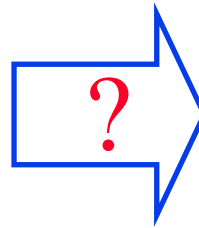


# Will BWA/LTE Rollout Spur Economic Growth?



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Panel at 5<sup>th</sup> IEEE International Conference on Advanced Networks and Telecommunication Systems (ANTS), Bangalore, India, December 20, 2011



1. Economic Growth
2. India ARPU
3. 3.9G vs. 4G
4. WiMAX vs. LTE
5. New Technology Adoption
6. Is the Time Right?

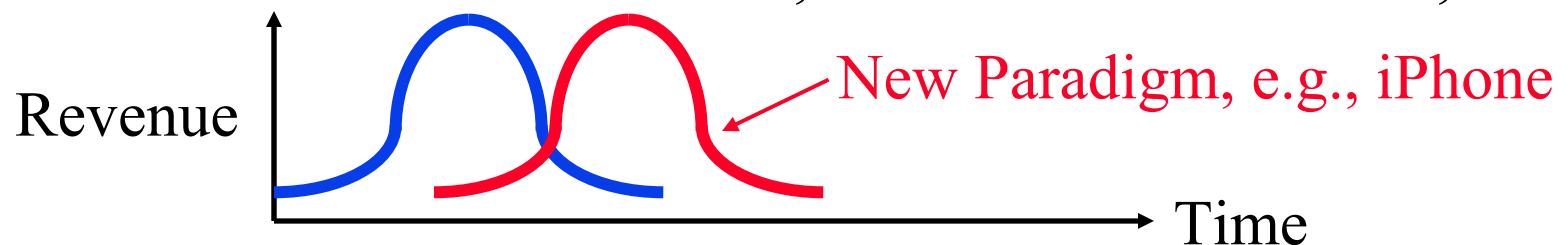
# **Economic Growth or Economic Growth for Telecom Sector?**

- ❑ Numerous studies have shown that broadband leads to economic growth, jobs
- ❑ Many cities/states/countries have invested in BWA
- ❑ BWA  $\Rightarrow$  Economic growth for the country  
 $\neq$  Economic Growth for the Telecom Sector

# India ARPU



- ❑ Metros + Villages  
= Meaningless Average of 1 Billion  
highly diversified population
- ❑  $0+0+0+0+0+0+0+0+0+0+1000 = 100$  Average
- ❑ ARPU has no meaning.
- ❑ India is always high on total adoption metrics.  
Always low on per capita metrics.
- ❑ Better: Tier-1 Metro ARPU, Tier-2 Metro ARPU, ...



## 3.9G vs. 4G

- ❑ 3G = IMT-2000 = UMTS, W-CDMA, CDMA2000, HSPA+
- ❑ 4G = IMT-Advanced  
= LTE-Advanced, IEEE 802.16m
- ❑ WiMAX forum officially declared WiMAX to be 3G technology so that they can use spectrum allocated to 3G.
- ❑ WiMAX, LTE are at most 3.9G or “near-4G”  
Telecom companies are selling them as 4G

# WiMAX vs. LTE



- ❑ Similar with very minor differences
- ❑ Net Head vs. Bell Head
- ❑ Enterprise Networking vs. Carrier Networking
- ❑ Academic vs. Telecom
- ❑ Intel/Google vs. Ericsson/Qualcom
- ❑ Both use OFDMA. Both are incompatible with 2G and 3G (CDMA) radios.
- ❑ Quad-band  $\Rightarrow$  Penta-band

# New Technology Adoption

- ❑ Cost is the key: Save money over legacy
- ❑ 3G pricing in India is 10 times that of 2G  
Rs 100/200 MB vs. Rs 100/2GB  
This prevents 3G adoption.  
Continuing this with 4G will prevent 4G adoption as well. Battery is also an issue.
- ❑ Also there is an upper limit per person:  
\$30-50/month is the limit in USA  
DSL prices have always been in that range regardless of the speed.
- ❑ Cost Insensitive (Killer Apps):
  - Entertainment, Pornography (Movies, Internet, p2p, ...)
  - Games
  - Geeks



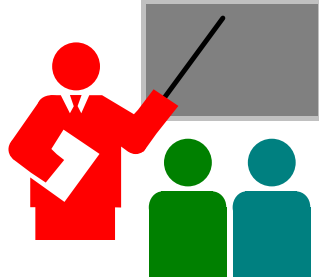
# Is the Time Right?



- ❑ Stock market  $\Rightarrow$  Timing important
- ❑ 3G = IMT-2000 = First offered in 2001
- ❑ 3G has come in USA just a few years ago.  
According to Verizon Ad (Oct 2009),  
AT&T did not have a nationwide 3G at that time.
- ❑ General public became aware of 3G with iPhone
- ❑ 3.9G equipment and services (e.g., Clearwire) are too expensive right now.
- ❑ Volume Market  
 $\Rightarrow$  Requires cost reduction by volume production  
Which will happen after adoption in US/Europe  
Need at least 2 more years



# Summary



1. LTE may be good for Tier-1 Metro
2. Nationwide ARPU will not be affected.  
Metro ARPU will be affected.  
Villages need education before telecom.
3. Bringing entertainment (movies, cricket) that is cheaper using 4G than on 2G/3G may spur adoption
4. Time is right for trials but real deployment should wait for volume adoption in US/Europe