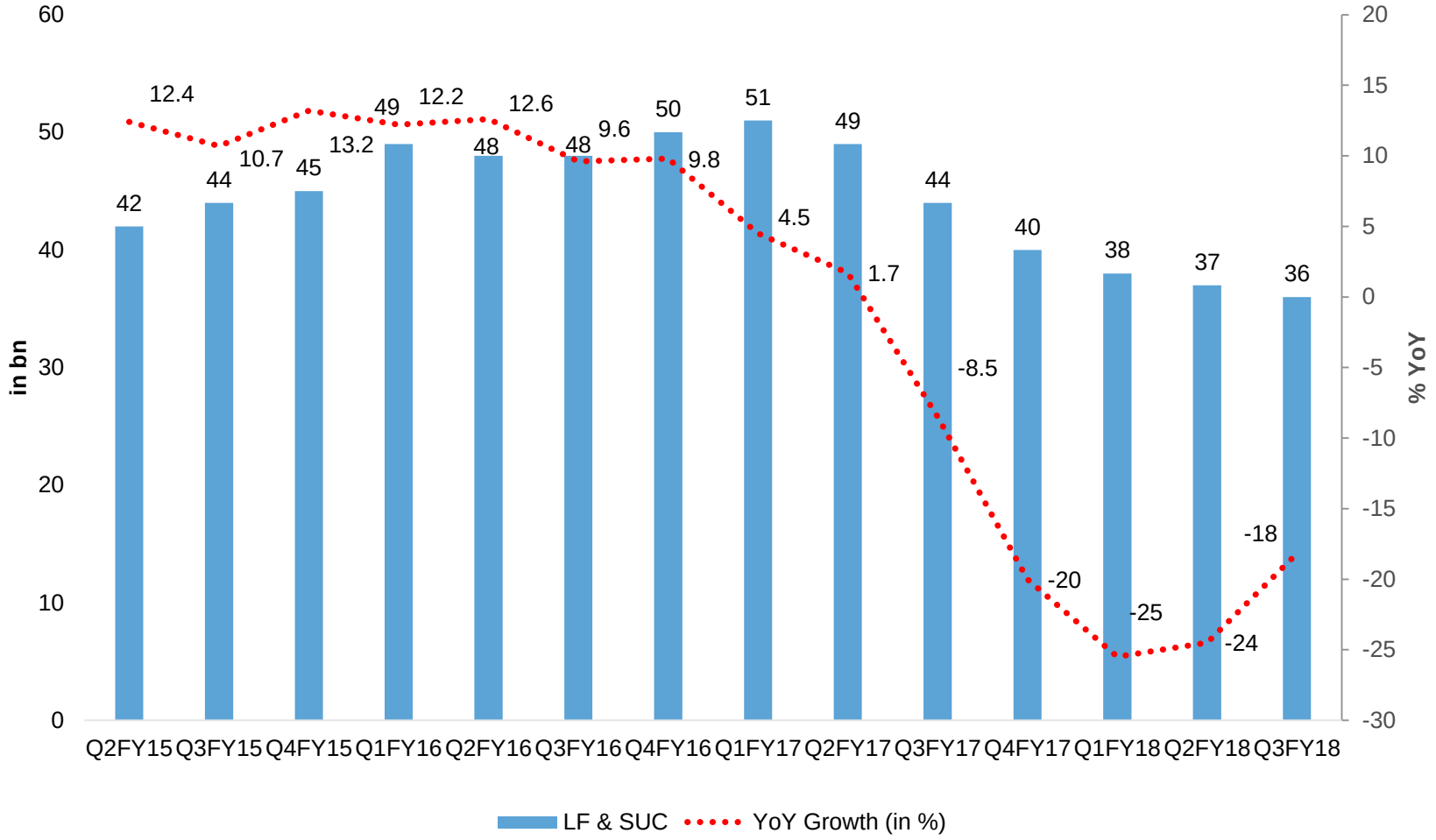
Source: TRAI, COAI Analysis

Profits not enough to cover interest cost…



Source: Operator Financial Results

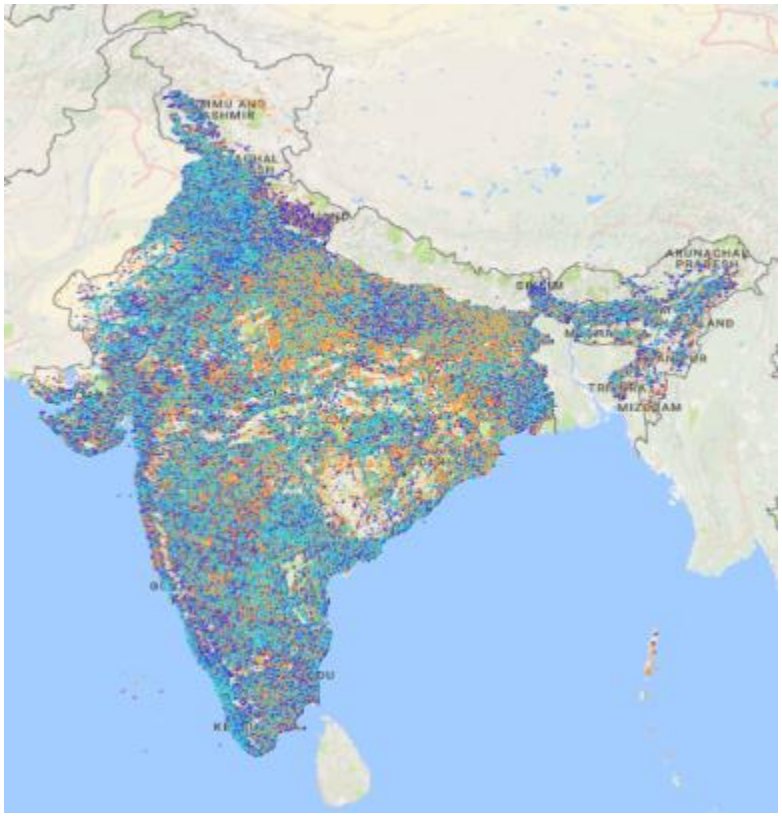
Revenue of the Government has fallen…



Source: TRAI

In spite of all the challenges we have State of the Art Network…

Pan India 2G/3G/4G Coverage



Total number of Cell sites

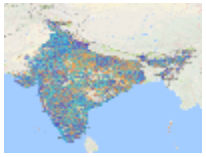
Cell Site Type	Count
GSM	5,99,795
CDMA	17,246
3G	3,69,483
4G	7,52,718
WIMAX	3,538
Total	17,42,780

Wireless is the key provider of connectivity in the country

Source: Tarang Sanchar. As of March 1, 2018

Sector is inching towards a world class Mobile Broadband Infrastructure

Mobile Operators are working at breakneck speeds to create a world class Digital Highway



Coverage Expansion
200 Million new connections by 2023

Network Rollout
More than 17 lakh BTSs out of which >11lakh BTSs are of 3G/4G

Internet Traffic will grow 5.6 Exabytes per month by 2020 with a CAGR of 34% against the corresponding global CAGR of 22%.

