

**16 April 2010**

@ Research and Action  
Agenda for a National Broadband  
Initiative

## MOBILE BROADBAND: THE PREFERRED CHOICE

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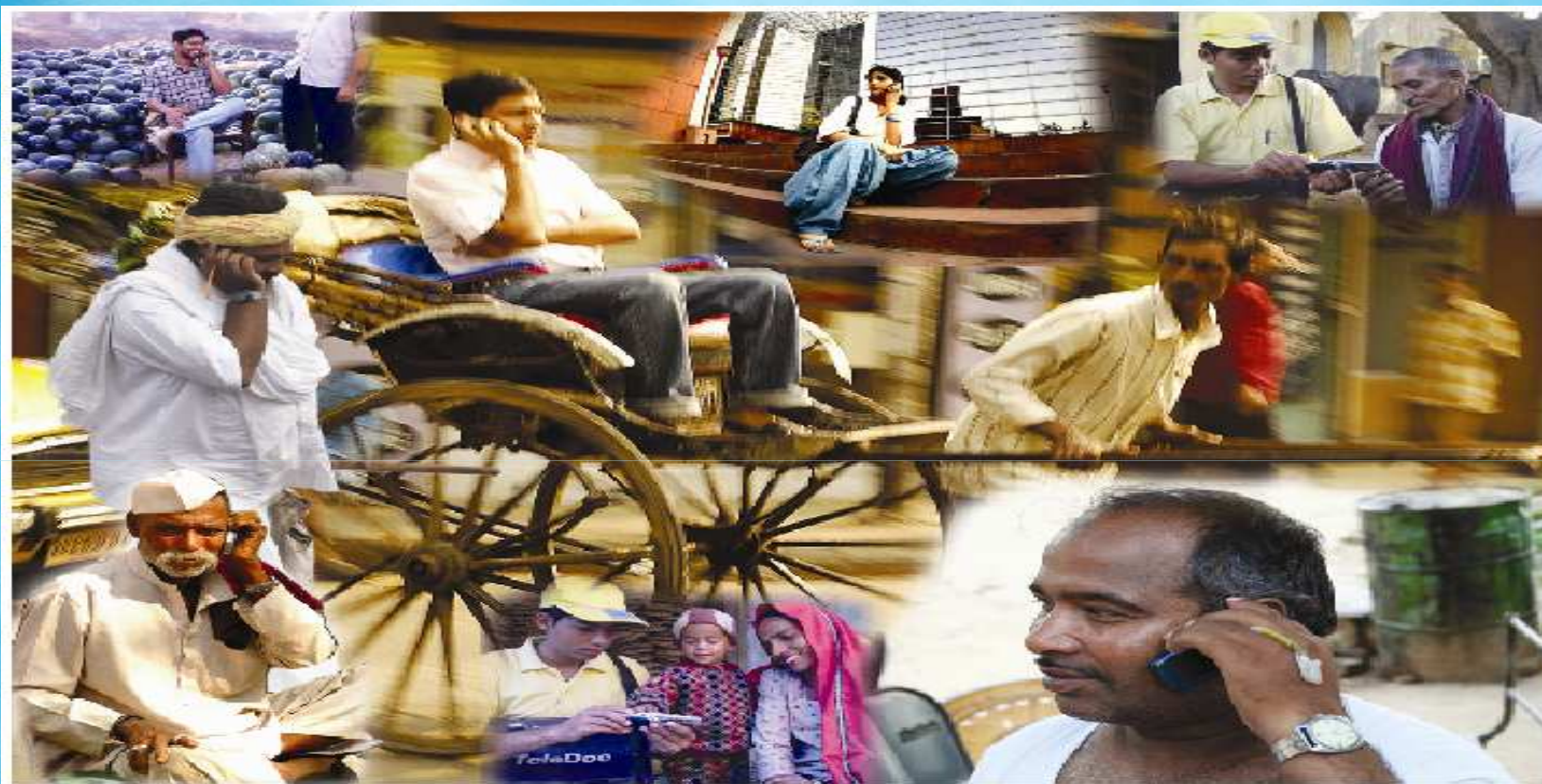


**“Broadband is no longer a luxury. It has become the core infrastructure of the modern economy, which is needed to support advanced applications and services for governments, businesses and consumers. If we take the right steps together now, broadband networks will serve as a platform in the coming years for innovation, growth and development.”**

Sami Al Basheer Al Morshid,  
Director, ITU Telecommunication  
Development Bureau



