

Connecting India through Mobile Broadband

GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

WELCOME

Rajan Mathews, Director General, COAI

GSMA Mobile Broadband Workshop

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Mobile Broadband – Future spectrum needs

Robindhra Mangtani, Senior Director, Government and Regulatory Affairs, GSMA

About the GSMA

Representing more than 800 GSM mobile phone operators across over 200 territories and countries of the world and 200+ manufacturers and suppliers. initiatives as associate members.

The primary goals of the GSMA are to ensure mobile phones and wireless services work globally and are easily accessible, enhancing their value to individual customers and national economies, while creating new business opportunities for operators and their suppliers. The Association's members serve more than **5 billion customers**.

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Connecting the World

Fixed



1.1 Billion Lines

Mobile



Over 5 Billion Connections

Mobile networks are connecting the world...

MOBILE BROADBAND WILL CONNECT THE WORLD TO THE INTERNET

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Ubiquity of Smartphones

By 2013, the number of smartphones will exceed the number of PCs





1.82 Billion Units

1.78 Billion Units

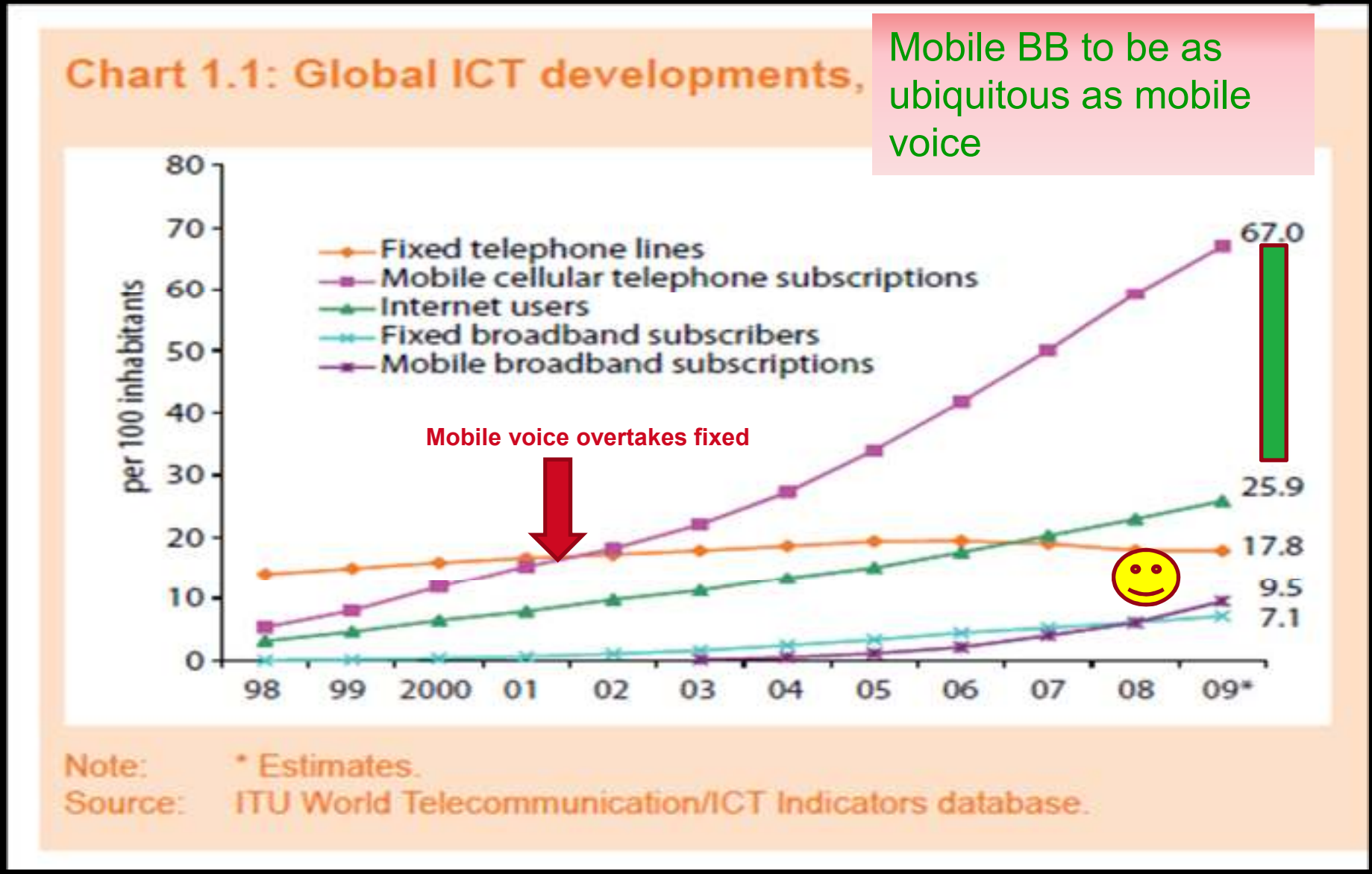
MOBILE WILL BECOME DOMINANT INTERNET ACCESS DEVICE

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Source: Gartner, Inc.

The opportunity : 5 billion + MBB users

Mobile BB to be as ubiquitous as mobile voice

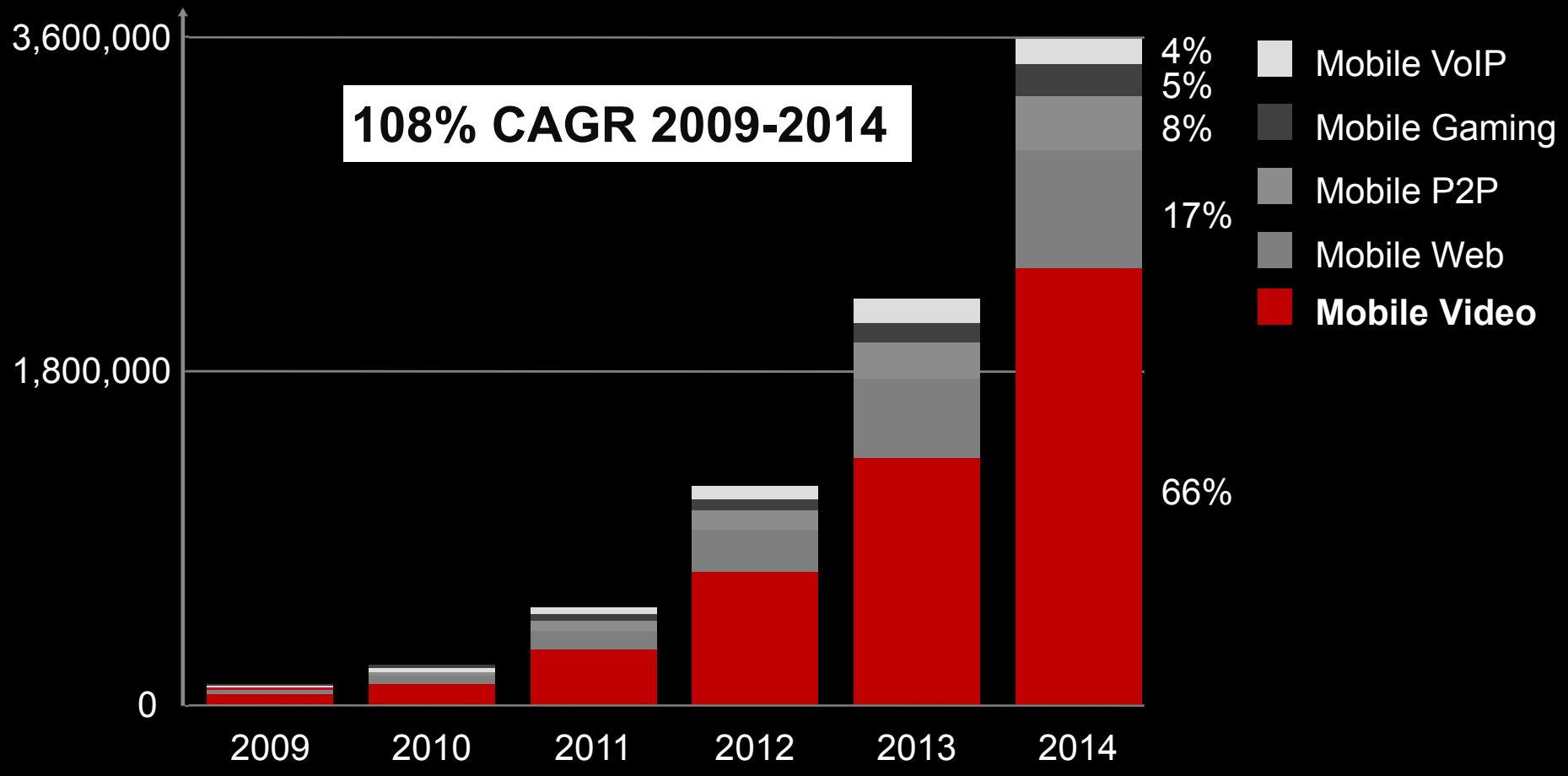


Source : http://www.itu.int/ITU-D/ict/publications/idi/2010/index.html

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Traffic Growth Forecasts

Mobile Traffic (TB per Month)



Source: Cisco VNI Global 2010

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Source: Cisco VNI Mobile, 2010

Mobile Beyond Voice

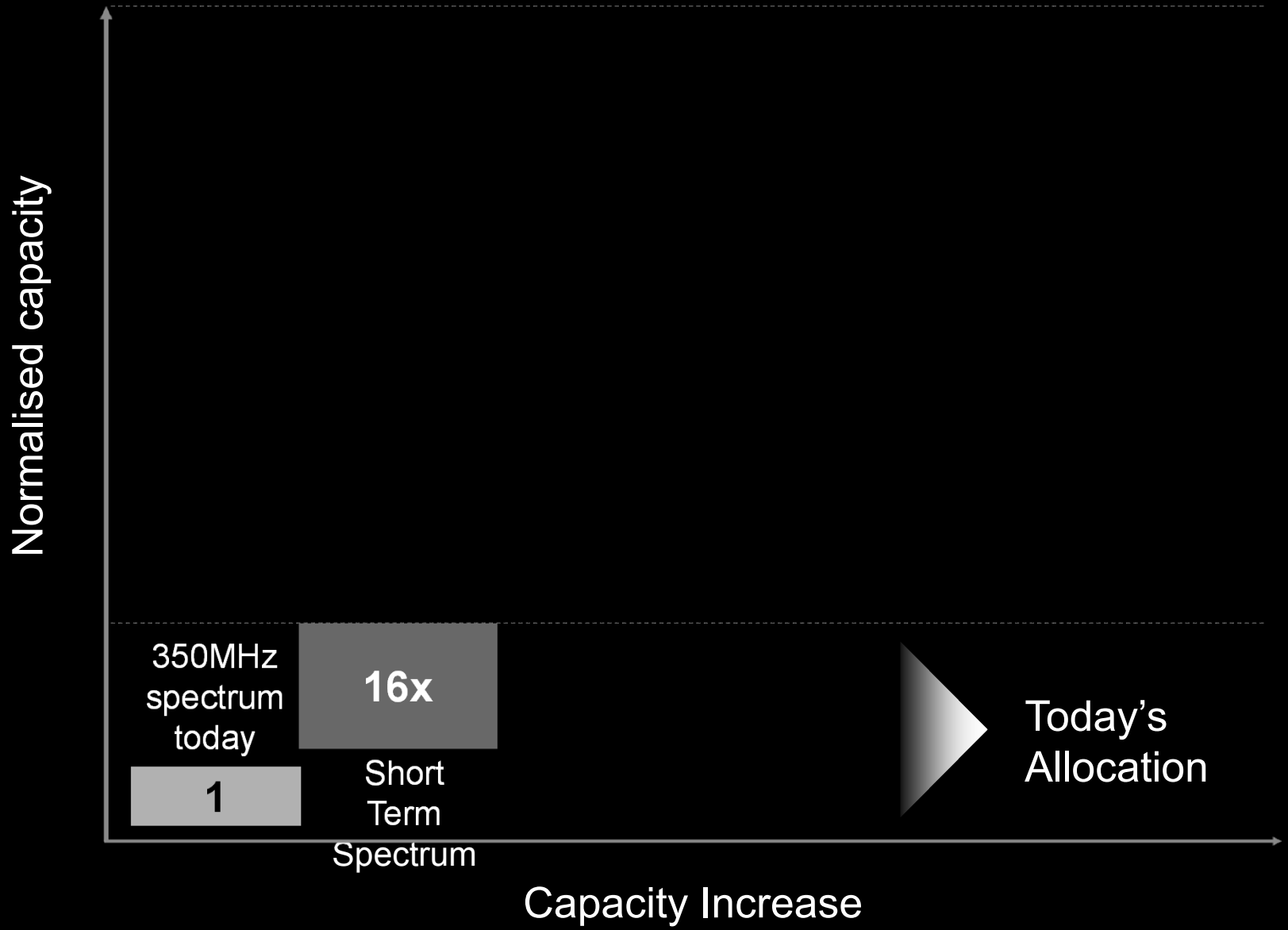
Healthcare	Transportation	Utilities	Consumer Electronics	Government
				
				
				