Wireless Broadband users
500 Million new internet users by 2023

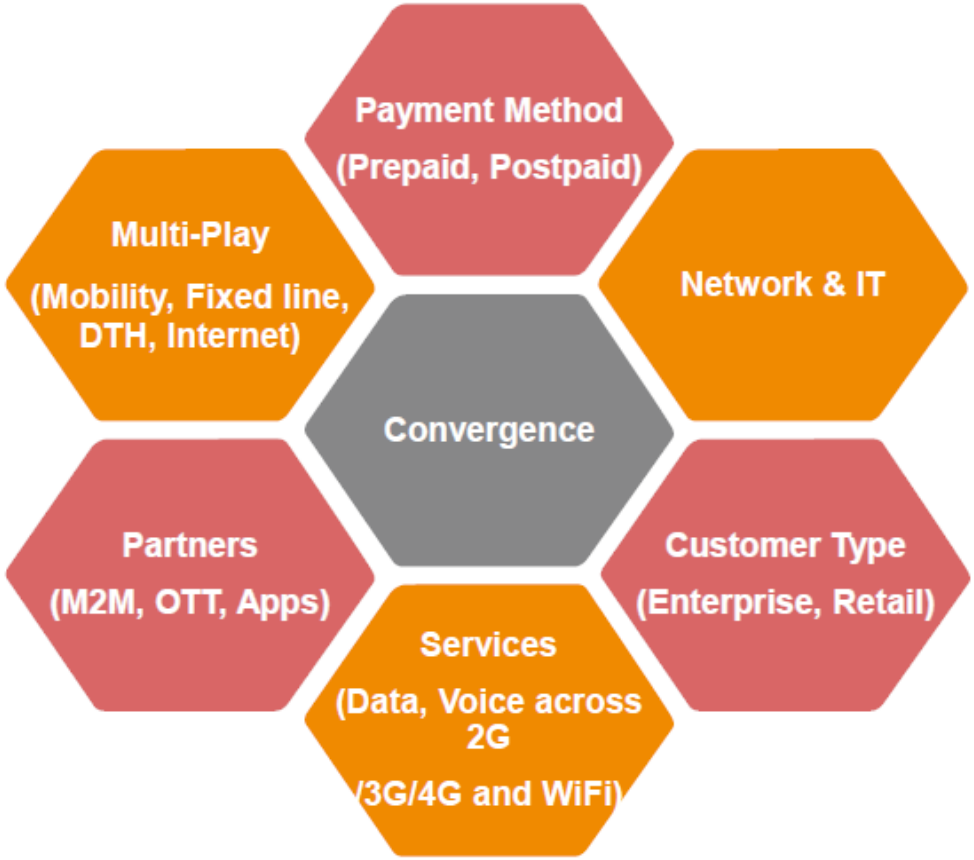
Massive increase in Data Usage
Monthly smart phone data consumption to be increased to 18GB by 2023

India will be second largest smartphone market (after China) with 1 Bn smartphones by 2025

The mobile broadband infrastructure will create new opportunities for the operators.

Source: Report of Standing Committee on IT, CISCO VNI, GSMA Mobile Economy Global 2018

Convergence is leading towards a new 'Pricing Model'