# THE INDIAN MOBILE MAGIC



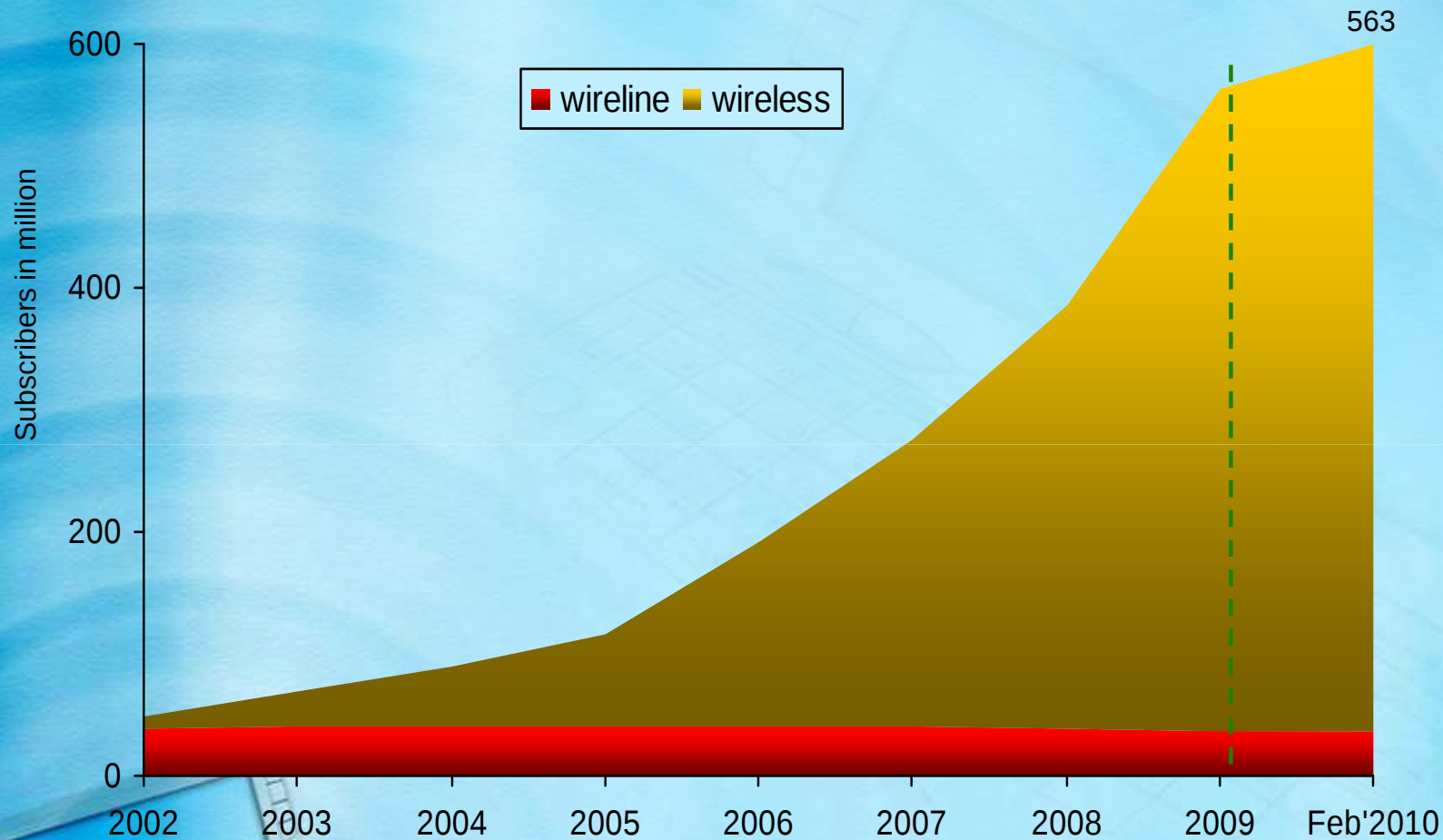
Already, broadband networks are widely considered essential infrastructure for the global information economy, providing businesses, students and consumers with fast, always-on access to Internet-based services, content and applications.

## **INDIAN MOBILE – CURRENT STATUS**

- ~220 operational networks
- Investments over 150,000 crores
- Mobile subscriber base of ~563 million,
  - Growing @ 12-15 million + every month
- Lowest Mobile tariffs and lowest ARPU (Average Revenue Per User) in the world.
  - ARPU of ~ Rs. 144/sub/month
- One of the highest MoU (Minutes of Use) globally~ 411min./sub./month
- Rural subscriber base served by private GSM operators ~125 million
  - Growing @ around 4-5 million every month, i.e. nearly 50% of the GSM subscriber adds are from the rural areas