A WORLD OF CONNECTIONS…

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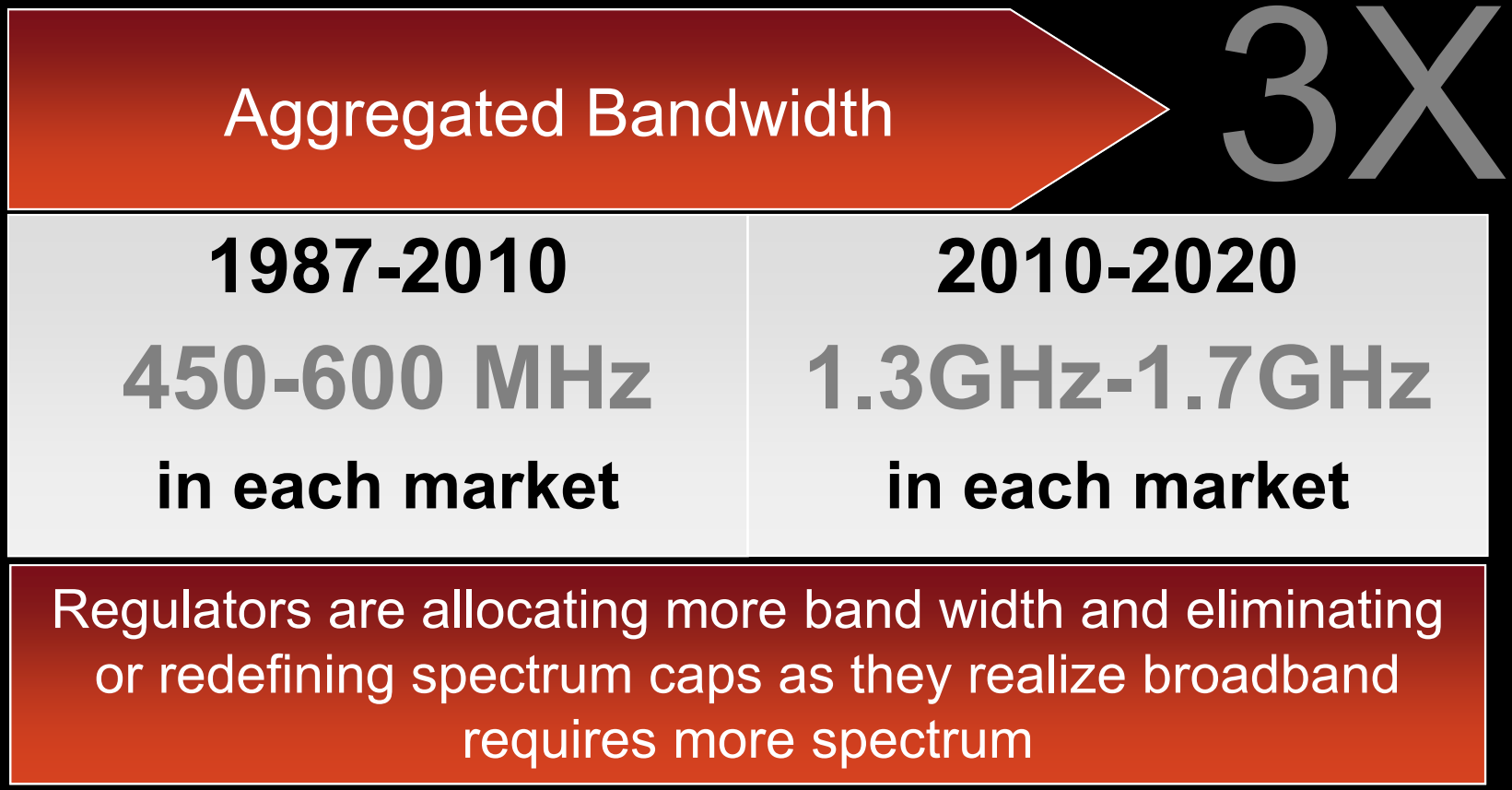
Meeting the capacity shortfall

Forecasted 2025 Capacity Need



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Mobile Industry Spectrum Requirements



According to the **ITU-R Report M.2078** by the year 2020 mobile services (IMT-2000) will need:

- 1.280 MHz for low market demand (rural areas)
- 1.720 MHz for high market demand (urban areas)

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From voice to mobile broadband

Aggregated bandwidth X 2? X3? X4?

By 2020 IMT will need:
- 1280 MHz bandwidth for rural areas
- 1720 MHz bandwidth for urban areas



Australian 2020 estimates:
1100 MHz required
300 MHz to be added



Colombia to auction 300 MHz of spectrum



Statements On making 500 MHz of new bandwidth available



More than 600 MHz to be released



Spain to release 310 MHz mobile spectrum

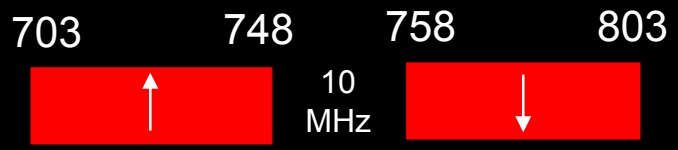
FCC Federal Communications Commission

Chairman Genachowski in October 2009:
"In fact, I believe that that the biggest threat to the future of mobile in America is the looming spectrum crisis."

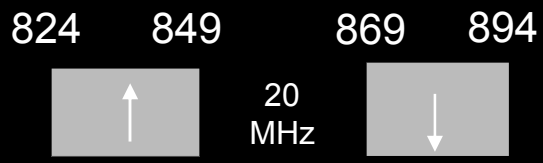
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Candidate mobile bands Asia Pacific

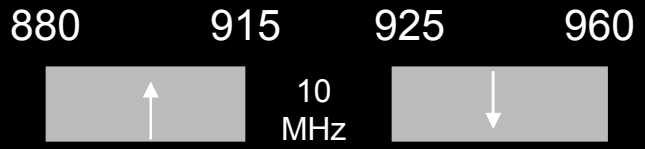
The coverage bands



The 700 band: 2X45 MHz

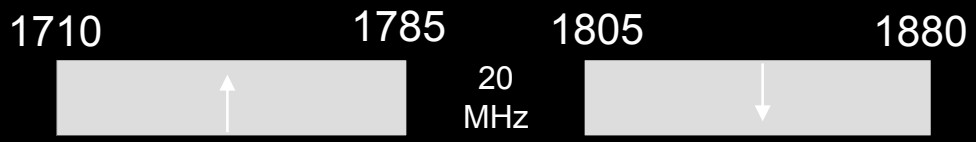


The 850 band: 2X25 MHz

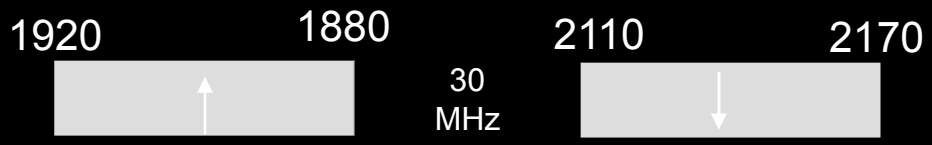


The 900 band: 2X35 MHz

The capacity bands



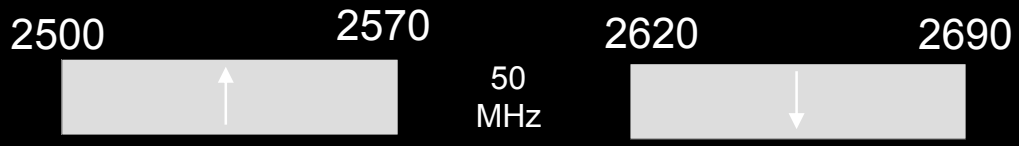
The 1800 band: 2X75 MHz



The 2100 band: 2X60 MHz



The 2300 band: 100 MHz



The 2600 band: 2X70 MHz and 50 MHz unpaired

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How Harmonisation brings down device costs

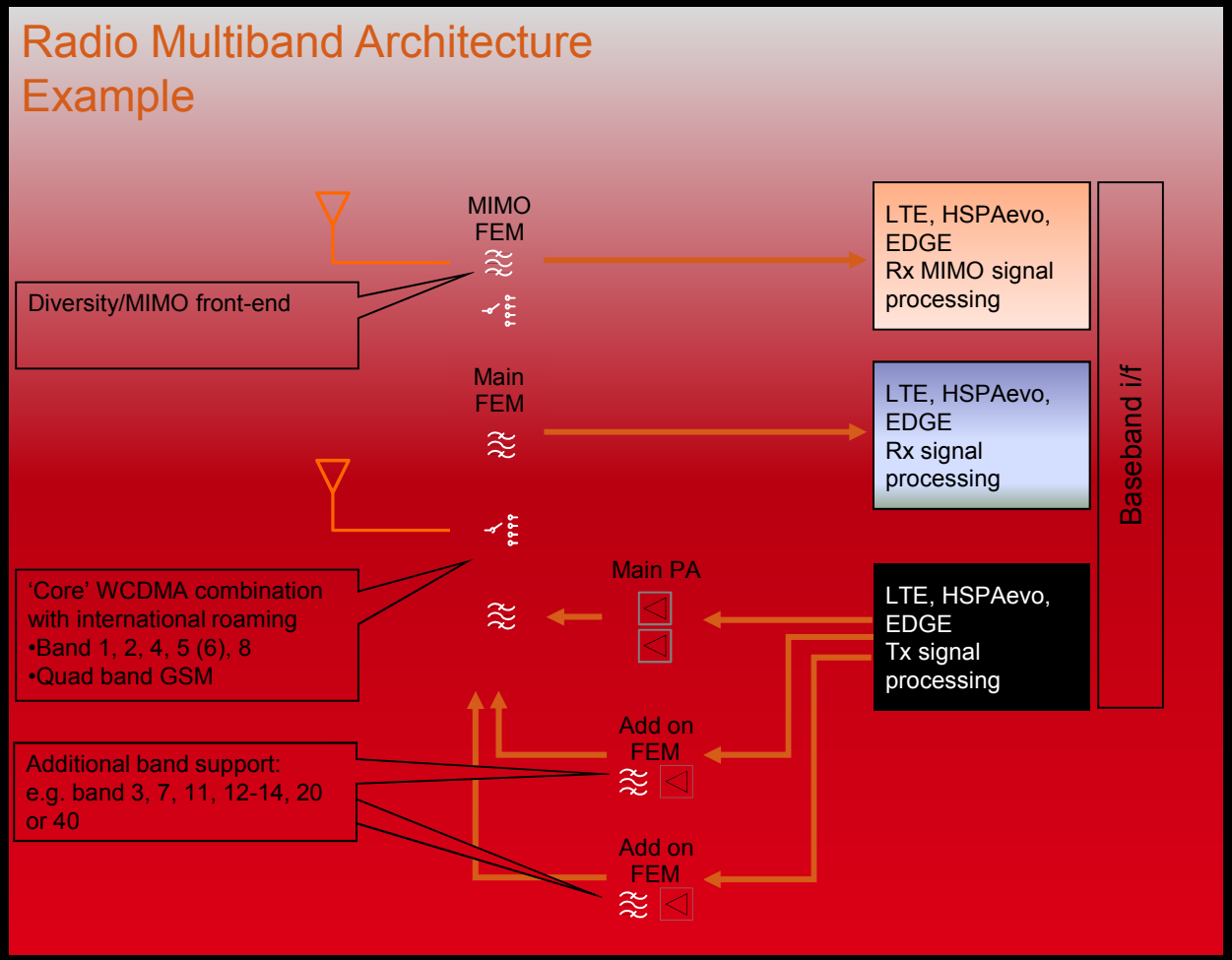


Source: LECG analysis of data from Strategy Analytics and Yankee Group.

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Why international harmonisation matters

- Because of the need for analogue components in the RF chain, effectively means a new RF front end module per frequency band. But this is complex and can impact on RF performance (as well as costs).



Number of bands a handset can support is limited.

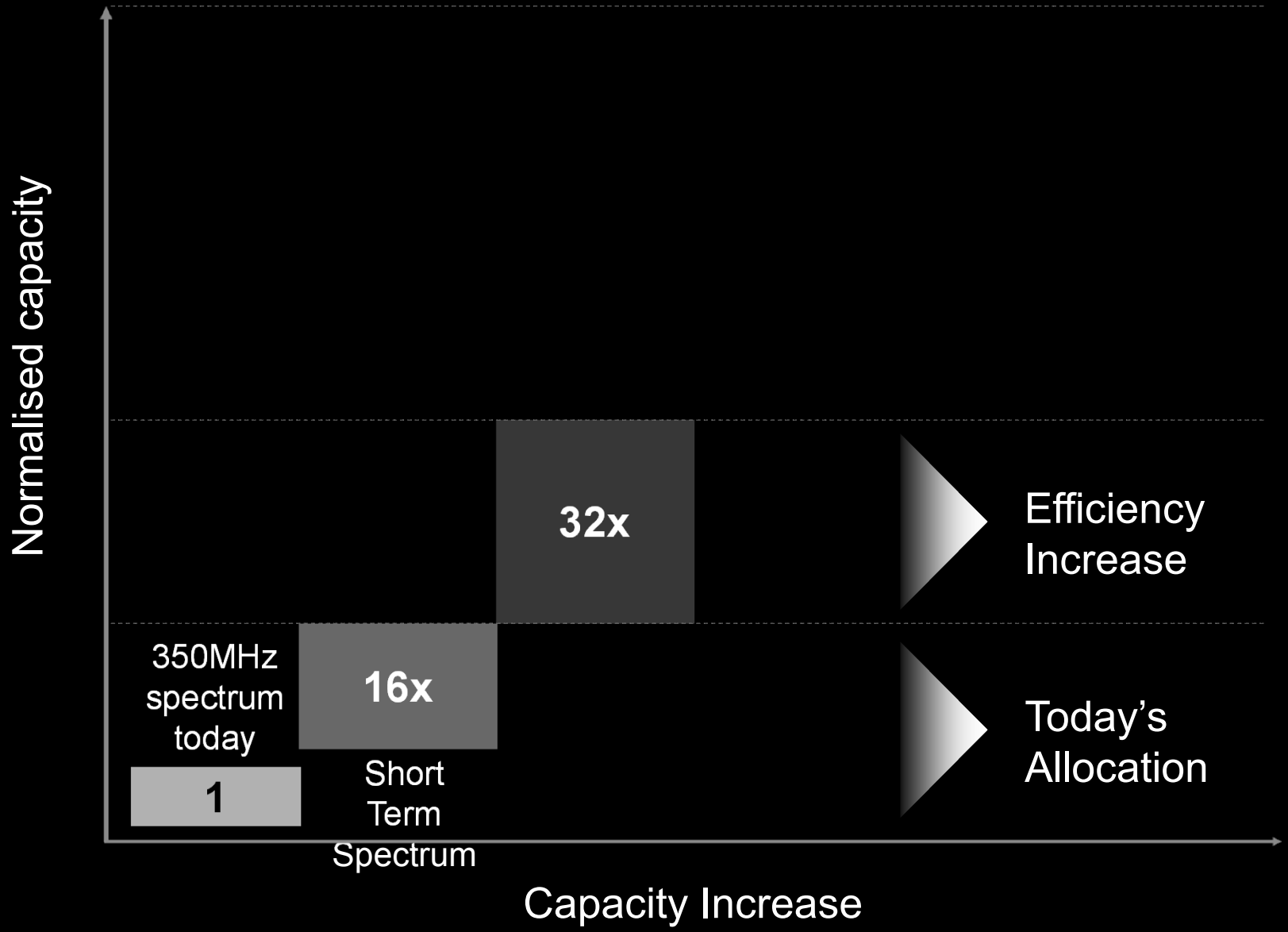
As the number of bands goes up the RF efficiency goes down.

