

Telecommunications in 2047: is it possible to forecast?

Prof. Bhaskar Ramamurthi

Dept. of Electrical Engineering

&

Centre of Excellence in Wireless Technology

IIT Madras

A Thought Experiment...

- We want to forecast what telecom might be like 25 years hence
- Let us see how we might have forecast about 2020 in 1995....
- What was the telecom scene in 1995?
 - \$1000 capex (~Rs 30,000) per landline
 - Needed revenue of Rs 750 per month (at 1995 prices!) at least to be viable
 - ➔ Less than 10M residential lines
 - Mobile phone technology (2G) was just booming in the West
 - (Feature) Phones cost \$150 or more
 - Talk time cost Rs 8-16 per minute (even for incoming calls!)
 - Mobile phones used only by rich, or for business

Could anyone have forecast that...?

Ten years hence (by 2005)

- Feature phones will cost only \$25
- Talk time cost will drop to sub-rupee levels per minute with incoming free

• Twenty-five years hence (by 2020)

- voice calls will be free countrywide (no STD!)
- 600M Indians will use wireless broadband via smartphones
- 160M smartphones costing avg Rs 14000 will be sold in India per year
- 75% of PFCE (Rs 100 lakh cr of Rs 133 lakh cr) will be spent via UPI

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How did this happen?

- CMOS semiconductor technology improved to integrate radio circuitry at frequencies as high as 2 GHz
- Moore's Law – integrated circuits doubling in capacity every 18 mo
 - This was probably the one established forecast by 1995
- Display technology based on LED/OLED
 - Kodak gave it away in 90s thinking it is “worthless”
- GPS geolocation – a military technology now tracking each human being
- Sensors like accelerometers ((how does your screen change from portrait to landscape?) meant originally for airbags, and cameras
- Above all, a new business architecture where global wireless standards enabled the handset to be spun off as a consumer product

➡ **Nobody forecast what was to come: what 500M+ lower middle class Indians hold in their hands today and work wonders with!**

(mobile tower electronics is also witnessing huge cost reduction but let us leave it for another day)

Can we (dare) look into the crystal ball?

- For sure:
 - “Holographic-type” video communications
 - Will there be another display technology revolution to put the clumsy AR/VR headgears behind?
 - Tactile Internet-based Remote Operation
 - Remote machine operation, surgery, ..., (driving?)
- Not so sure....
 - Tactile sensors for “feeling” texture of cloth, skin, etc
 - Can we shake hands remotely?
- Likely:
 - Quantum computing and communications security
 - Unimaginable search space, highly secure transactions,...

Who will call the shots?

- Tectonic shifts in who holds the aces...
 - from Telecom giants (like AT&T, Alcatel, Siemens,...),
 - to Mobile phone giants (like Ericsson, Nokia, Hua Wei, Samsung, Qualcomm,)
 - to Tech companies (Google, Facebook, ...)
- Huge geopolitical and national security implications
- Impossible to become 100% "self-sufficient" either
- What does being Atmanirbhar mean....?