HYBRID PLANS

SHARED DATA PLANS

VALUE ADD-ONS

PERSONALIZED SERVICES

Disrupt Multiple Sectors

Media and Entertainment

Advertisements

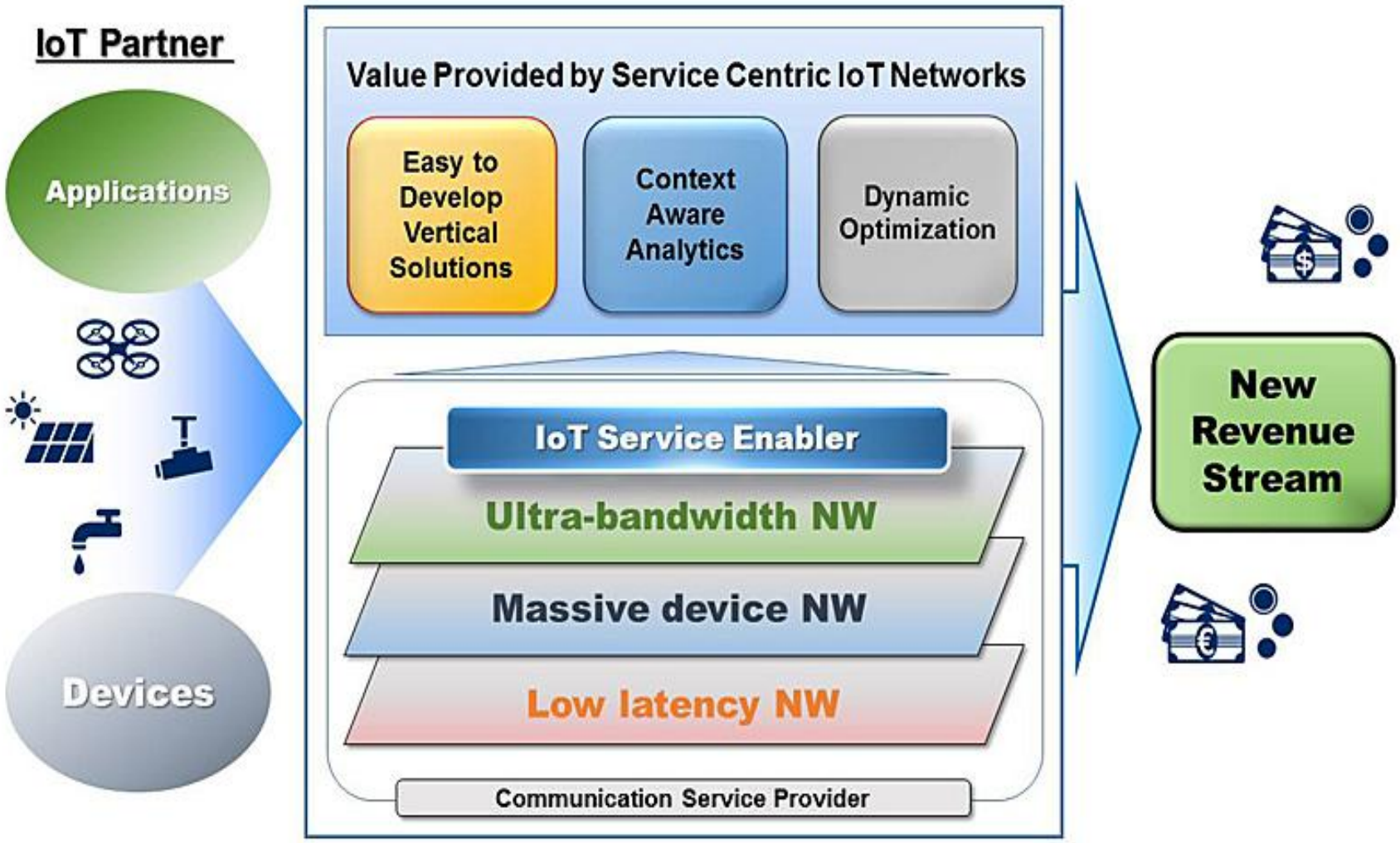
Education

Health

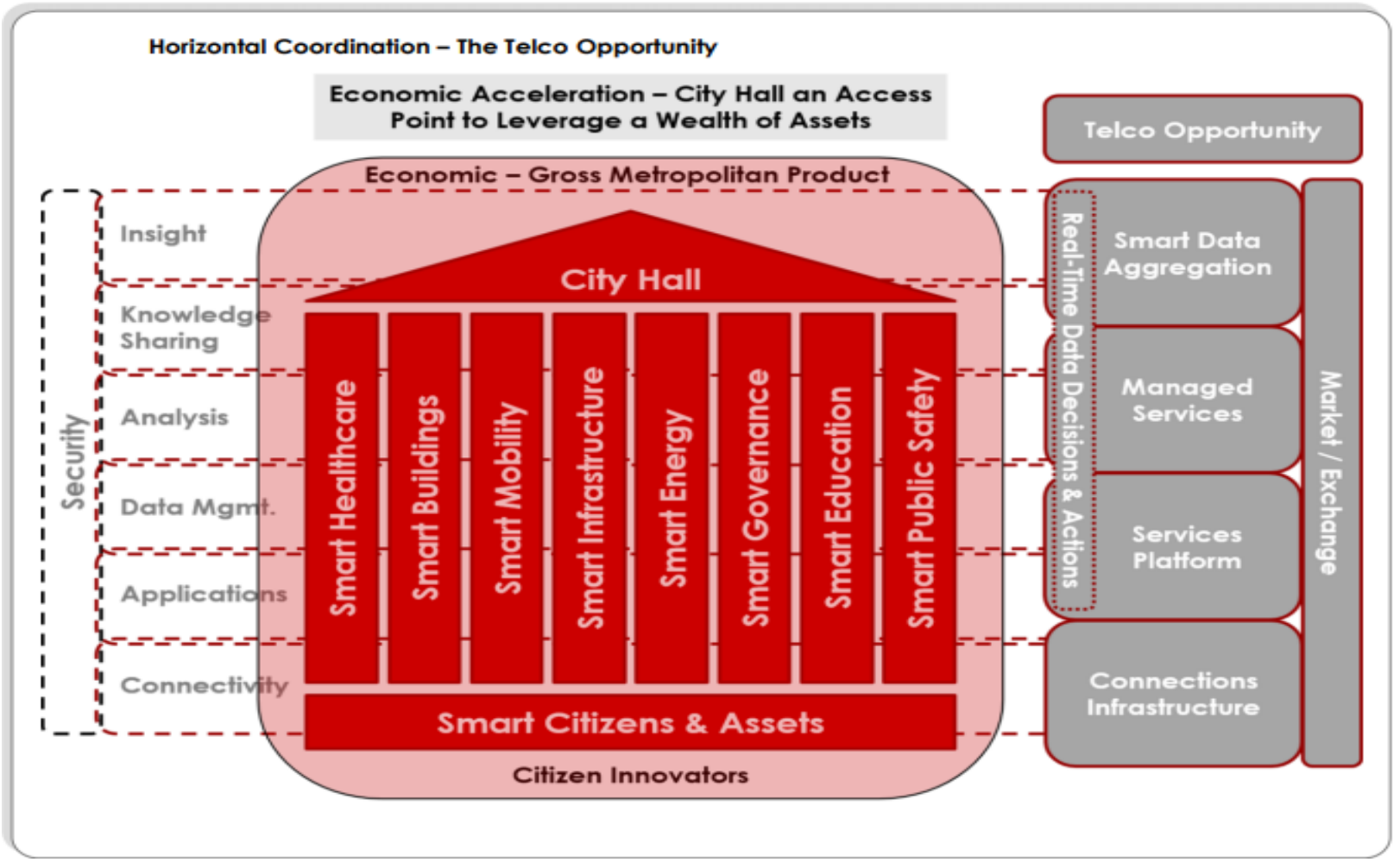
Governance

Bundled plans

M2M/IoT will create new revenue streams



Smart Cities- Telco's will be the foundation of connected cities



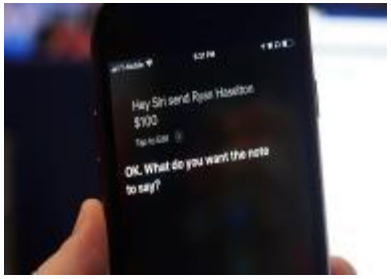
Artificial Intelligence will shape the future network & business

Customer service chat bots – Automating customer service inquiries, routing customers to the proper agent

Customer Relationship Management by AI tools analyzing the customer's usage pattern and creating customer specific value proposition

Sales through Speech: Allowing customers to explore or purchase media contents by spoken words