Every new FEM adds to complexity

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Meeting the capacity shortfall

Forecasted 2025 Capacity Need



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What can be done to drive efficiency

- Spectrum Efficiency.
  - LTE advanced is significantly more efficient than GSM (18x)
- Network Offload
  - Ranges of figures and a variety of approaches but could allow operators to focus on high value / high mobility traffic
- Harmonisation
  - Fragmentation impacts receiver sensitivity and battery life (not just economies of scale)
- Cell Splitting
  - Could be as much as a 10folt increase in capacity IF you can get planning consent and appropriate sites
- Unpaired spectrum
  - Could be useful for A-symmetric traffic management

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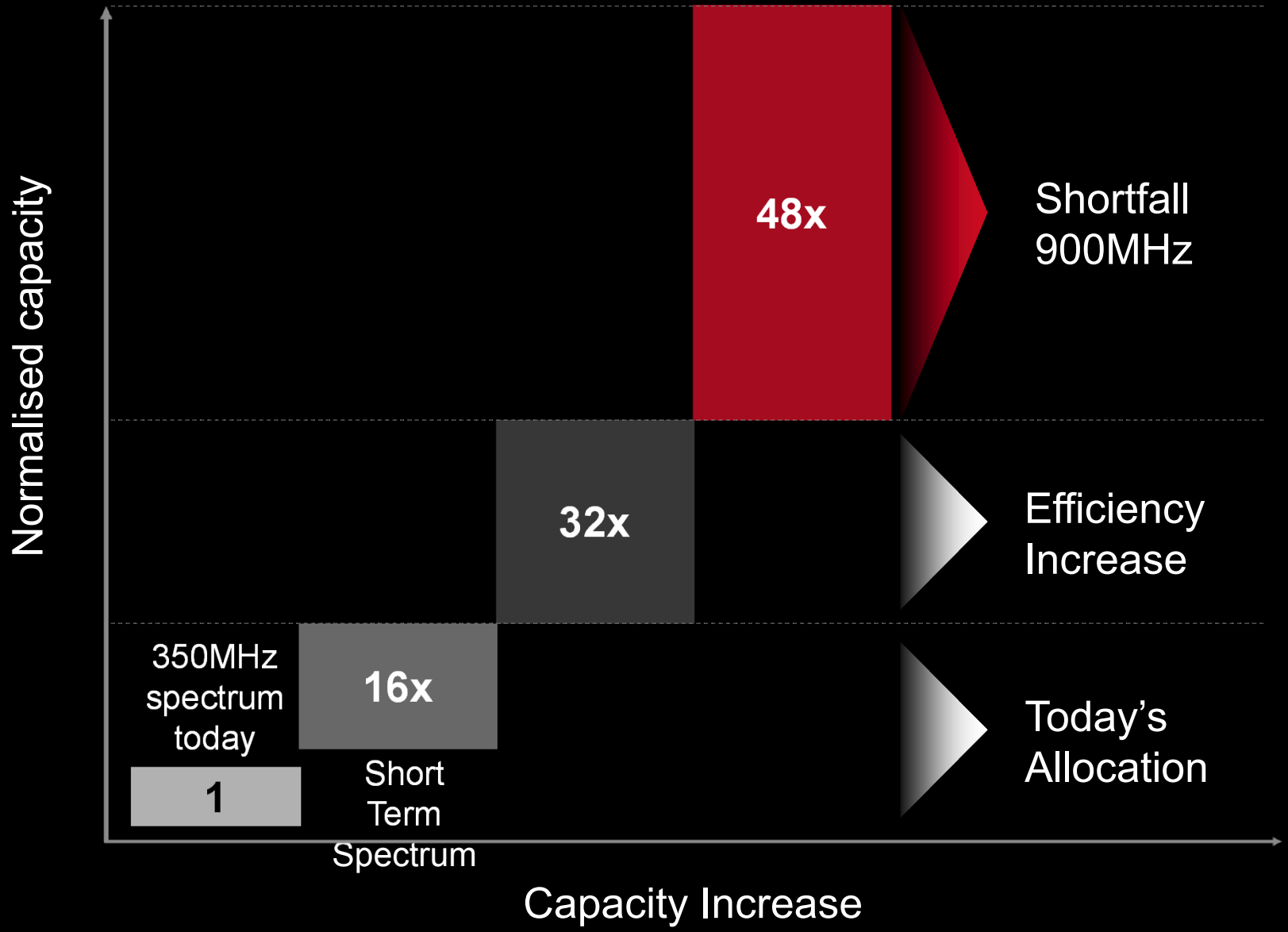
And what helps (but doesn't fix it)

- Spectrum Sharing
  - Could be up to 30% efficiency gain if moved to a wholesale model (but this is unlikely to be supported by regulators or industry)
- Spot Markets / Cognitive Radio
  - So far unproven and although useful where there is available spectrum – in urban centres (where we need most spectrum) there are few white spaces
- Improved compression techniques
  - Use of more efficient video codec could reduce bit rates by 50% but... We anticipate consumers will demand higher quality . HD video quality
- Femto Cells
  - Complexity of engineering the Femto into the network topography will not provide significant more capacity in Urban areas. May be useful but not for capacity
- Mesh technology
  - May be useful for coverage but not for capacity

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Meeting the capacity shortfall

Forecasted 2025 Capacity Need



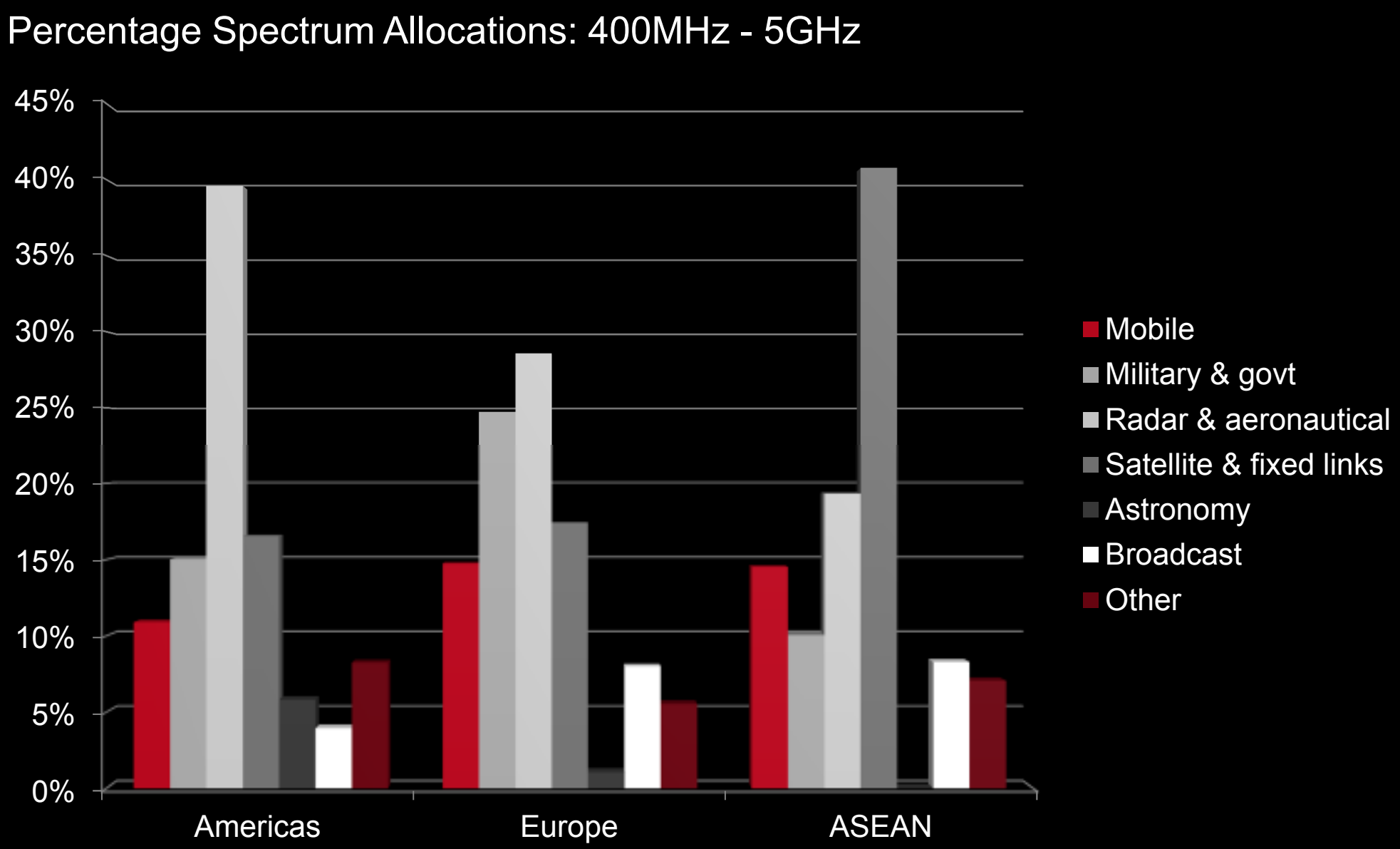
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Spectrum is a national sovereign asset



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Moving incumbents will be a significant challenge

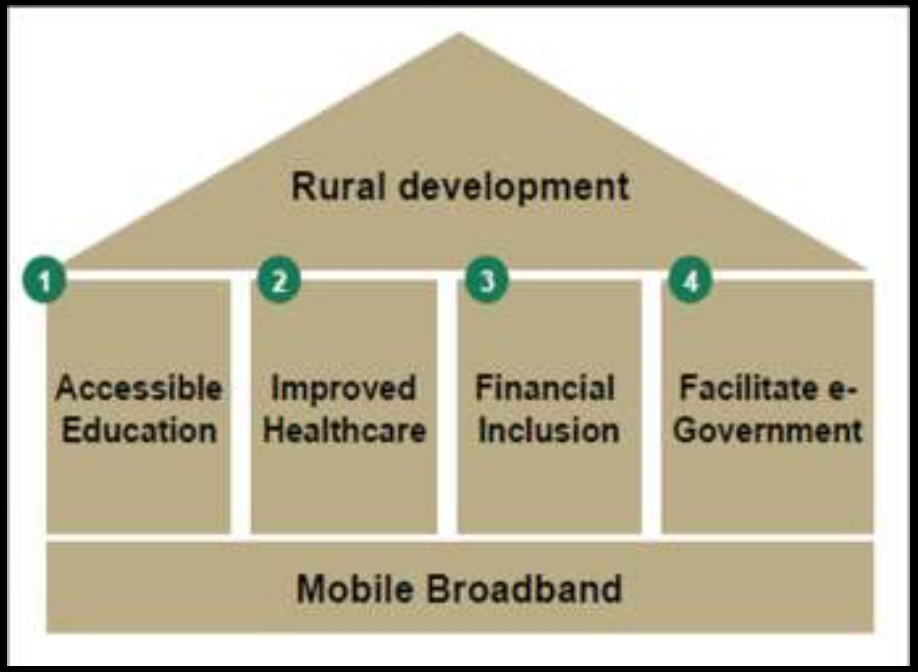


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Social inclusion and development

- Allocating 700 MHz band to mobile broadband in APAC
  - Can increase rural Internet subscriptions by 14-23% by 2020
  - Overall number of Internet subscriptions expected to increase 2-8%
  - 1.1M new business activities could be created by 2020
  - Could contribute additional US$ 103B to government revenues for 2014-2020

Mobile broadband is a powerful tool for facilitating rural development



Accessible education to rural areas lacking adequate facilities, resources and teachers

Improved healthcare services for rural and under-privileged groups

Provide much-needed financial intermediation to unbanked poor and rural areas

Reduce bureaucracy and improve government interfaces towards businesses and consumers

Source: BCG The Boston Consulting Group

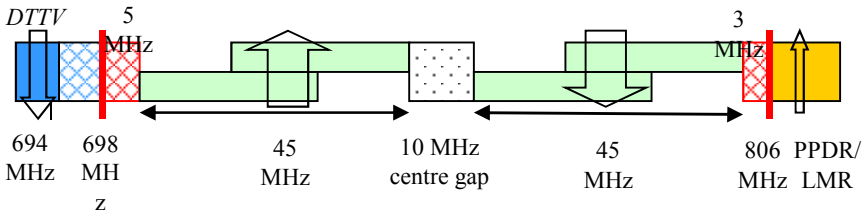
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Allocation of sufficient and harmonized spectrum has been assumed in the analysis of socio-economic benefits

Sufficient bandwidth needs to be allocated to mobile

2 x 45 MHz needed to provide sufficient bandwidth for effective rollout

- APT harmonized UHF bandplan for IMT within the 698-806 MHz band
- Lower guard-band between 698-703 MHz and an upper guard-band between 803-806 MHz



Adequate bandwidth will facilitate competition between operators, enhancing efficiency and consumer choice and price benefits

Harmonization of spectrum across region necessary to reap full benefits

Non-harmonization will drive up cost of hand-sets and make them unaffordable to lower-income consumers

- Lack of frequency harmonization can drive up terminal costs, as providers will not be able to enjoy economies of scale
- Small un-harmonized markets risk being marginalized by equipment manufacturers
- Harmonization will reduce cross-border interference and facilitate improved usage quality

Source: 9th Meeting of the APT Wireless Forum (AWF-9); GSMA

A selection of socio-economic analysis

- World Bank **Information and Communication for Development Report (IC4D 2009): http://www.infodev.org/en/Article.384.html**
- **Boston Consulting Group analysis of socio-economic impact of allocating 700 band to mobile in APAC: http://www.gsmamobilebroadband.com/upload/resources/files/277967-00-Impact%20of%20700-22Oct10-EG-SIN.pdf**
- **Analysys Mason Assessment of Economic Impact of Wireless Broadband in India: http://www.gsmamobilebroadband.com/upload/resources/files/AM_India_Exec_Summary_Final.pdf**
- **McKinsey&Company Mobile Broadband for the masses: http://www.gsmamobilebroadband.com/upload/resources/files/MBBforMasses.pdf**
- **Boston Consulting Group Towards A Connected World,** Socio-Economic Impact of Internet in Emerging Economies: http://www.telenor.com/en/resources/images/Towards%20a%20Connected%20World_tcm28-50426.pdf
- Analysys Mason / DotEcon / Hogan&Hartson Report for the European Commission 'Exploiting the Digital Dividend' – a European approach: http://www.analysysmason.com/EC_digital_dividend_study

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In conclusion...

- President *Barack Obama* – 16.03.10

  "Just as past generations met the great infrastructure challenges of the day, such as building the railroads and the Interstate highways, so too must we harness the potential of the Internet. Expanding broadband across the nation will build a foundation of sustained economic growth and the widely shared prosperity we all seek.