**Indian Mobile : Sustained Stupendous Growth**

# WORLD'S 2nd LARGEST WIRELESS MARKET



**Highest subscriber additions globally !!**  
**Records tumbling month after month...**

# TELECOMMUNICATION TRENDS



## All IP

- Growing trend towards an all-IP architecture



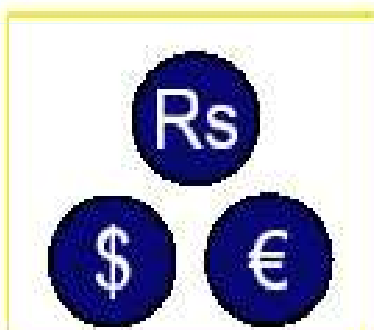
## Services / Applications

- Services and Applications are moving towards the internet



## Device Capabilities

- Ever increasing device capabilities



## Flat Rates

- Subscribers go for predictable communication costs



## Wireless Data

- Operators observe increase in wireless data usage



## Spectrum

- Increased wireless usage requires more spectrum

# **INDIAN BROADBAND SECTOR**



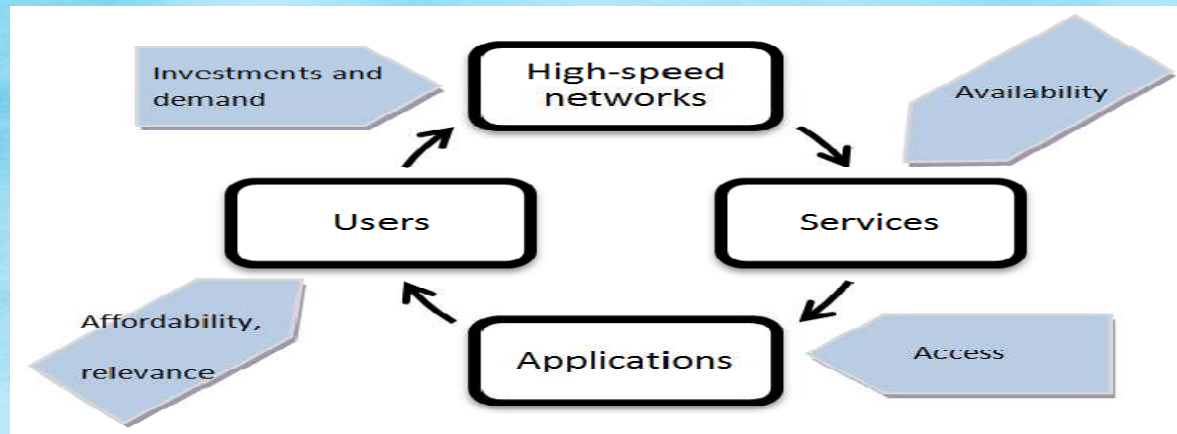
- **Limited availability of last mile access has impeded growth of Broadband services in the country.**
- **Lack of adequate infrastructure has also meant that most connections are around average speed level (256kbps), thus limiting the utility of Broadband.**

**Wireless is the route to get the desired broadband penetration in the country**

**Mobile broadband will be the most desirable and preferred way to increase broadband penetration**



# ECO SYSTEM



**Broadband can be viewed as an —ecosystem that includes**

- the networks that support high-speed data communication
- the services these networks provide.
- the applications provided by these services and
- the users who are increasingly creating applications and content.

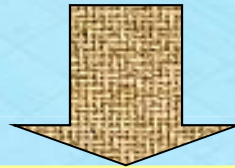
**Viewing broadband as an ecosystem helps define the likely roles that governments will need to play in using broadband as a tool in ICT for development.**

# ECO SYSTEM- INTER-DEPENDENCIES

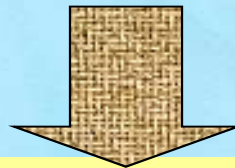


There can be inter-dependencies among the components of the broadband ecosystem. These interdependencies link the various components in multiple ways.

Investments in high-speed networks improve the quality of service and promote the creation of even more complex or bandwidth-intensive applications.



Wide spread access to services has also allowed users to create their own content, again driving the demand for high quality services that can do more than simply download content, but also allow sharing among users



Similarly, the availability of various applications attracts more users by increasing the value of broadband and supports wider investments in networks and quality of services.