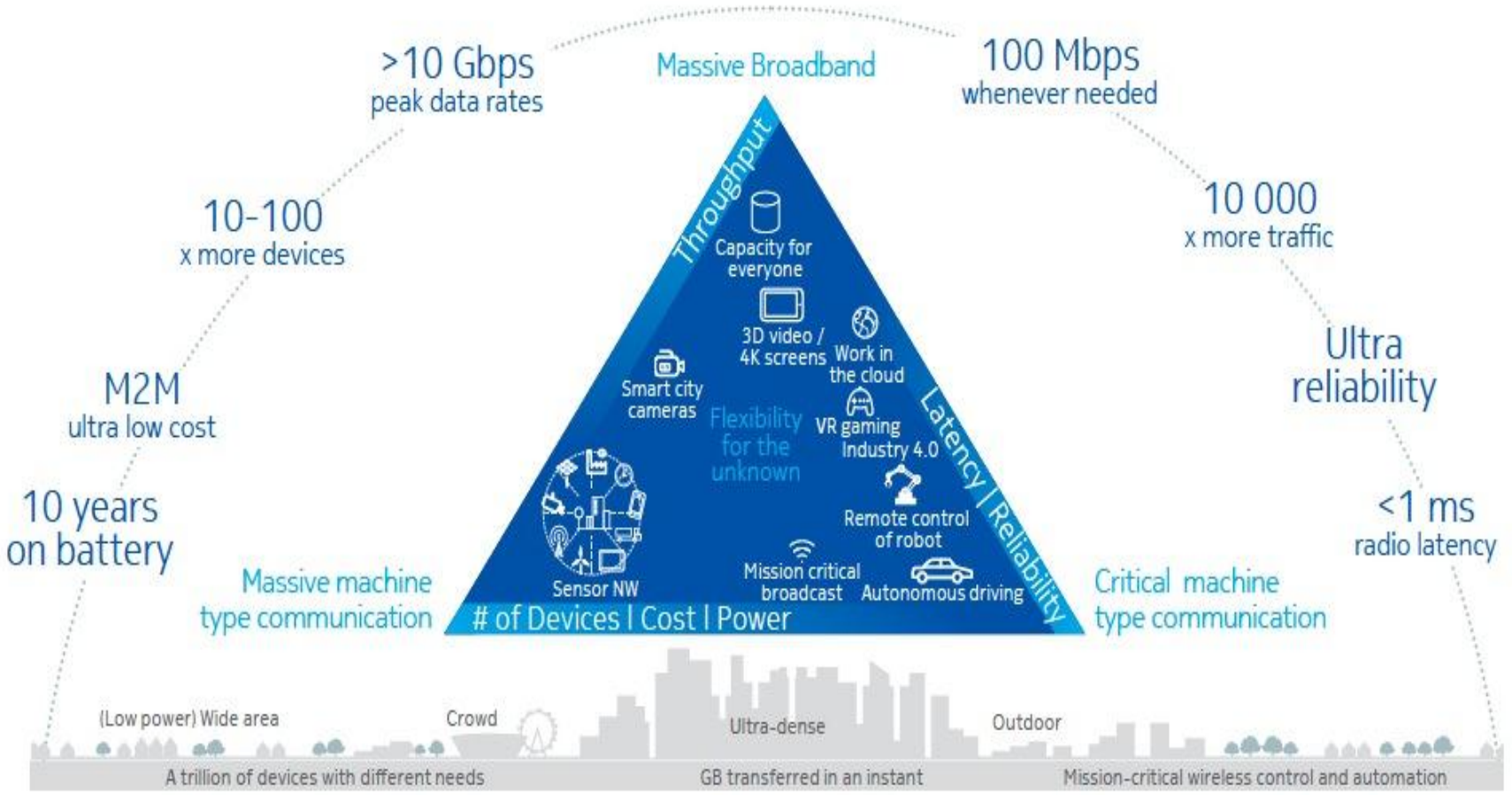
Predictive maintenance – The ability to fix problems with telecom hardware (such as cell towers, power lines, etc) before they happen, by detecting signals that usually lead to failure



Functions like 'Personal Assistance', Facial Recognition, voice Recognition are paving their path towards Digital Payment options

AI applications to facilitate– Self Optimizing networks (SONs), Software defined networks (SDN) & Network Function Virtualization (NFV)

Future Network-5G: Different Apps/Verticals demand different flexibility



5G Network is envisaged to accommodate Apps & Services with different Latency, Reliability & Bandwidth

Following Technology to enable efficient resource Sharing:

- **Software Defined Network (SDN):** Approach to control the Network (switches & routers) through software programming.
- **Network Function Virtualization (NFV):** Concept of replacing dedicated network appliances (routers and firewalls) with software running on servers