- ITU Secretary General, Dr Hamadoun Toure, 15.02.2011

  "governments need to raise broadband to the top of the development agenda, so that rollout is accelerated and the benefits are brought to as many people as possible"

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3G + LTE – THE KEY TO MOBILE BROADBAND IN INDIA

Dr. Lakshminath Reddy Dondeti,
Director, Engineering - Technical Standards, Qualcomm



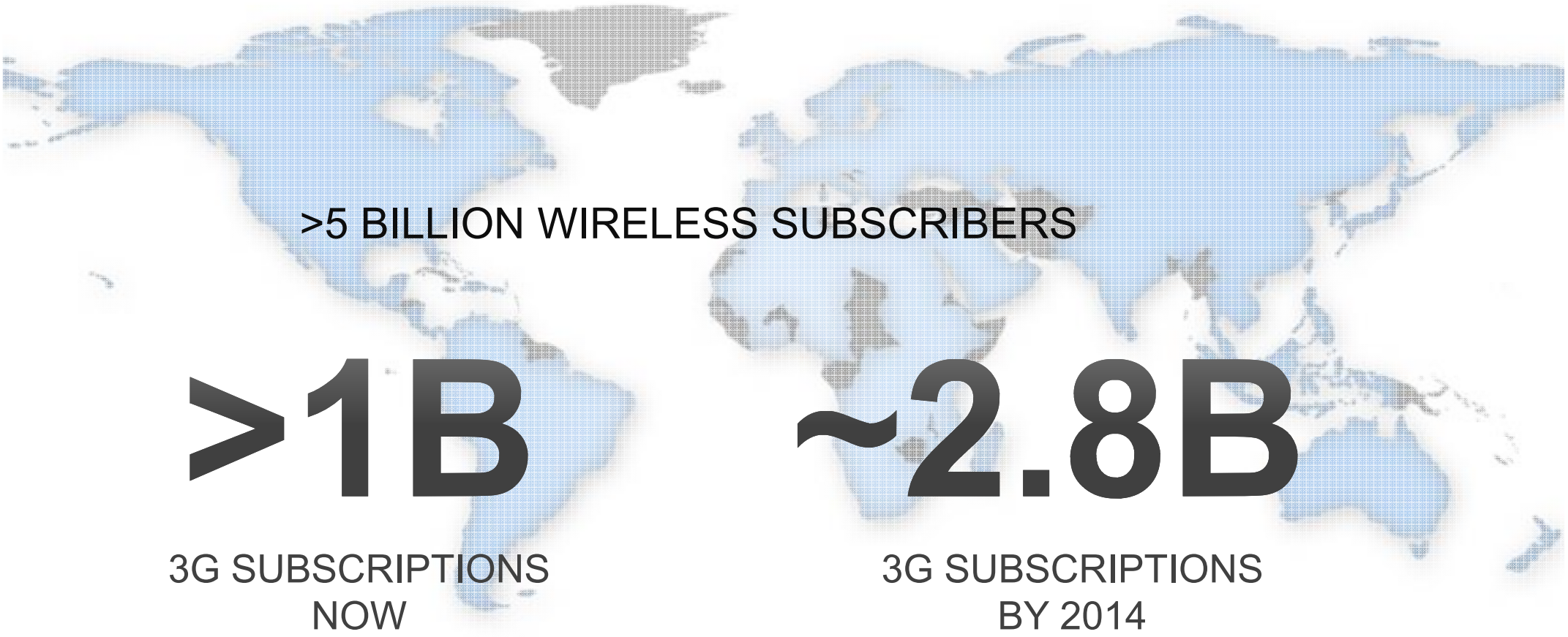


3G + LTE – THE KEY TO MOBILE BROADBAND IN INDIA

May 2011



The Biggest Platform in the History of Mankind



>5 BILLION WIRELESS SUBSCRIBERS

>1B

3G SUBSCRIPTIONS
NOW

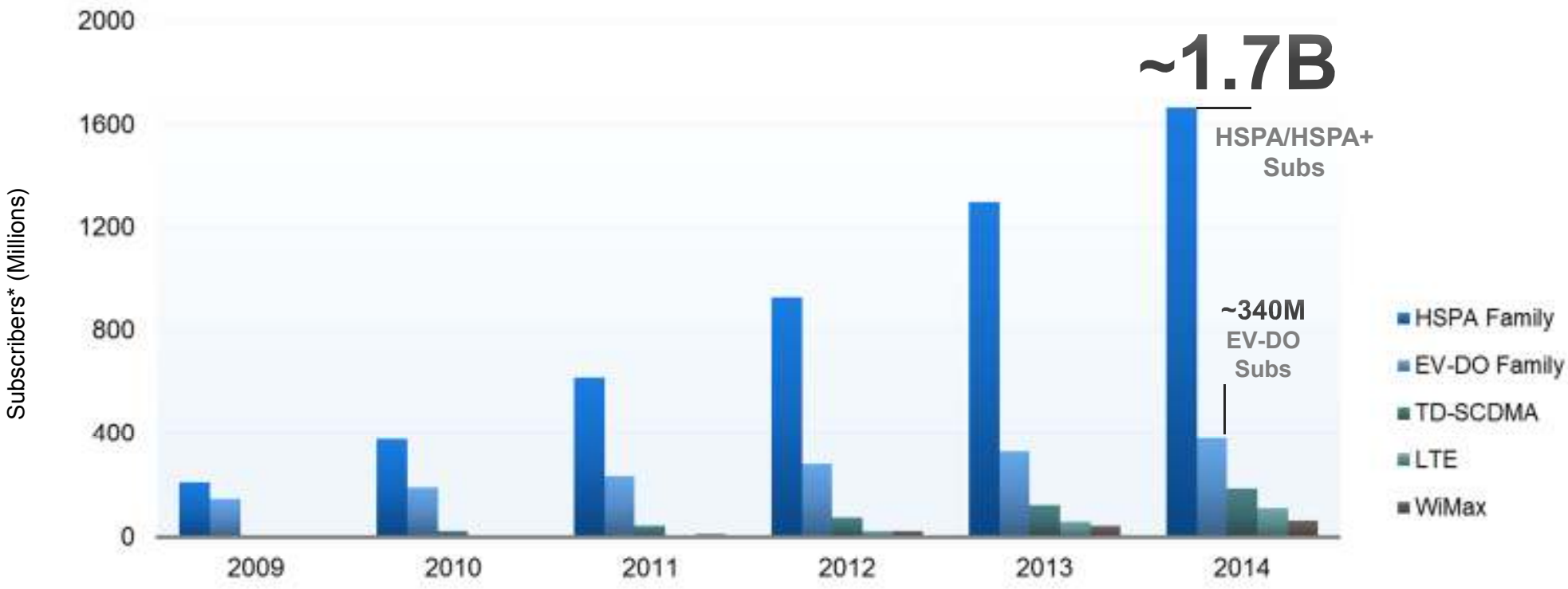
~2.8B

3G SUBSCRIPTIONS
BY 2014

Note : 3G includes CDMA2000, WCDMA and TD-SCDMA

Source: Wireless Intelligence estimates as of Nov.2 , 2010 for the quarter ending Sep 30, 2010; *number of unique wireless connections

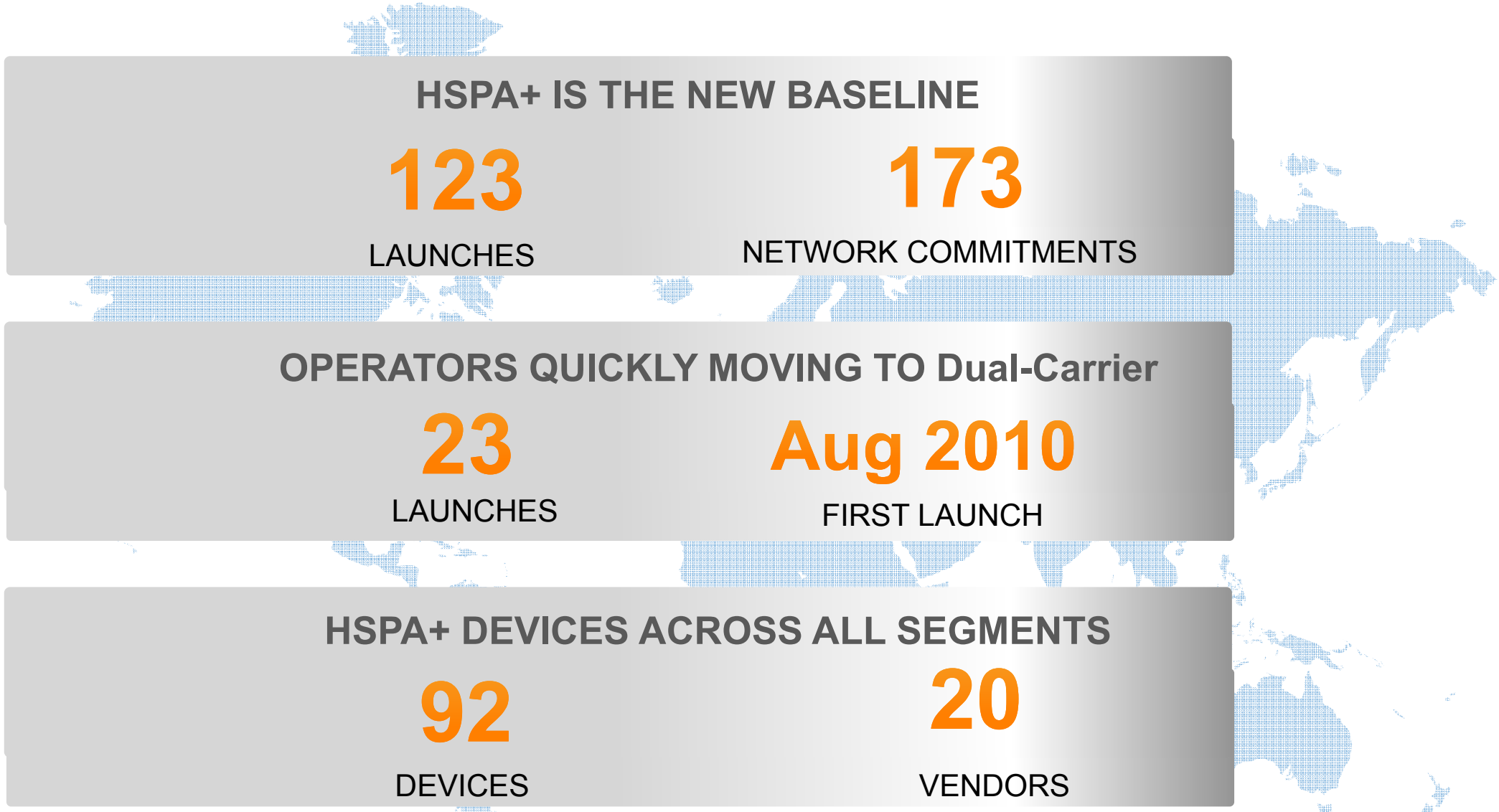
HSPA+ is The Mobile Broadband Leader



Total 3G* mobile broadband subscribers expected to be ~2.2B by 2014 (of total 2.8B 3G)

Note: * 3G includes EV-DO family, HSPA family and TD-SCDMA, ** number of unique wireless connections.
Source: 3G subs – Wireless Intelligence (Nov-10), LTE – Avg. of ABI (Oct-10) and Yankee (Sep-10) and WiMax - ABI (Oct-10).

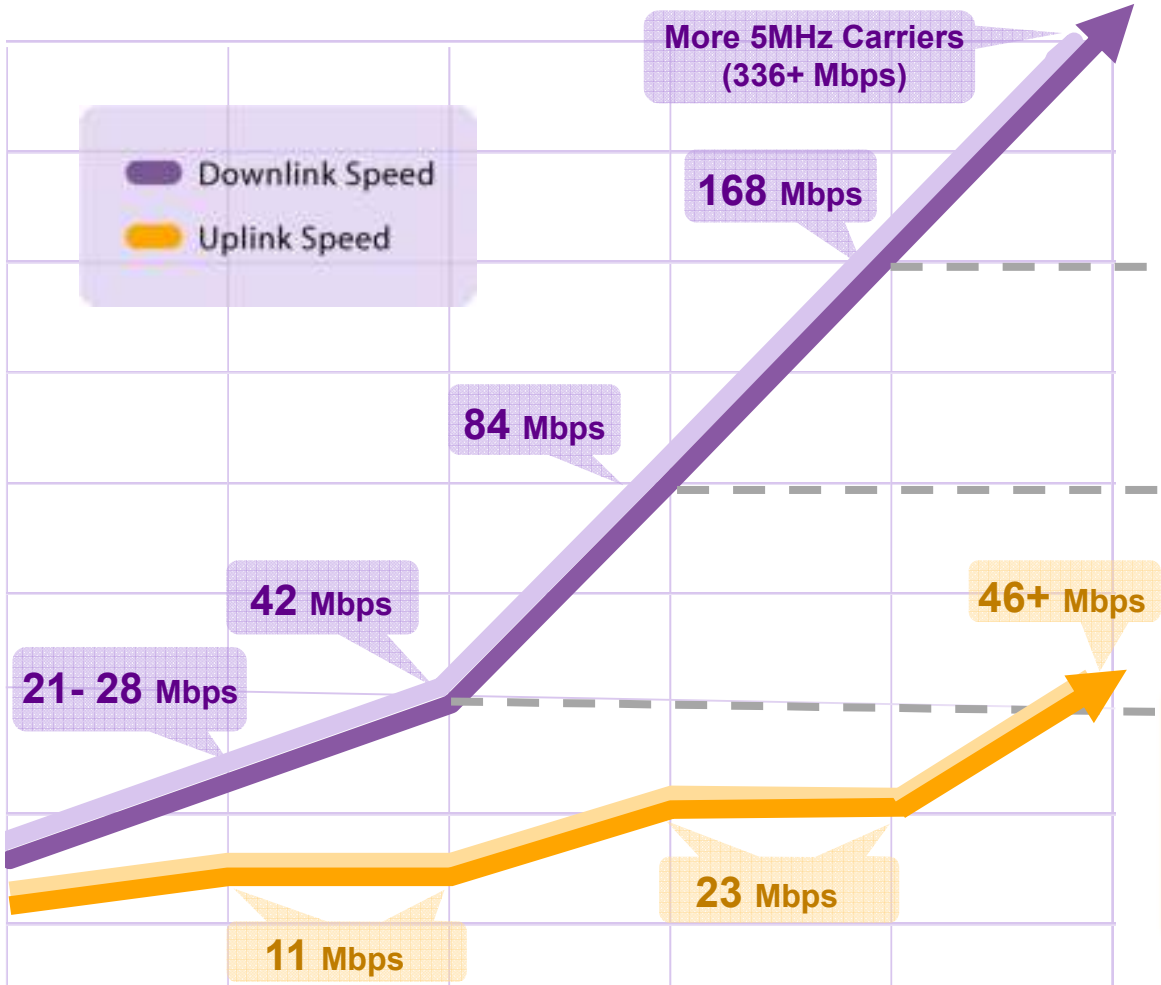
HSPA+ is The New Baseline



All Indian 3G Operators Have Already Deployed HSPA+ Networks

Source: www.gsacom.com, Apr 12, 2011, Devices as of February 2011

HSPA+ Has A Strong Evolution Path



R11 and Beyond: HSPA+ Advanced

- Expands HSPA+ to 40MHz deployments
- Further leverages multiple antennas (UL MIMO/Beamforming)
- Exploits smart networks (multipoint) and HetNet enhancements

R10: 20 MHz Multicarrier

- Expands HSPA+ to 20 MHz deployments
- Evolution to femtocell networks

R9: Expands Dual-Carrier

- 10 MHz Dual-Carrier in uplink
- Combination of MIMO and Dual-Carrier in downlink
- Aggregation across spectrum bands
- Femtocell enhancements: active mobility

R8: 10 MHz Dual-Carrier

- Enhances broadband—doubled data rates to all users
- Introduction of femtocell support
- Alleviates signaling traffic e.g., from Smartphones

Rel - 7 Rel - 8 HSPA + (commercial)

Rel - 9 Rel - 10 HSPA +

Rel-11 and Beyond HSPA + Advanced

Created 01/21/11

Notes: R8 reaches 42 Mbps by combining 2x2 MIMO and HOM (64QAM) in 5 MHz, or by utilizing HOM (64QAM) and multicarrier in 10 MHz. R9 combines multicarrier and MIMO in 10 MHz to reach 84 Mbps peak rates. Uplink multicarrier doubles the uplink peak data rate to 23 Mbps in 10 MHz in R9. R10 expands multicarrier to 20 MHz to reach 168 Mbps. R11 expands multicarrier to 40MHz to reach

HSPA+ Enhances User Experience







- More responsive user experience
  - 50% reduction in call setup[1]
  - 50% reduction in transitions time between inactive and connected states[2]
- Better ‘always-on’ experience
  - User can stay longer in connected state without compromising battery life (CPC)[3]
- Higher peak and user data rates
- More Enhancements in R8 and beyond
  - Further alleviates signaling load and extends battery life

[1]Paging messages sent over HSDPA channels in CELL_PCH state. [2]Up to 50% reduced time over the air (from PCH to CELL_FACH/DCH state) compared to R6 with Enhanced CELL_FACH/PCH. [3]Users can stay in connected state longer without compromising battery life and experience faster state transitions thanks to CPC (DTX and DRX).