## NEED OF MOBILE BROADBAND



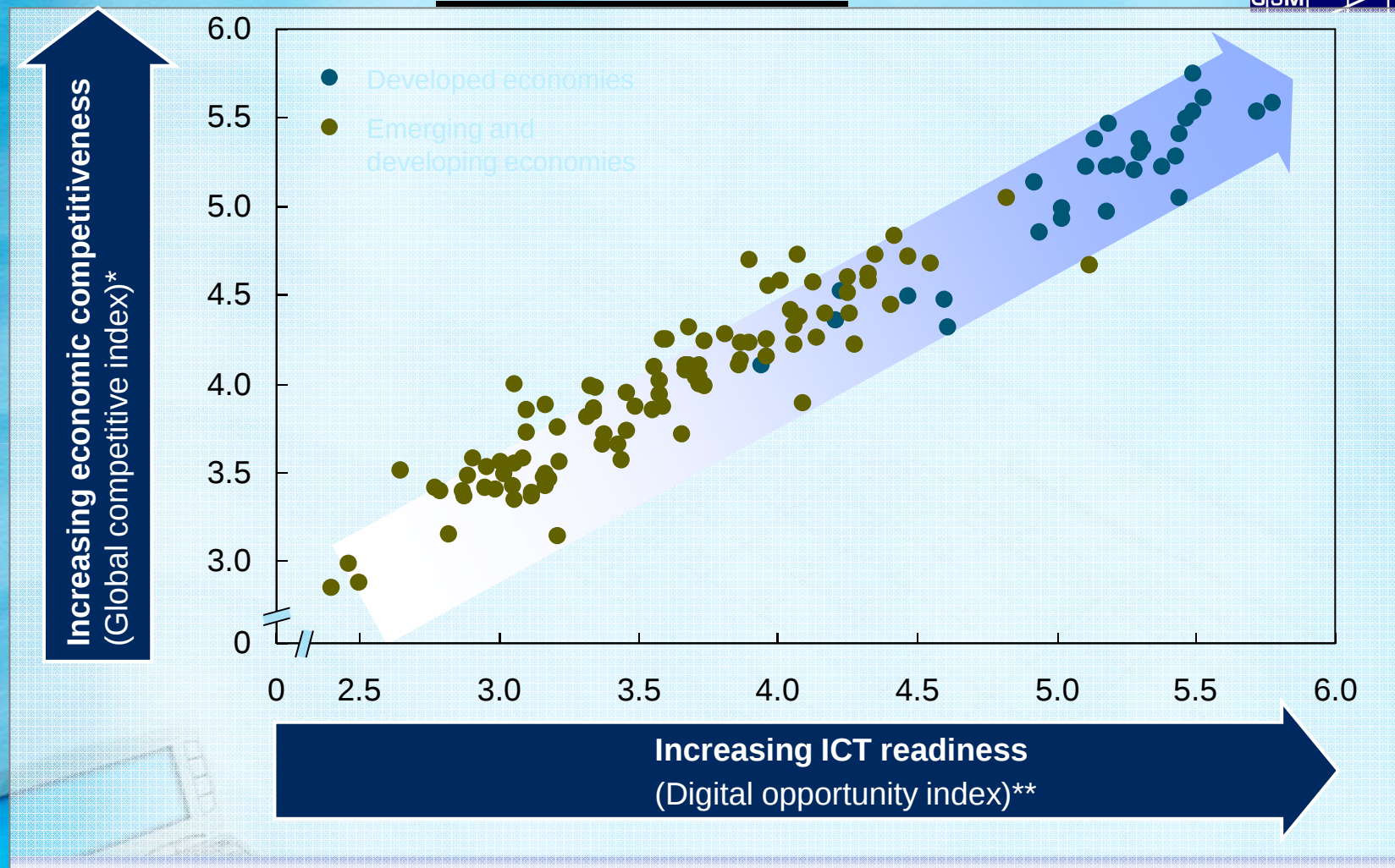
- The wireless telecommunications market is rapidly expanding, fueled by convergence in the consumer segment, and increased wireless integration in the enterprise segment.
- At the same time, conventional voice services are being commoditized, resulting in stable or declining voice ARPU (average revenue per user) for most operators, especially in developed markets.
  - Thus, operators are looking to advanced and rich data services to help spur revenue growth.
- To support such data services, operators are fast realizing that they must look beyond their 2G/2.5G networks for long-term, cost-effective and proven solutions.



# BENEFITS



# ICT READINESS DRIVES ECONOMIC DEVELOPMENT



\* Composite index of indicators relating to institutions, infrastructure, macro-economy, health, education, market efficiency, technological readiness, business sophistication, and innovation

\*\* Composite index of indicators relating to coverage/access, tariffs, equipment penetration and broadband adoption

Source: World Economic Forum; McKinsey

# BROADBAND STIMULATES ECONOMIC ACTIVITY



|                                |                                     | Explanation                                                             | Examples                    |
|--------------------------------|-------------------------------------|-------------------------------------------------------------------------|-----------------------------|
| Direct<br>(ICT industry)       | <b>1</b> Immediate value creation   | GDP contribution from direct network investment                         | South Korea                 |
|                                | <b>2</b> Multiplier effects         | Impact of broadband investment on suppliers of equipment, content, etc. | Japan                       |
| Indirect<br>(other industries) | <b>3</b> Foreign direct investments | Foreign direct investments as a result of good ICT infrastructure       | Argentina                   |
|                                | <b>4</b> Productivity increases     | More efficient business processes because of connectivity               | Zambia                      |
|                                | <b>5</b> Human capital formation    | Increase in knowledge and skills as well as improved health services    | Bangladesh, Malawi, Rwanda, |

Source: McKinsey

These benefits include the ability to expand economic opportunities and innovation, increase trade and productivity, reduce business costs, create jobs and encourage foreign investment.

# POTENTIAL APPLICATIONS



## ➤ **Telemedicine**

- ❑ Remove the lack of doctors in rural areas
- ❑ Remove language barriers through Multi-lingual interfaces
- ❑ Bridge lack of visual examination through video capability



## ➤ **Education**

- ❑ Provide high bandwidth access for e-education courses
- ❑ Provide video based Computer Based Trainings (CBTs)



## ➤ **Governance**

- ❑ Remove bureaucracy by providing instant viewing of land records etc.
- ❑ Provide government information like policies, forms, schemes
- ❑ Centralized initiative, decentralized implementation

Broadband also has social benefits, connecting consumers, businesses, and governments and facilitating social interaction. It delivers information to individuals and businesses, supports good governance, and strengthens social capital.