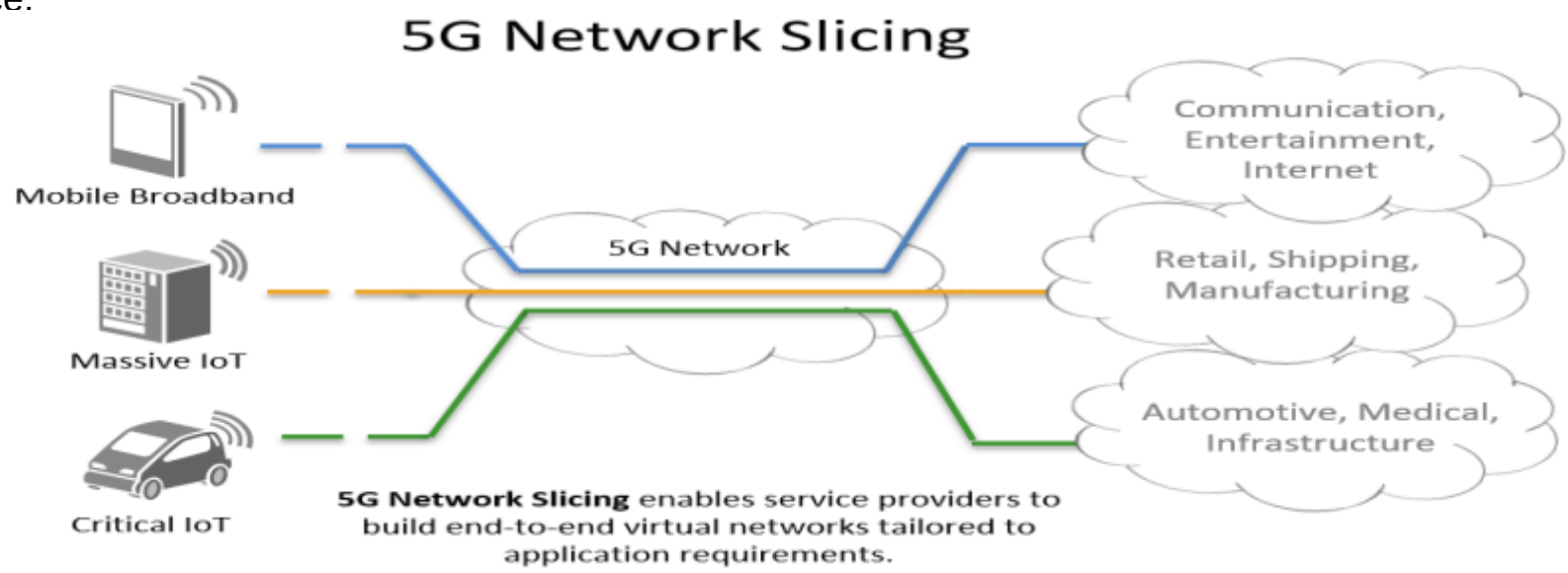
Network Functions:

- **Network Slicing:** Creating a dedicated virtual networks for different services over a common network infrastructure.
- **Mobile Content Delivery Network as Service:** interconnected system of servers that use geographical proximity as a criteria for delivering web content.

Varying kind of Network Functions to be provided as services, dynamically and on demand at pay-as-you-go' prices.

Network Slicing: a 5G Concept

- Network slicing, implemented through virtualization, will allow operator to provide different services with different performance characteristics to address specific use cases.
- Each network slice operates as independent, virtualized version of the network. For an application, the network slice is the only network it sees.
- Advantage of this architecture is that the operator can create slices that are fine-tuned for specific use cases. One slice could target autonomous vehicles, another enhanced mobile broadband, another low-throughput IoT sensors, and so on.
- Different slices will have different QoS requirements, inherently invoking traffic management within each slice.



How TRAI Recommendations on NN may hamper the 5G Functionalities

- These Recommendations may sacrifice the very 5G characteristics that is promising for consumers, innovation and economic growth across the sectors.

- TRAI recommendations do not allow Prioritizations, traffic management techniques etc., and hence against the very basic nature of the 5G & IoT use cases.

- It will stop the use of the QoS capabilities which can be used to serve different use cases and to experiment with various business models that could support them.

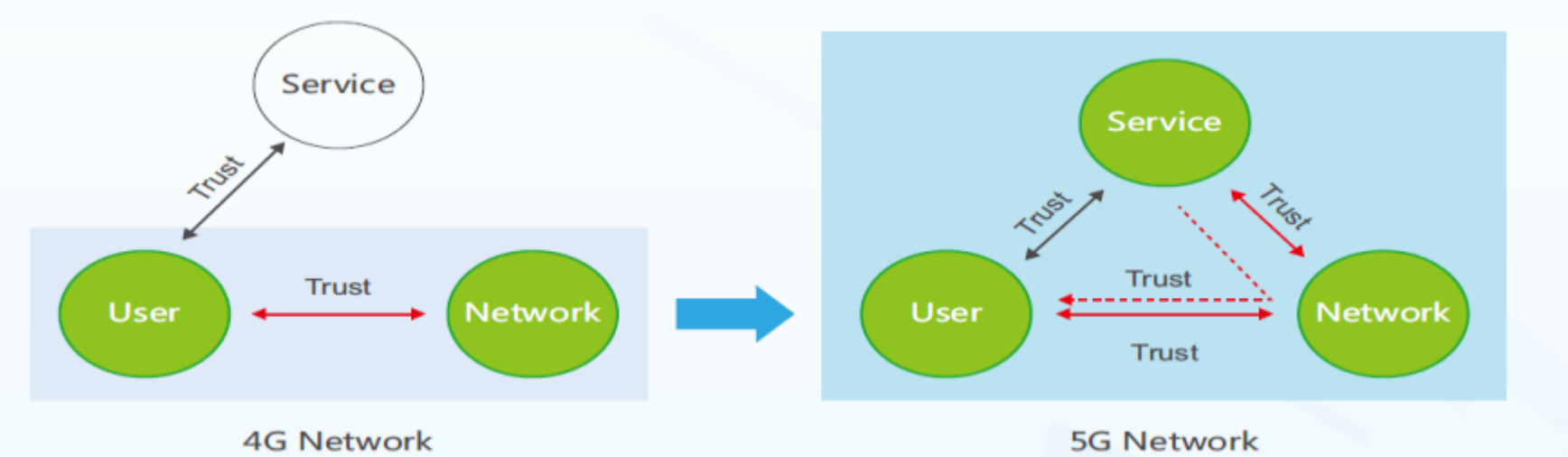
- TRAI Recommendations on TMPs and non-discrimination principles, will not allow the operators to implement network slicing for different use cases.