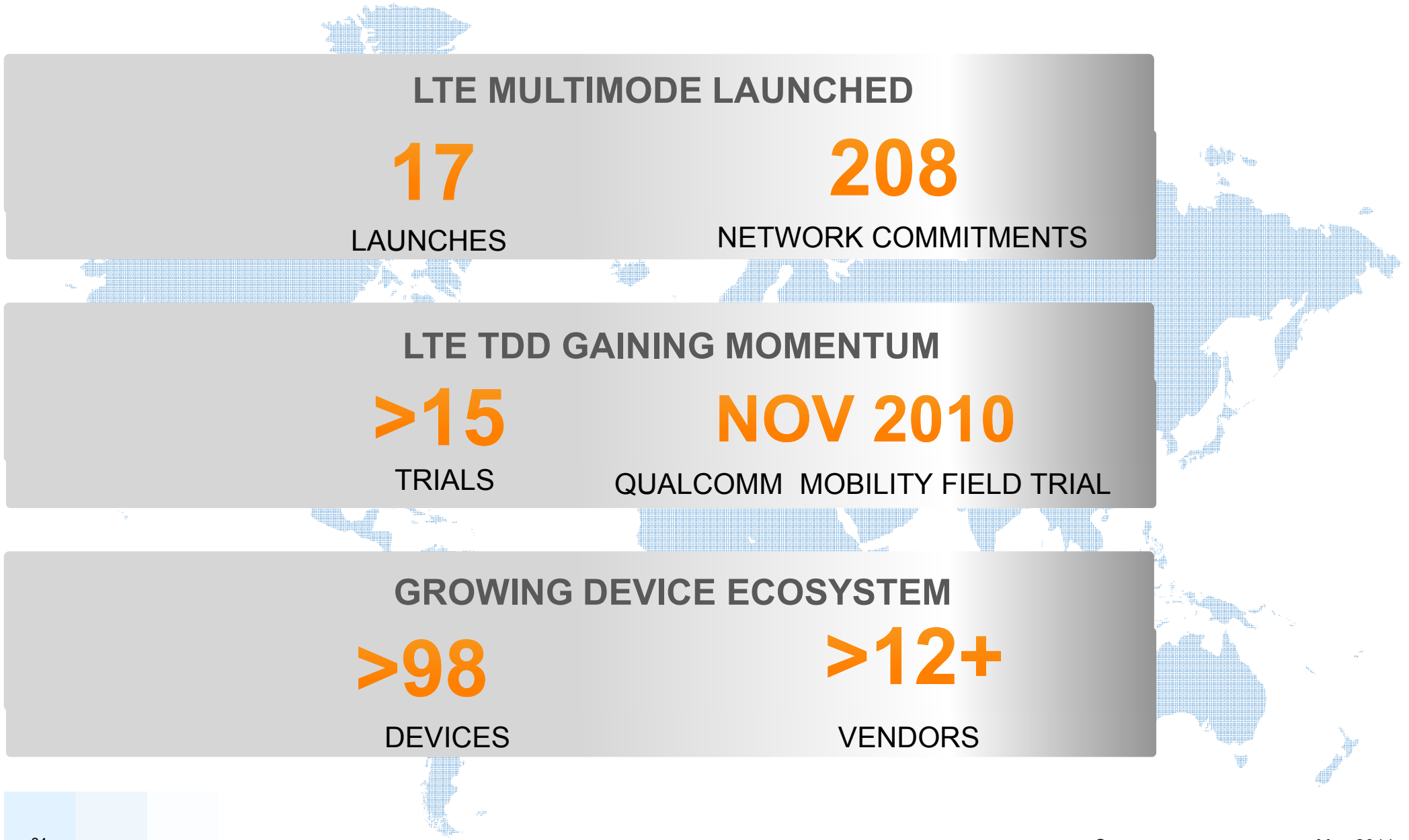




3G And LTE



LTE Has Strong Commitments



Source: www.gsacom.com, May 2011

LTE TDD: The Global Solution for Unpaired Spectrum

LTE TDD

Complements 3G to Boost Data Capacity
3G provides ubiquitous data, voice and global roaming

Seamless 3G Interoperability from Day One

Leverages LTE FDD and Huge 3G Ecosystem
Common TDD/FDD standard and design ensures economy of scale

Qualcomm: Common FDD/TDD chipset platform
Multimode chipsets supports LTE FDD & TDD with 3G and its evolution

3G and LTE: Working Hand in Hand



Industry's first LTE multimode solutions

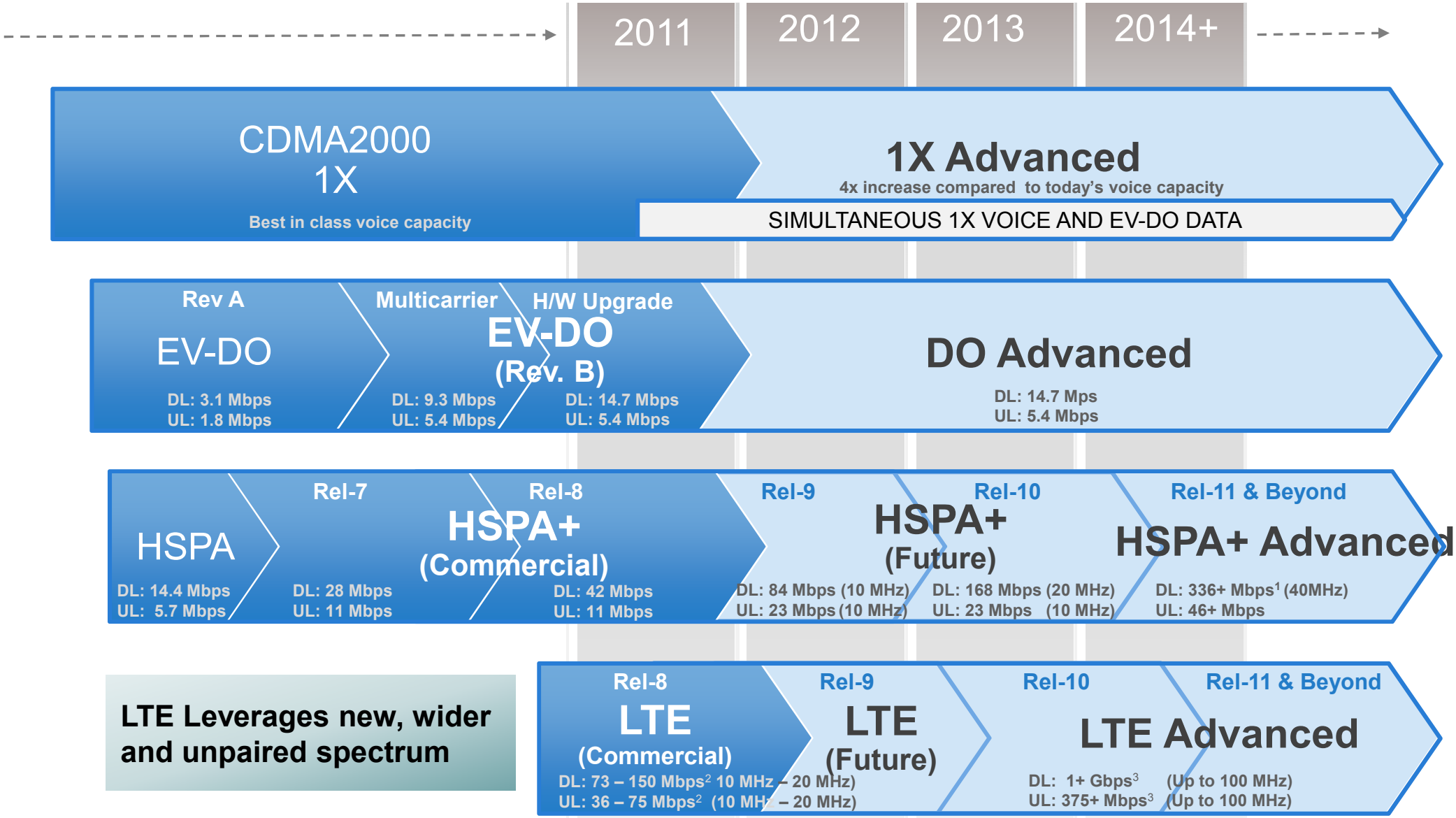
- LTE leverages new, wider spectrum to boost data capacity
- WCDMA/HSPA+ provides ubiquitous data and voice
  - Provides global broadband experience in global bands (900/2100 + 850/1900)
  - LTE deployed across a fragmented set of bands and in a fragmented set of scenarios.
- Seamless service continuity from day one with multimode devices

LTE ***(FDD or TDD)***

HSPA+ Coverage

HSPA+ ensures similar user experience outside the LTE coverage

Qualcomm is a Leader in 3G and 4G



■ Commercial

Note: Estimated commercial dates.

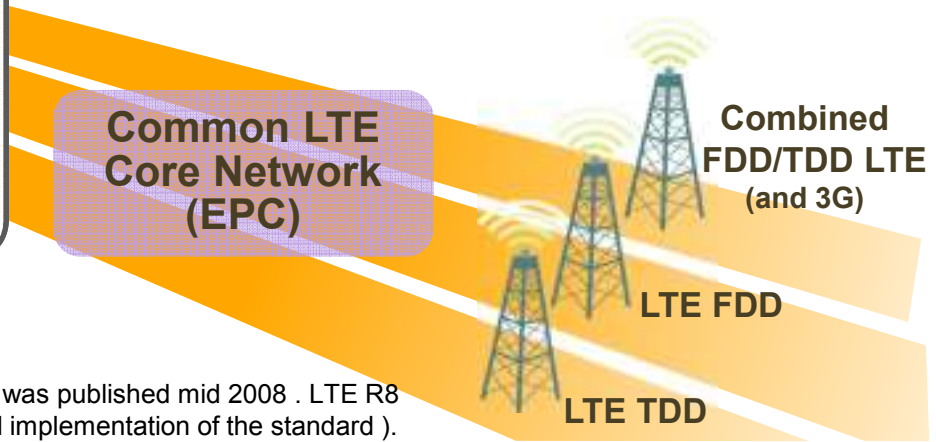
[1]R11 expands multicarrier to 40 MHz to reach up to 336 Mbps, [2]Peak rates for 10 and 20 MHz FDD using 2x2 MIMO, standard supports 4x4 MIMO enabling peak rates of 300 Mbps. Peak data rates takes overhead into account, per standards 172 Mbps is achievable in 20 Mhz. [3]Peak rates can exceed 300 Mbps by aggregating multiple 20 MHz carriers planned for LTE Advanced (LTE Rel-10). Peak data rate can exceed 1 Gbps using 4x4

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Standardized, Seamless 3G Interoperability Supported from Day One

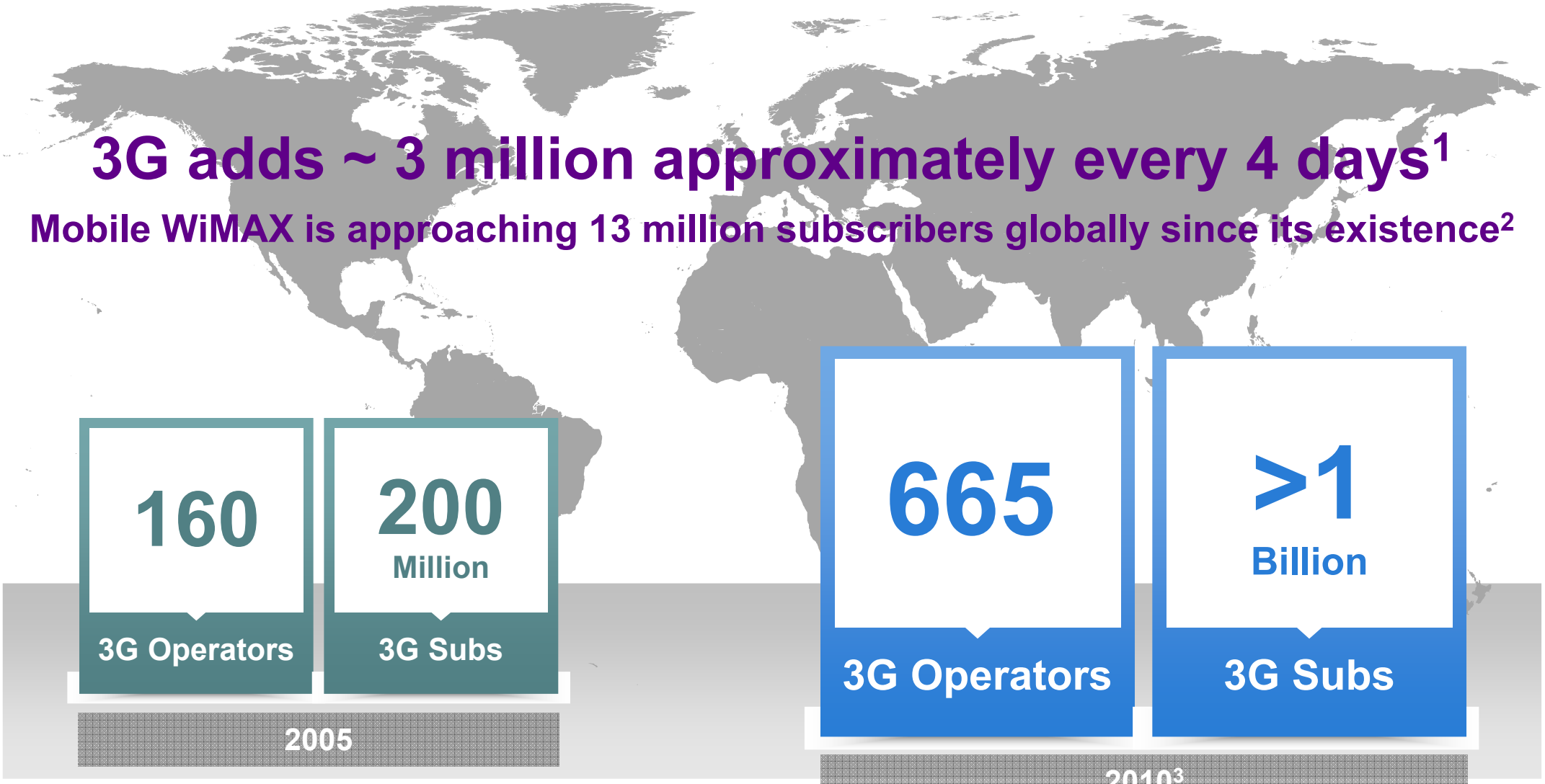
- LTE FDD/TDD Standardized in 2009[1]
- Optimized 3G Interoperability
  - Both with WCDMA/HSPA+ and CDMA2000 1X/EV-DO
- Seamless voice support—3G fallback
  - Circuit Switched FallBack (CSFB) to WCDMA, 1X or GSM to support voice and emergency services

- Leverages same core network as LTE FDD
  - Shares most of FDD design and standard
  - Inherent seamless interoperability with LTE FDD
  - UMTS core network components may be upgradeable to support EPC functionality
- LTE continues on 3G's strong track record of mobility, interoperability and high spectral efficiency



[1]The LTE air interface 3GPP publication was12/2007, but the core network (EPC) was published mid 2008 . LTE R8 ASN.1 was frozen in March 2009 (A stable ASN.1 code is required for commercial implementation of the standard).