# MARKET DRIVERS FOR 3G IN INDIA



- **Address capacity problems in 2G networks**
  - ❑ For voice services in Spectrum limited situation
  - ❑ Better end-user experience in terms of voice and data
- **Cost efficient mechanism for Mobile Broadband**
  - ❑ Optimized investment for affordable service
  - ❑ Broadband where ever there is mobile – reach
  - ❑ Would give significant impetus to overall internet penetration
  - ❑ Seamless backward compatibility for ubiquitous coverage
- **3G – The big technology leap for Rural India**
  - ❑ Meets all requirements of USO services requirements
  - ❑ Future proof investment in rural India
  - ❑ Can be turned in to mass market service without wastage of investment
  - ❑ Development of Regional Content
- **Augment GSM Infrastructure for WCDMA – low deployment cost**



## 3G SERVICES



- High speed internet connectivity
- Faster video/data downloads
- New services like video telephony, video on demand, mobile TV & other entertainment related services
- Rich Multi-media services with streaming audio and video like video conferencing
- Online Gaming with more bandwidth, security, and reliability
- Location based services
- Personalized services, where content can be pushed to users



**VOICE was killer app on 2G**  
**CHOICE would be killer app on 3G**



BEYOND  
3G



- **HSPA is the set of technologies standardized by 3GPP3 that defines the migration path for UMTS operators worldwide. HSPA includes HSDPA (High Speed Downlink Packet Access), HSUPA (High Speed Uplink Packet Access) and HSPA Evolved .**



# FAST FACTS



The path to mobile broadband began with WCDMA, and its first evolution – HSPA (High Speed Packet Access) – is the leading mobile broadband technology globally.

## **Over 4 Billion GSM & WCDMA-HSPA**

- Approaching 90% worldwide subscriptions market share

## **3G-GSM (WCDMA)**

- 325 Networks commercially launched
- 135 countries

## **453m Mobile Broadband Subscriptions (WCDMA,HSPA)**

- More than 97% of WCDMA networks upgraded with HSPA
- 315 commercial HSPA operators launched in 133 countries

## **FAST FACTS**



**2137 HSPA devices launched; more than 67% growth YoY.**

**The majority of HSPA devices support peak downlink data speed of 7.2 Mbps or higher.**

**More than 31% of HSPA networks have launched HSUPA.**



*Source – GSA*

# HSPA- GLOBAL ECOSYSTEM ESTABLISHED



- Thousands of GSM user devices; unprecedented economies of scale

- Being Repeated for HSPA

2137 devices launched by 197 suppliers; 71% annual growth

- ❑ 806- Phones including smart phones
- ❑ 371- Notebooks HSPA-enabled
- ❑ 287- USB Modems
- ❑ 171- PC data cards & embedded modules
- ❑ 170- Routers
- ❑ 70- Others

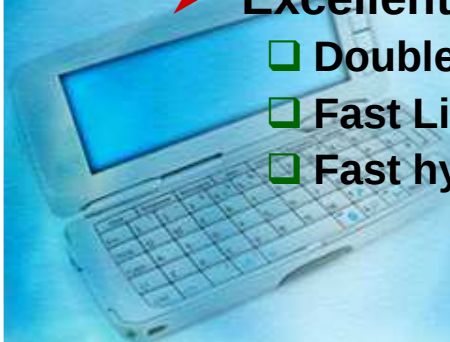


- 780 HSPA devices launched in past year

- Most networks & devices support peak DL 7.2 Mbps or higher.

# THE HSPA ADVANTAGE

- **Backward Compatibility**
  - ☐ With Existing 3G/UMTS
  - ☐ Consistent with 3GPP standards.
- **Better Quality of Service assured**
  - ☐ Reduced Latency
  - ☐ Short Transition time Interval
  - ☐ Reduced Response Time
- **Use of Harmonized Spectrum**
  - ☐ Economies of scale
  - ☐ Seamless roaming
  - ☐ Inter-operability
  - ☐ Interference free operations
- **Excellent System Capacity**
  - ☐ Doubles base station capacity of WCDMA.
  - ☐ Fast Link adaptation.
  - ☐ Fast hybrid Automatic Repeat Request.



# The HSPA ADVANTAGE



- **High Network Throughput Efficiency – Through fast Scheduling**
  - ❑ Integration of voice with Data
  - ❑ Dynamic Allocation of bandwidth
- **High Bite Rate Transmissions**
  - ❑ Ever-improving performance, with commercially-proven transmission bit-rates of up to 14Mbps today and up to 42 Mbps in the near future
  - ❑ LTE (Long Term Evolution) will deliver further enhancements in peak rates (exceeding 100Mbps)
- **Superior Coverage**
  - ❑ Fewer Number of sites required.
  - ❑ Low Capex