Role of Security & Privacy in future technology & services

- Traditional (2G, 3G, 4G) security architecture focuses on voice & data protection with the security features like SIM, Authentication Unit (between User & Network) and securing the channel between communicating parties (hop-by-hop).

- With 5G catering new business & service delivery models, privacy concerns are increased in the evolving threat landscape.

- With more devices coming into play across industries like manufacturing, transport, e-health etc., the trust model in 5G will evolve as ‘everything is a service’ in 5G regime.



Challenges of security & data privacy in 5G

- Making access & service authentication simpler and less costly-both by networks and service providers.
- Service Oriented Security (E2E) & User Privacy Protection-*How to ensure?*
- Uniform security management framework in a multi-vendor scenario.
- Flexible security architecture to support different network slices' security attributes.
- Customized service offering needs user information hence users' concerns about privacy need to be dealt adequately.
- 5G being a heterogeneous network, various access networks with different network functionalities -*how to ensure security of user privacy information across the networks?*
- Security of user information from technologies like Data Mining, Big Data Analytics.

Challenges before the Industry

- Policy & Regulatory Issues.
  - Cost of Compliances is quite high.
  - Licensing provisions are restrictive.
  - Adoption of Same Service Same Rule is necessary for maintaining level playing field.
  - Litigations-one of the highest across the industries
- Financial Condition of the Telcos-Govt. Levies
  - Highly taxed sector
  - LF & SUC ranges from 11-13% of operators' revenue
  - AGR definition
  - GST is 18%
- Investment
  - No major investment coming to the sector
  - Once the highest FDI contributor, now Foreign investors are withdrawing from the sector.

Will hamper the adoption of future technologies

Industry key requirements

- To review the financial health of the sector on annual basis and take effective steps to improve the investment climate
- To rationalize the regulatory levies such as LF, SUC, USO levy and costs to promote network investments and affordable telecom services
- GST to be levied at 5%, conforming to the status as “essential service”
- To rationalize the cost of regulatory compliance, such as subscriber verification, EMF, etc.
- Adoption of light touch regulatory policies as a enabler of the future technologies.
- Approach on Spectrum Auction, Telecom Equipment testing, Manufacturing should be sector friendly

Create an investor friendly environment

Indian Telco of 2020 – 'An Integrated Digital Service Providers'

COAI

Payment Services: Interoperability of wallets and merchant acceptance points will increase the digital payment transactions

JioMoney airtel money vodafone m-pesa

Digital Wallets & Payments Bank

Convergence leading towards a new 'Pricing Model'

Mobile Broadband Infrastructure
Will see the deployment of 5G networks & voice will shift to LTE, App based video calling

3G 4G LTE 5G VoLTE

AI, AR/VR based Application
Mobile network data revenue from AR/VR could be golden for the telcos. Requirement of 4-5 times the bandwidth of traditional video.

Data Monetization to create customized service offering

Telcos need to create future network infrastructure to support IoT, M2M, smart cities which will be the key for future growth

Thank You