3G Operators Committed to Combined 3G and LTE Strategy



3G adds ~ 3 million approximately every 4 days[1]

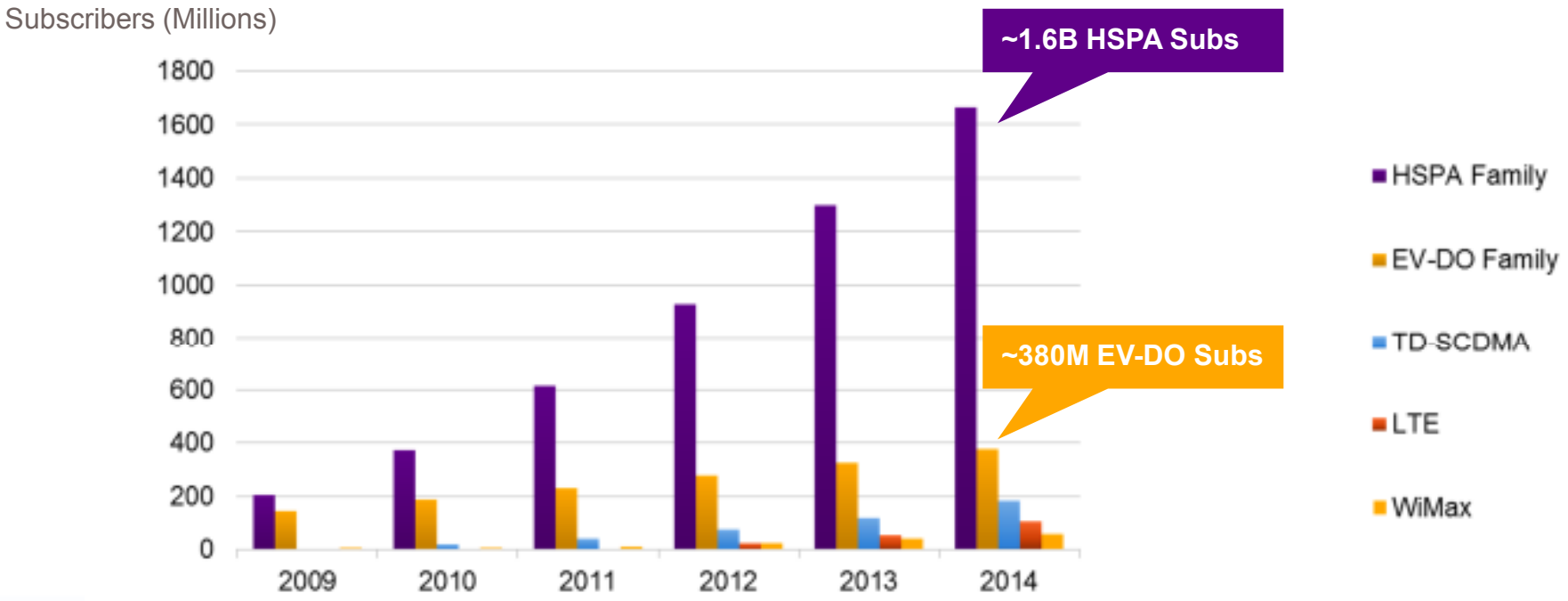
Mobile WiMAX is approaching 13 million subscribers globally since its existence[2]

160	200 Million	665	>1 Billion
3G Operators	3G Subs	3G Operators	3G Subs
2005		2010[3]	

Sources: [1]3G - Wireless Intelligence, as of Q2 '10. [2]3G WiMAX - Maravedis, as of Q1 '11 [3]Wireless Intelligence estimates as of Jul 19 for the quarter ending Jun 30, 2010, GSMA and CDG, Jul 2010 [4]Global Mobile Suppliers Association (GSA) Aug 26, 2010

LTE Leverages Huge 3G Ecosystem

- The 3G ecosystem is committed to LTE and multimode devices
  - 3G Operators committed to combined 3G and LTE Strategy
- LTE leverages 3G's scale to provide similar access to devices
  - More than 4900 3G devices by ~235 vendors (Source: CDG and GSA as of July 2010)
  - ~840 HSPA devices launched in past 9 months—48% growth (Source: GSA July 2010)



Source: 3G subs – Wireless Intelligence (Jul-10), LTE – Avg. of ABI (Jun-10) and Yankee (Mar-10) and WiMax - Avg. of ABI (Mar-10) and Informa (Jun-10)

Note: * 3G includes EV-DO family, HSPA family and TD-SCDMA

LTE TDD Excellent for Hot-Spot Expansions

- Existing networks can leverage LTE TDD for targeted capacity expansions
  - TDD spectrum typical available at higher frequency bands optimal for capacity expansion[1]
  - Excellent indoor complement for small nodes—does not interfere with FDD network
- New LTE TDD networks—plan for small nodes from day one
  - Mix of LTE TDD hot spots (picocells, femtocells) with LTE TDD macro coverage

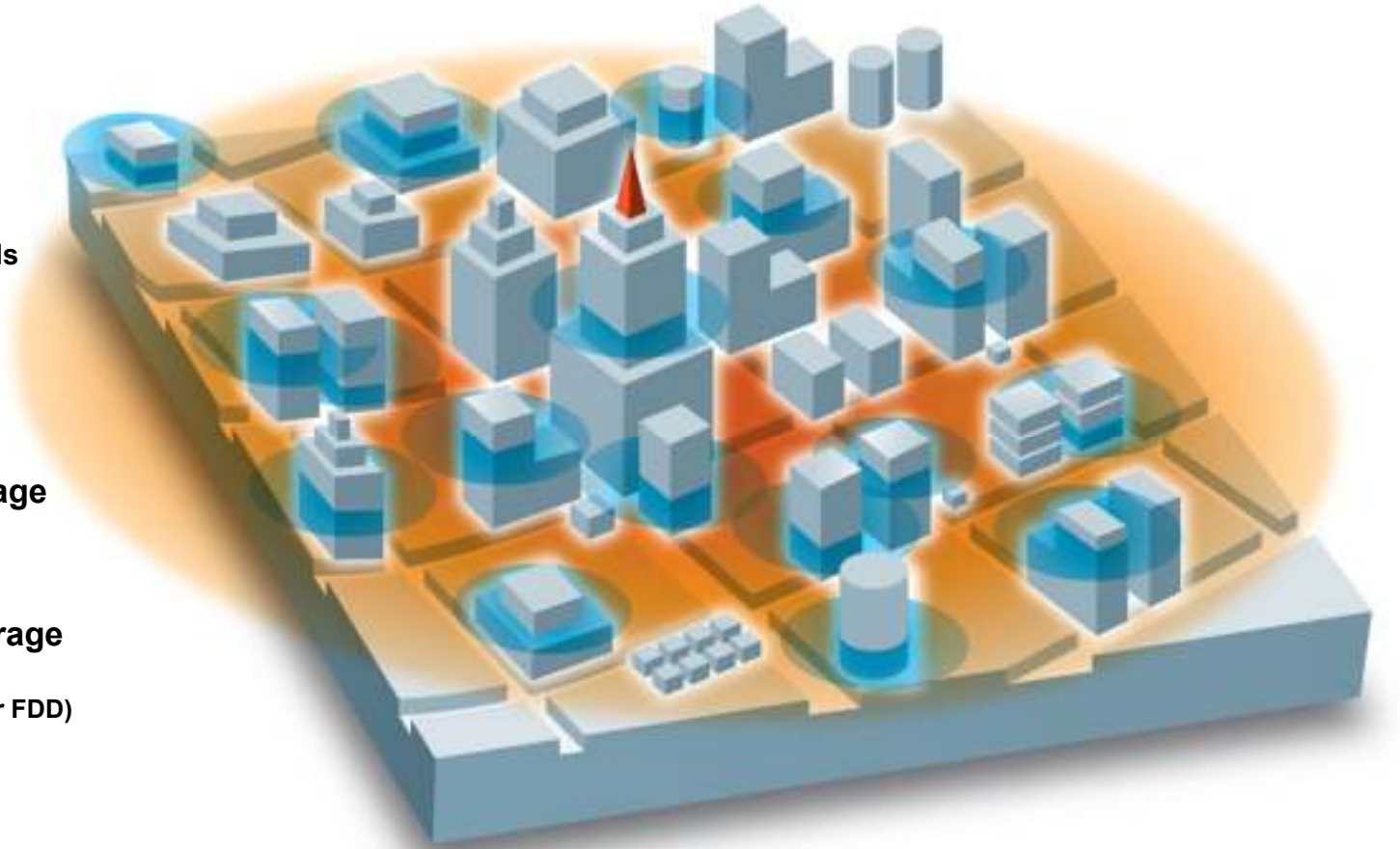
Capacity boost

LTE TDD Hot-spots
E.g. Micro, Pico and Femtocells
(2.3 GHz and 2.5/2.6 GHz)

Wide Area Coverage

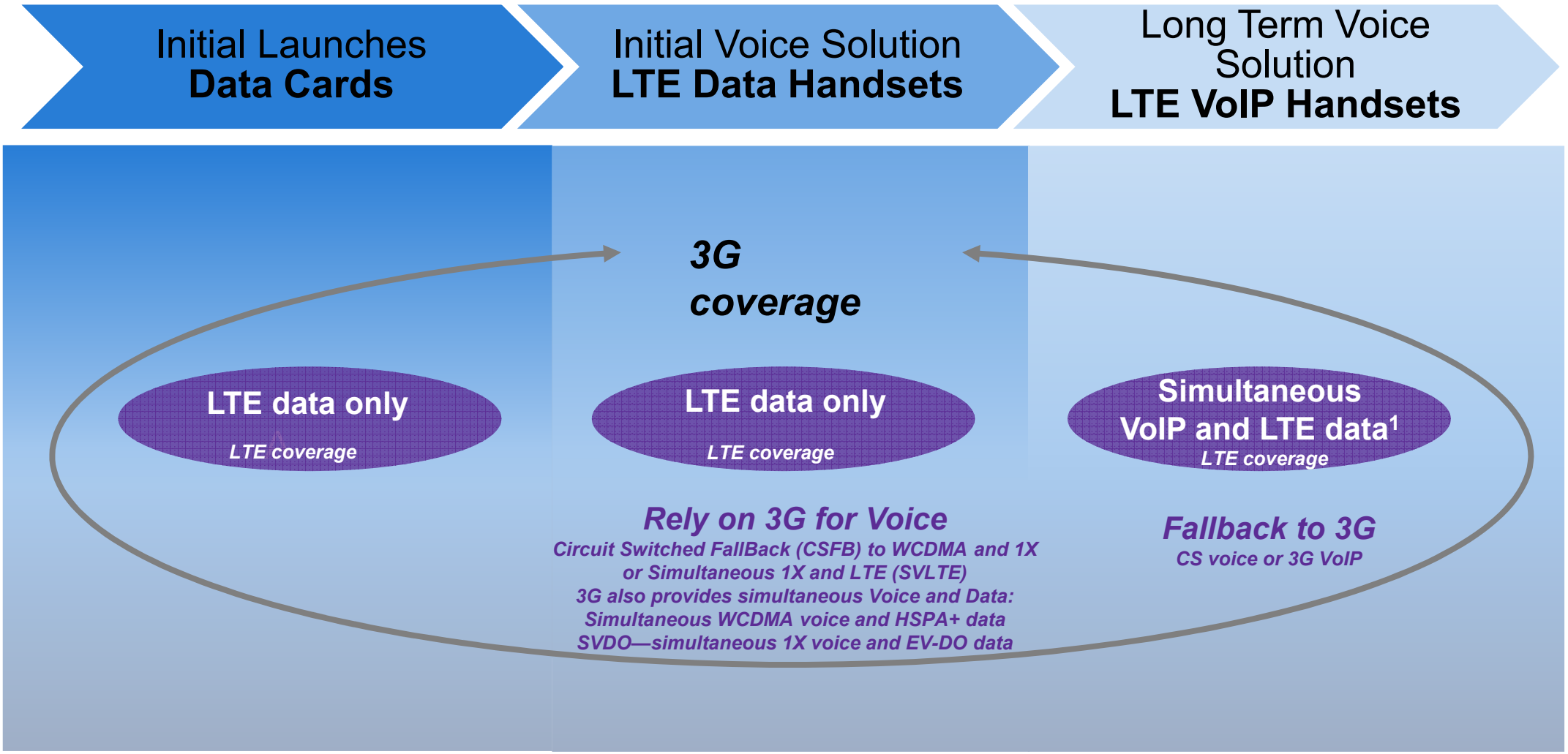
3G FDD Wide Area Coverage
HSPA+ and EV-DO Rev. B
(e.g. 800/900 MHz and 2.1 GHz)

LTE FDD Wide Area Coverage (Or LTE TDD)
(e.g. digital dividend spectrum for FDD)



[1]Note: LTE TDD can provide sufficient coverage, especially for capacity driven macro networks, but provides reduced coverage compared to FDD

LTE Voice Through Fallback to 3G

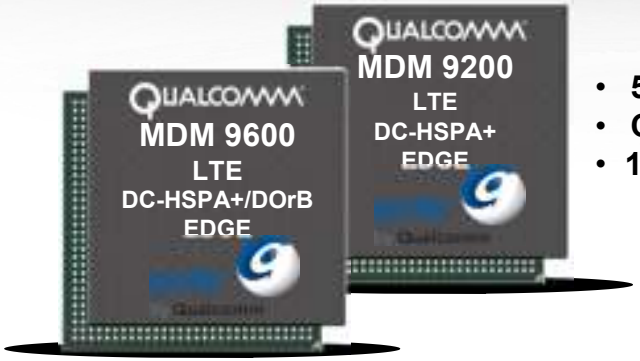


[1]Requires Single Radio-VCC for service continuity.