# L T E: Long Term Evolution



# **LTE: LONG TERM EVOLUTION**



**LTE is the next step in the user experience**

**LTE is essential to take mobile broadband  
to the mass market**

## **LTE Performance**

**Peak Downlink > 150 Mbps**

**Typical User Experience: 10-100 Mbps**

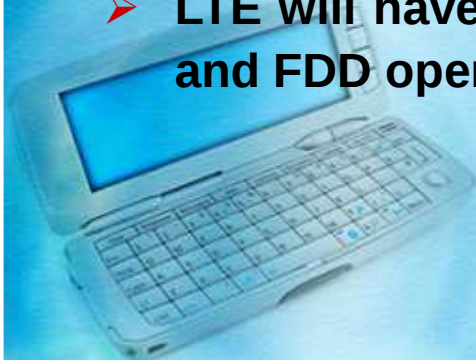
**Typical User UL rate: 5-50 Mbps**



# LONG TERM EVOLUTION



- LTE is an all IP network based upon TCP/IP, with higher level services such as voice, video & messaging, built on top.
- LTE has considerable flexibility, supporting channel bandwidths from 1.4 MHz to 20 MHz.
  - ❑ This optimises the use of radio spectrum by making use of new spectrum and refarmed spectrum opportunities.
- Operators evolving to LTE from GSM/WCDMA/HSPA will maintain full backward compatibility with legacy networks.
- LTE will have scalable channel bandwidths using OFDMA with both TDD and FDD operation.



# LTE:SYSTEM ARCHITECTURE EVOLUTION



- LTE involves transition from existing networks that combine circuit and packet switching to all-IP requires considerable simplification of the system architecture.
- System Architecture Evolution (SAE) is a simplified network architecture designed for seamless integration with IP-based communications networks
- All transmission related issues are managed at the transmit site, allowing faster response times for scheduling and re-transmission, thereby improving latency and throughput
- Operators can manage critical functions such as mobility, handover, billing, authentication and security within the mobile network whilst extending the network to other IP-based access technologies
- The trade off is that it makes central management more complex.



## LTE BENEFITS

### ➤ Lower Cost

- ❑ All IP nature of LTE means converged services will become a reality- Low Opex
- ❑ High Degree of Self configuration/ optimization

### ➤ Spectrum Flexibility

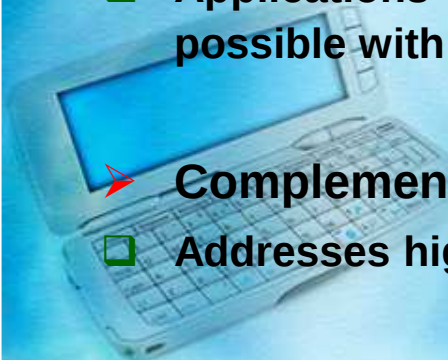
- ❑ Can use new or re-farmed spectrum
- ❑ FDD and TDD
- ❑ Variable Channel Bandwidth

### ➤ Improved Performance

- ❑ It can deliver the massive capacity at a much reduced cost per bit.
- ❑ Low latency & higher Data throughputs
- ❑ Applications like High Definition (HD) video streaming, mobile gaming will be possible with LTE.

### ➤ Complements 3G/ HSPA

- ❑ Addresses high capacity requirements



# **LTE IS ON TRACK, ATTRACTING GLOBAL INDUSTRY SUPPORT**



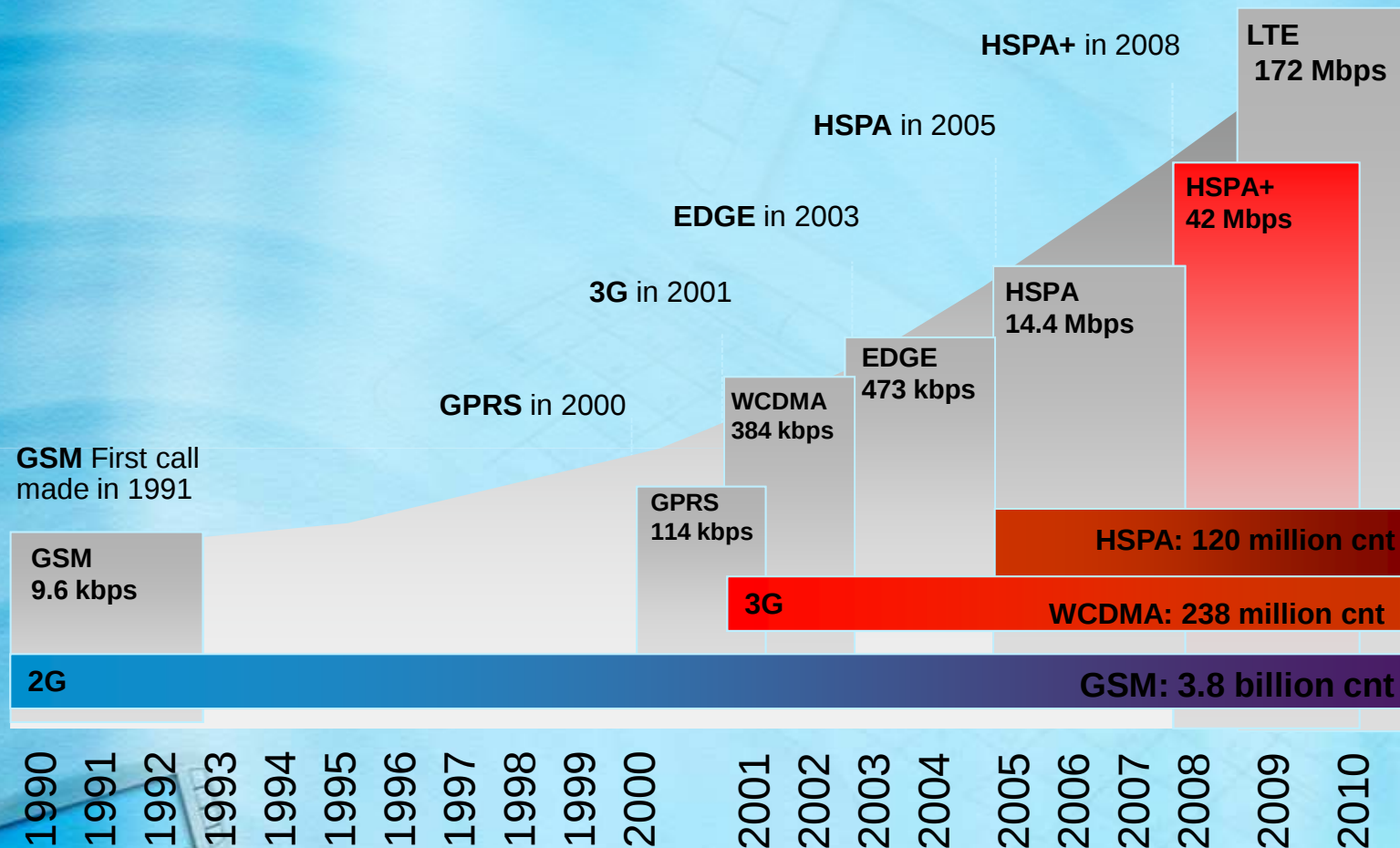
## **LTE commitments across the world**

- 59 network commitments
- countries with LTE network commitments- 28
- LTE systems launched in Norway & Sweden



Source - GSA

# THE GSM FAMILY - DELIVERING ON PROMISES



Source: Wireless Intelligence, June, 2009

**NEARLY TWO DECADES OF PROVEN TECHNOLOGY AND EXPERIENCE**

## SUMMARY

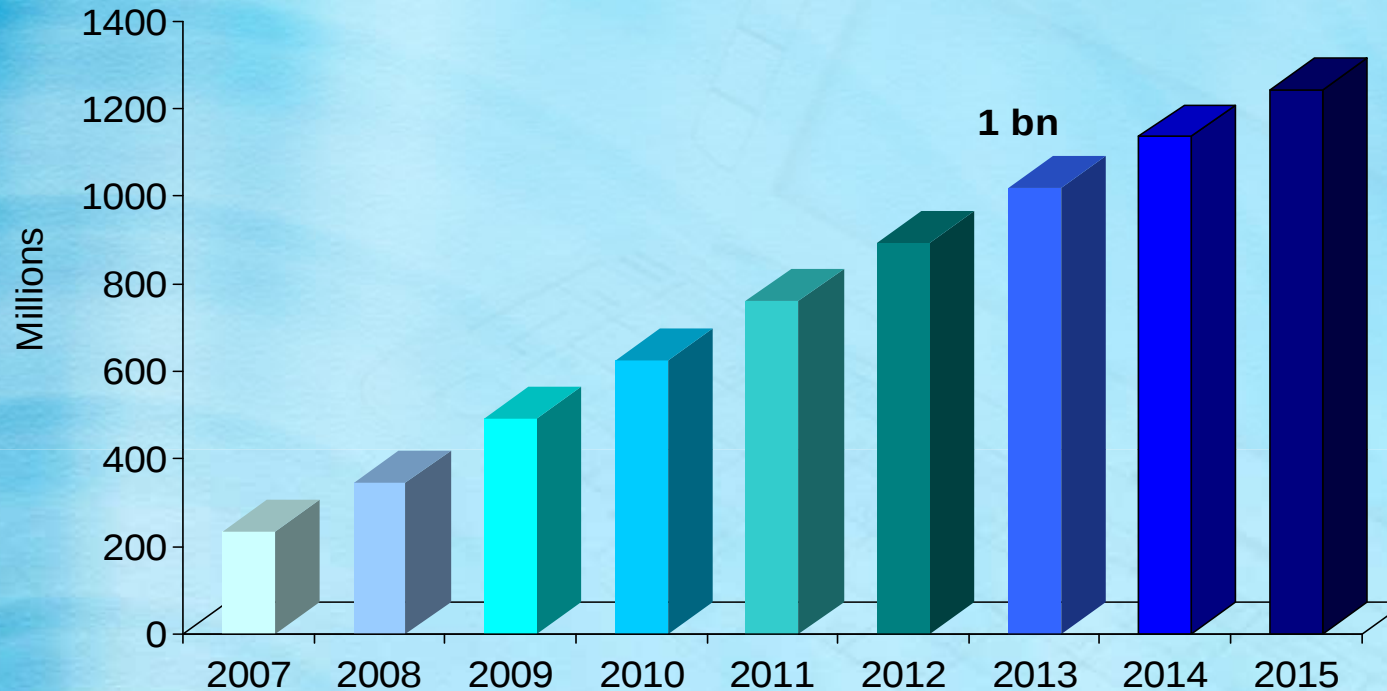


**GSM/3G/HSPA system with its established roadmap & proven capabilities forms an appealing ecosystem & is well positioned to succeed in mobile broadband.**

**3G is one of the most cost effective ways to deliver mobile broadband to the masses.**

**Expectedly 3G can single-handedly achieve far more in terms of bridging the digital divide than any other technology**

# COAI PROJECTIONS FOR THE FUTURE



**Even @ 10% broadband subs, by 2013, there would be >100 mn broadband subs in the country.**

# CHALLENGES AHEAD



## ➤ **Spectrum Reforms**

There is an urgent need to bring in Spectrum Reforms to support aggressive and balanced growth of the mobile sector.