Common LTE FDD & TDD Chipset Platform

Modems & Data Cards





- 50+ designs by 25+ OEMs
- Commercial 4Q 2010
- 100 Mbps DL/50 Mbps UL

Smartphones & Tablets





- Dual-Core CPU (28nm)
- Superior graphics & multimedia
- Integrated connectivity (WLAN, GPS, Bluetooth, FM)

- MSM8960 launches in 2012
- Handset & tablet launches in 2011 based on (MDM9x00+MSM)

Industry's First LTE/3G Multimode Chipsets

Worldwide LTE TDD Trials in 2010

Worldwide LTE TDD trials

- India BWA 2.3 GHz spectrum for LTE TDD
  - Qualcomm and Ericsson demonstrates LTE TDD mobility in India November 30th 2010
  - Reliance committed to LTE TDD
  - Qualcomm won one 20 MHz slot in key telecom circles for LTE TDD
- China Mobile showcased large-scale LTE TDD trial at the World Expo in 2010
  - China Mobile to establish three separate trial networks in 2010
  - China Mobile is also partnering to establish trial networks overseas, including Taiwan
- Clearwire (USA) conducted LTE trials in 2010 (FDD and TDD)
- Softbank Mobile in Japan is reported to consider LTE TDD
- LTE TDD testing in Ireland
  - With the authorization of regulator ComReg under its trial and test license program

Growing LTE TDD Eco-System

- All major Infrastructure vendors support LTE TDD
  - Examples are Alcatel-Lucent, Alvarion, Ericsson, Huawei, Motorola, Nokia Siemens Networks and ZTE
  - Typically common LTE FDD and TDD Infrastructure products
- Chipset vendors committed to LTE TDD chipsets in 2.3/2.5 GHz
  - Qualcomm, Altair, Sequans, Innofidei, Wavesat, Beceem, Runcom LG, Huawei, Samsung, ST-Ericsson (Source: GSA, Signals Research Group, August 2010)

Sources: GSA GSM/3G Market Update, Aug 2010 and Signals Ahead Volume 6, No. 8 June 16, 2010. Clearwire press release Aug 4th

Summary: LTE TDD is The Global Solution for Unpaired Spectrum

LTE TDD

Complements 3G to Boost Data Capacity
3G provides ubiquitous data coverage, voice services and global roaming

Seamless 3G Interoperability from Day One
LTE continues on 3G's strong track record of mobility and interoperability

Leverages LTE FDD and Huge 3G Ecosystem
Common TDD/FDD standard and design ensures economy of scale

Qualcomm: Common FDD/TDD chipset platform
Multimode chipsets supports LTE FDD & TDD with 3G and its evolution



Thank You

GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

ERICSSON

MOBILE BROADBAND – THE NEXT STEP

Mr. Stephen Coffey, Strategic Product Manager, Mobile Broadband ,Ericsson



MOBILE BROADBAND-THE NEXT STEP

STEPHEN COFFEY
MOBILE BROADBAND
ERICSSON AB

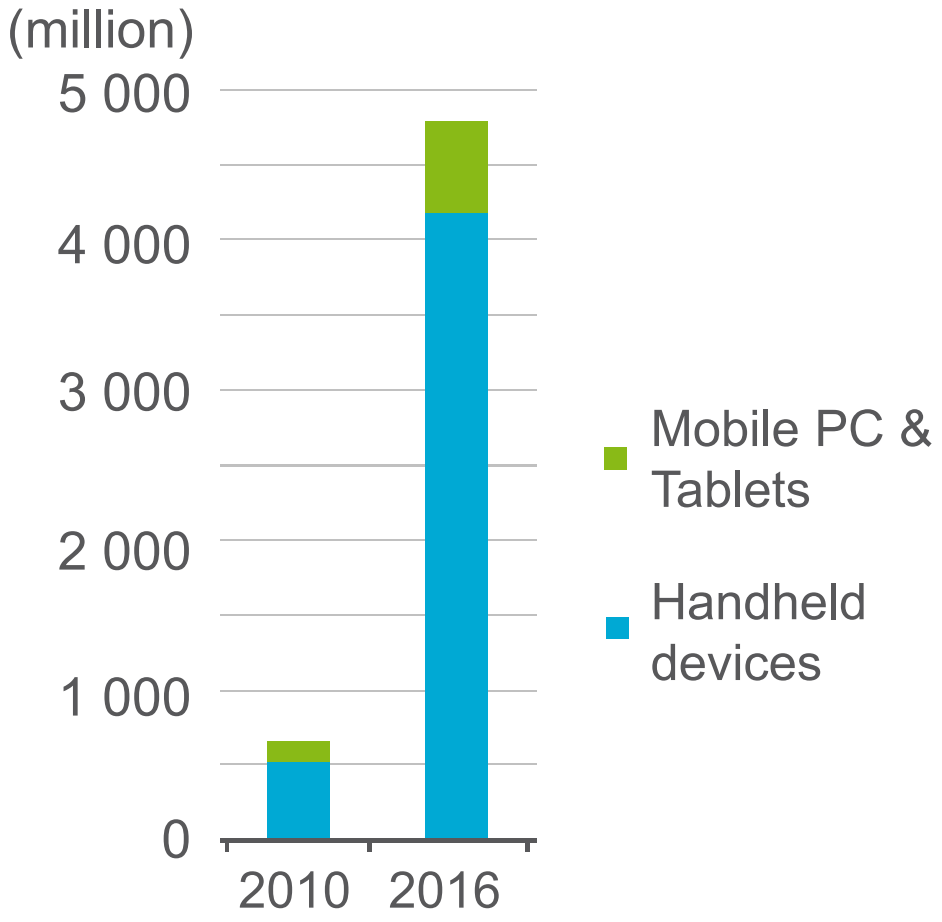
THE NETWORKED SOCIETY - USER EXPERIENCE IS KEY



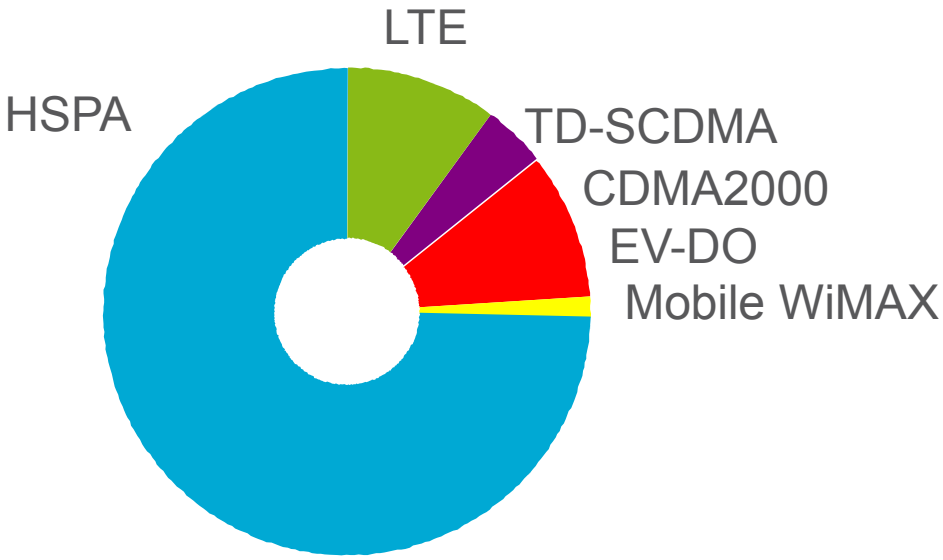
[Anywhere internet 24/7, please]

SMARTPHONES EVERYWHERE

MBB Subscriptions



Technology share 2016



85% of subscriptions on HSPA and LTE in 2016

Source: Ericsson
This slide contains forward looking statements

WINNING MBB STRATEGY

HIGH END & MASS MARKET DEVICES



SERVICE DIFFERENTIATION





NETWORK IS THE DIFFERENTIATOR





NETWORK IS THE DIFFERENTIATOR

NETZTEST 2010

Switzerland

Austria

LAND		Schweiz			Österreich			
Anbieter		Swisscom	Sunrise	Orange	A1 Telekom Austria	Orange	T-Mobile	Hutchison 3G
BREITBAND DOWNLOAD (STADT)								
Anteil > 1Mbit/s	(%)	93,1%	82,6%	46,1%	97,1%	95,1%	77,3%	62,2%
Datentransferrate	(kbit/s)	3926	1824	1458	3802	2365	2384	1683
connect URTEIL max. 500		454 sehr gut	386 gut	279 ausreichend	465 sehr gut	393 gut	388 gut	386 gut