## ➤ **Liberalization of M&A Policy**

There is a need to review M&A/ lock-in policies, to put in place a policy and regulatory environment that will allow free play of market forces and facilitate consolidation in the market.

## ➤ **Cost Effectiveness**

It is important that the present structure of multiple levies is rationalized to make the fiscal environment more conducive.



# **CHALLENGES AHEAD**



## ➤ **Review of USO Framework**

It is desirable to take a fresh look at the USO framework in order to unlock the huge potential that is still lying untapped in rural areas.

## ➤ **National Tower Policy**

Efforts should be made to increase coordination with State Governments/ agencies to create uniform policy for setting up towers, clearance issues etc. and standardization of governance & taxation.

## ➤ **Digital Dividend Spectrum**

The industry needs a clear and timely decision on allocation of digital dividend spectrum

## ➤ **Issues need to be resolved in Rural Areas-**

- ☐ Difficult topography,
- ☐ Difficulties in setting up towers,
- ☐ Lack of infrastructure,
- ☐ Irregular power supply
- ☐ Right Of Way

# SPECTRUM REQUIREMENT



# SPECTRUM DEMAND



- The confluence of the Internet and mobile/wireless computing is accelerating the consumption of spectrum. With data applications able to consume far more bandwidth than voice and with an increasing number of mobile users engaging in ever more bandwidth intensive applications, it is only a matter of time before current commercial mobile radio spectrum is exhausted.
- While engineering greater spectral efficiency and building more cell sites have increased some capacity, alone they are unlikely to address the expected magnitude of the demand.
  - ❑ In Long term, more spectrum is needed to enable mobile operators to keep pace with consumer demand for more and faster mobile broadband.

More commercial licensed spectrum available will facilitate the deployment of new wireless technologies that benefit from deployment across wide radio channels

## AVAILABILITY OF ADEQUATE SPECTRUM



- The total spectrum made available to the mobile industry is far lower than any other country.
- This has resulted in highly fragmented spectrum allocations to individual operators (an average of 2x5.7 post spectrum assignment to new licensees in 2008 V/s a global average of ~2x22MHz\*)
- Already spectrum in 900 MHz, 1800 MHz is very fragmented.
- Limited spectrum available in 2.1 GHz for 3G.
- Issues still needs to be resolved in 2.5-2.6 GHz band.

India needs to consider new frequency bands (like 700 MHz) for the future growth of mobile broadband services, specially for LTE

## **BENEFITS OF UHF BAND (700 MHz)**



- Since 700 MHz has excellent signal propagation characteristics, less infrastructure is required to provide wider coverage
  - ❑ Communication services can be provided in rural areas at lower cost( savings in capex)
  - ❑ Will help to bridge the 'digital divide' in India
  - ❑ Provide affordable mobile broadband to help develop a knowledge based economy.
  
- The possibility to use 698-806 MHz band for mobile communications provides a rare opportunity for providing cost effective wireless broadband services.

**Access to harmonized spectrum in UHF is a key to deliver mobile broadband services specially to the masses**



## **CONCLUSION**



**COAI is of the view that particularly in developing countries, mobile broadband technologies such as HSPA and LTE will do for broadband availability what GSM did for voice.**

**The industry thus needs a clear and timely decision on allocation of digital dividend spectrum as well as harmonized channeling arrangements / band plan.**

**-This will enable the industry to invest early with confidence in the future of mobile broadband and the services that it will deliver.**



## CONCLUSION



Mobile Broadband networks are an increasingly essential part of the global information society, enabling overall economic growth, creating new jobs, fostering innovation and enhancing national competitiveness.

To achieve these and other benefits of broadband, developing nations like India need to establish enabling environment that support long-term, cost-effective broadband deployments.

Other Challenges include:

- ☐ Availability of WCDMA handsets at reasonable price
- ☐ A well-established roadmap that ensures investment protection
- ☐ Excellent performance and a large ecosystem that provides cost efficiency
- ☐ Support for rich applications and services

## CONCLUSION



Although economic benefits have been seen in both developed and developing nations, the existing infrastructure, regulatory environment, urban-rural divide and other factors that affect broadband diffusion are often different in developing nations.

These differences should not preclude the expansion of broadband in emerging markets, but they reinforce the need to adopt best practices that facilitate the rapid and cost-effective deployment of broadband technologies, along with other information and communication technologies (ICT) and services.



***THANK YOU !!!***

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