connect TESTSIEGER

connect TESTSIEGER



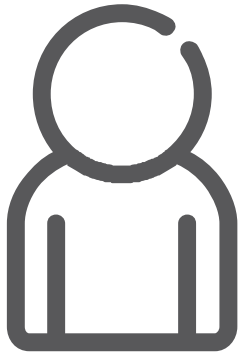
Source: Connect Magazine, October 2010

BEST SMARTPHONE NETWORK



Always on

Smartphone optimized





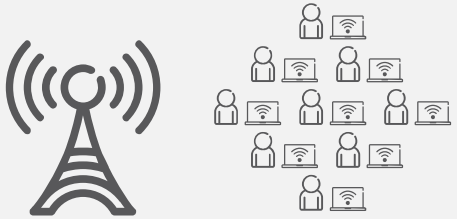
Coverage

Lack of coverage –
Main cause of churn



Speed and
low latency

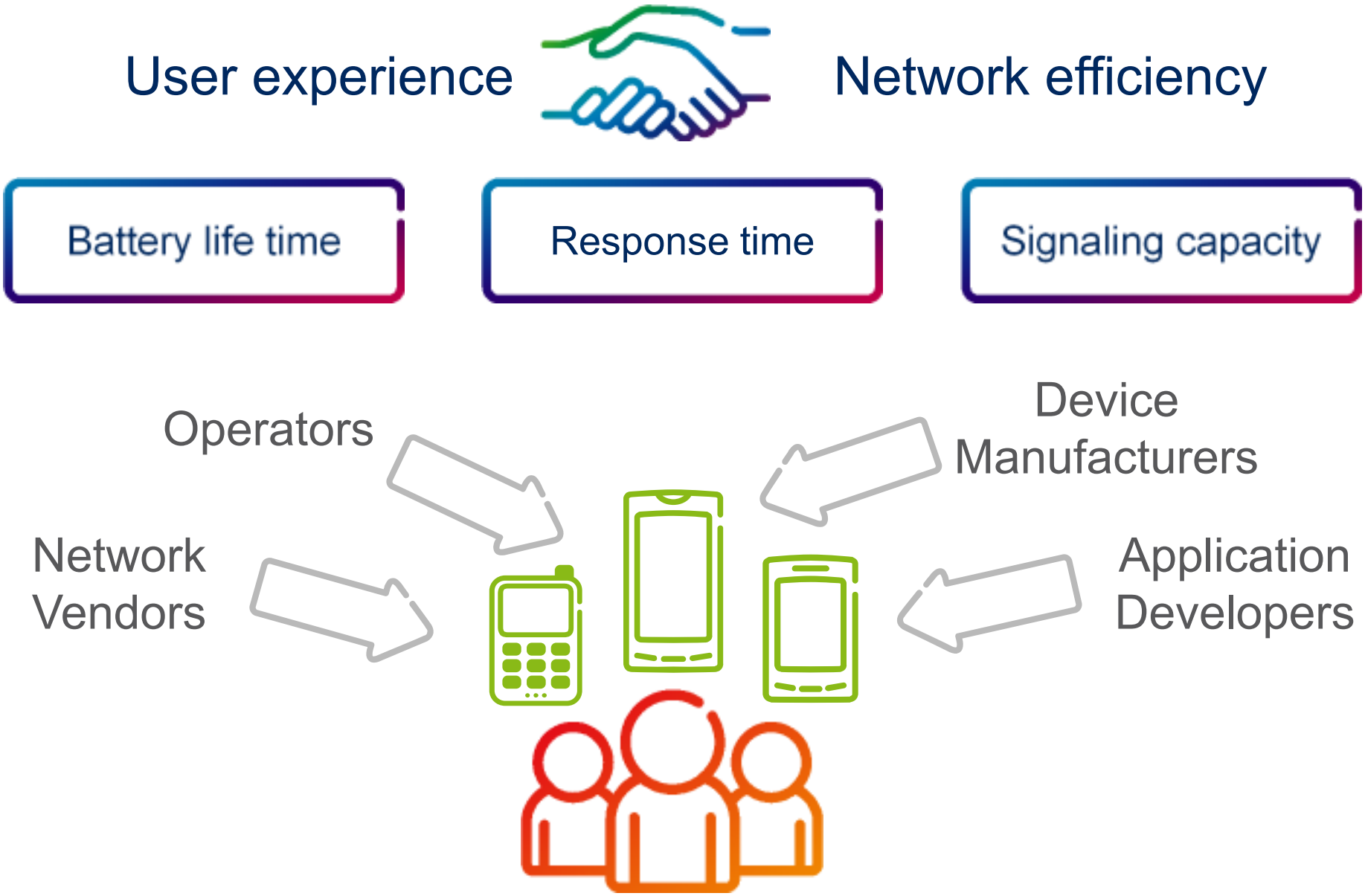
Perceived speed –
Clear differentiator



Capacity

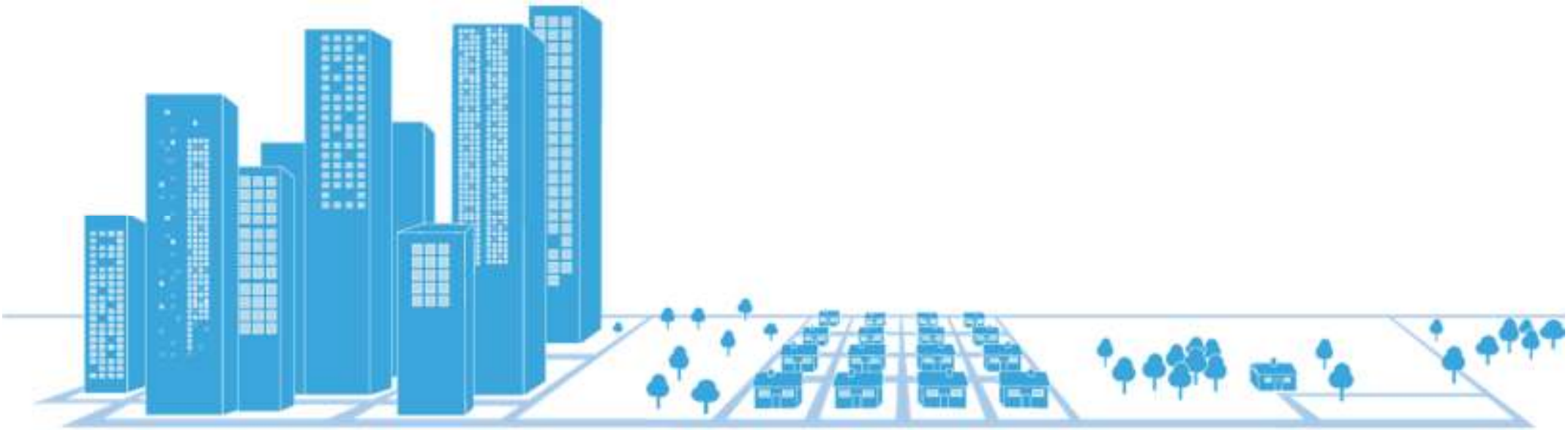
Traffic x2 per year

ALWAYS ON
SMARTPHONE OPTIMIZED



ANYWHERE COVERAGE

Urban Suburban Rural



LTE

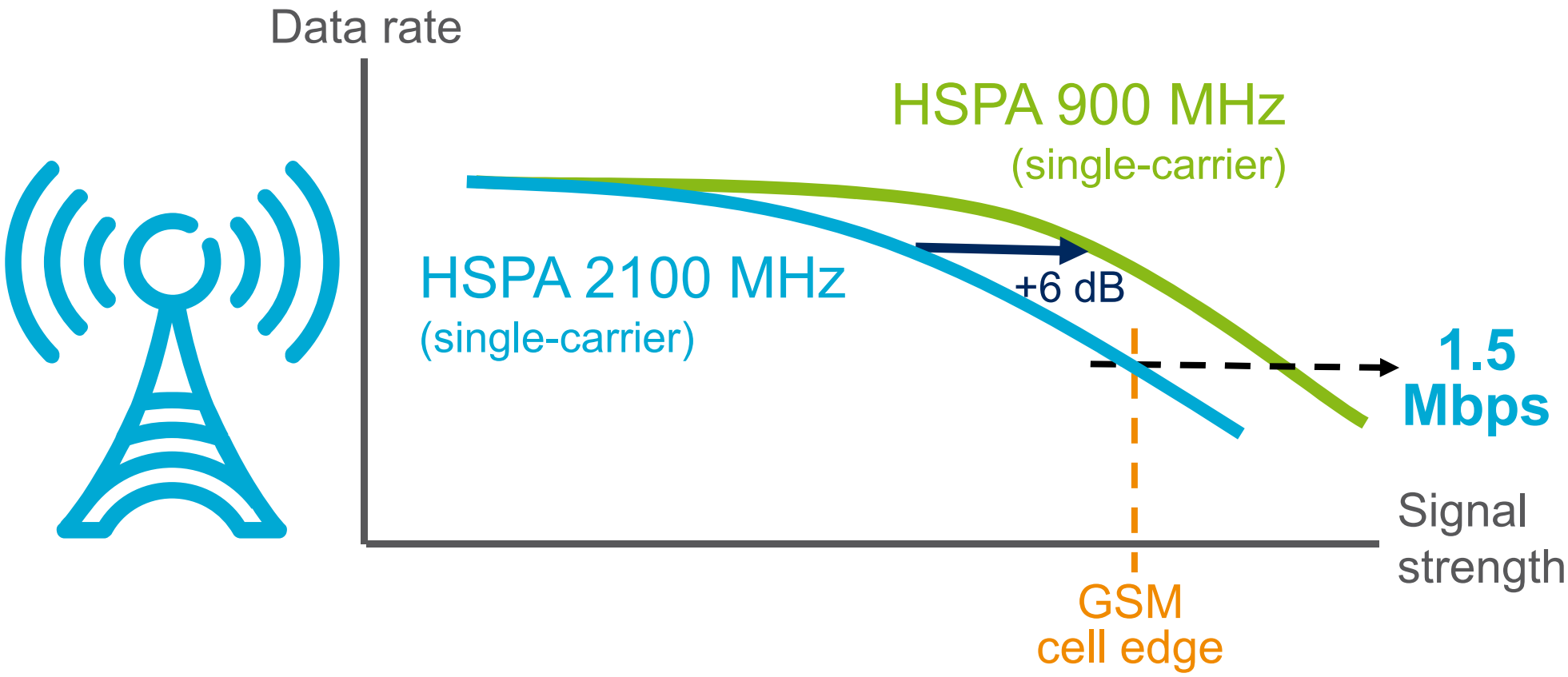
Low bands

HSPA / HSPA Evolution

EDGE / EDGE Evolution

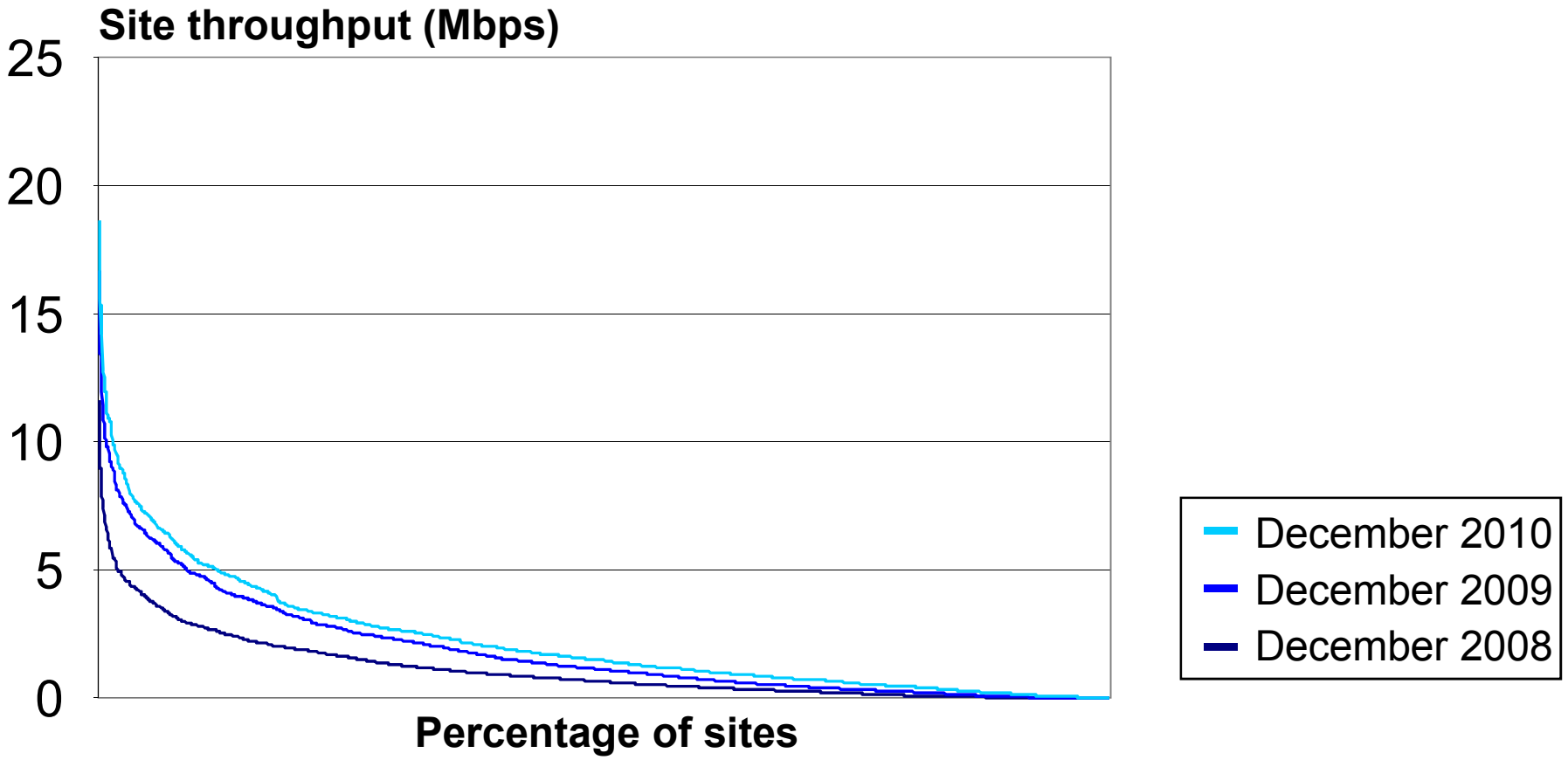
Smartphones demand coverage everywhere

COVERAGE



HSPA on every GSM site
Low band / High band

MANAGEABLE CAPACITY GROWTH

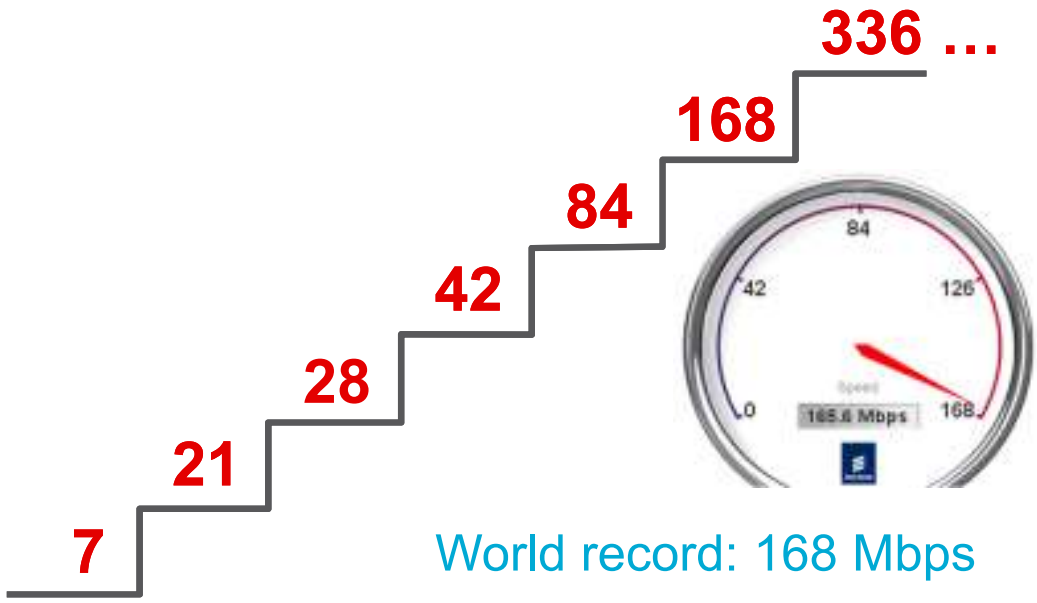


Source: MBB operator with high Smartphone and notebook penetration

3x traffic volume in 2 years
High capacity potential

NEED FOR SPEED AND LOW LATENCY

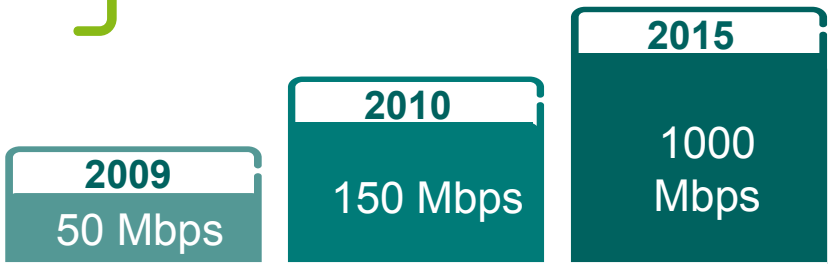
HSPA EVOLUTION



World record: 168 Mbps

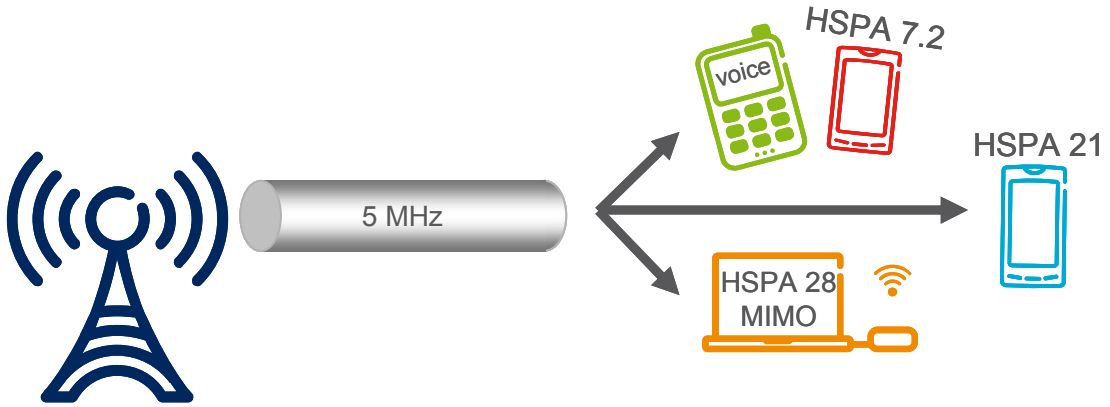
LTE

150 million people covered today

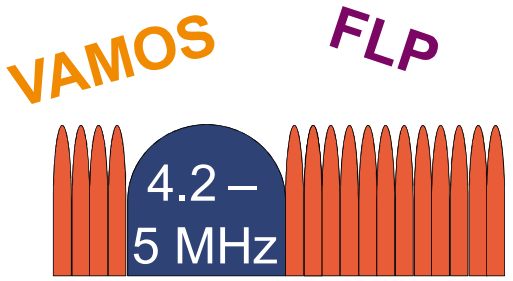


HIGH NETWORK EFFICIENCY

- HSPA carrier efficiency
  - All device types on all carriers



- Tight GSM spectrum usage
  - Allows re-farming for HSPA / LTE



900 MHz band

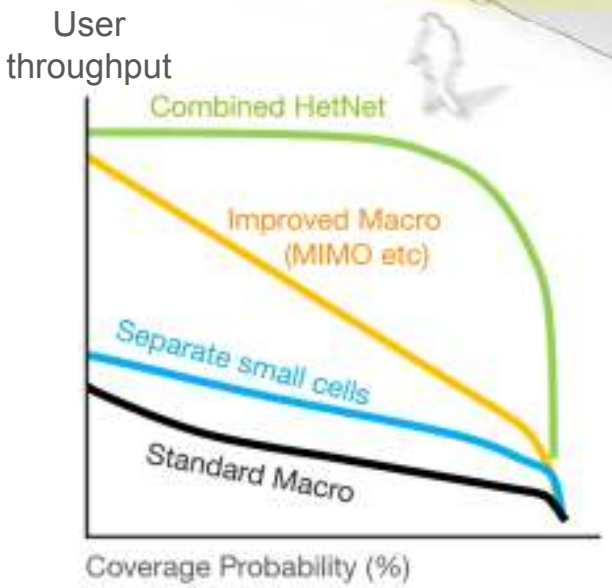
- High-performing base stations
  - Multi-standard (GSM / HSPA / LTE)

AIR:
Antenna
Integrated
Radio



THE BEST MOBILE BROADBAND





The networked society -
User experience is key











ERICSSON

GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011



Economic Impact on selected sectors

Kunal Bajaj, Director, Partner & Director India, Analysys Mason

Presentation for GSMA

Impact on Education and Healthcare Sector Revenue from a 10% Increase in Broadband Penetration in India

20 May 2011

Ref: 19927-195

analysys mason

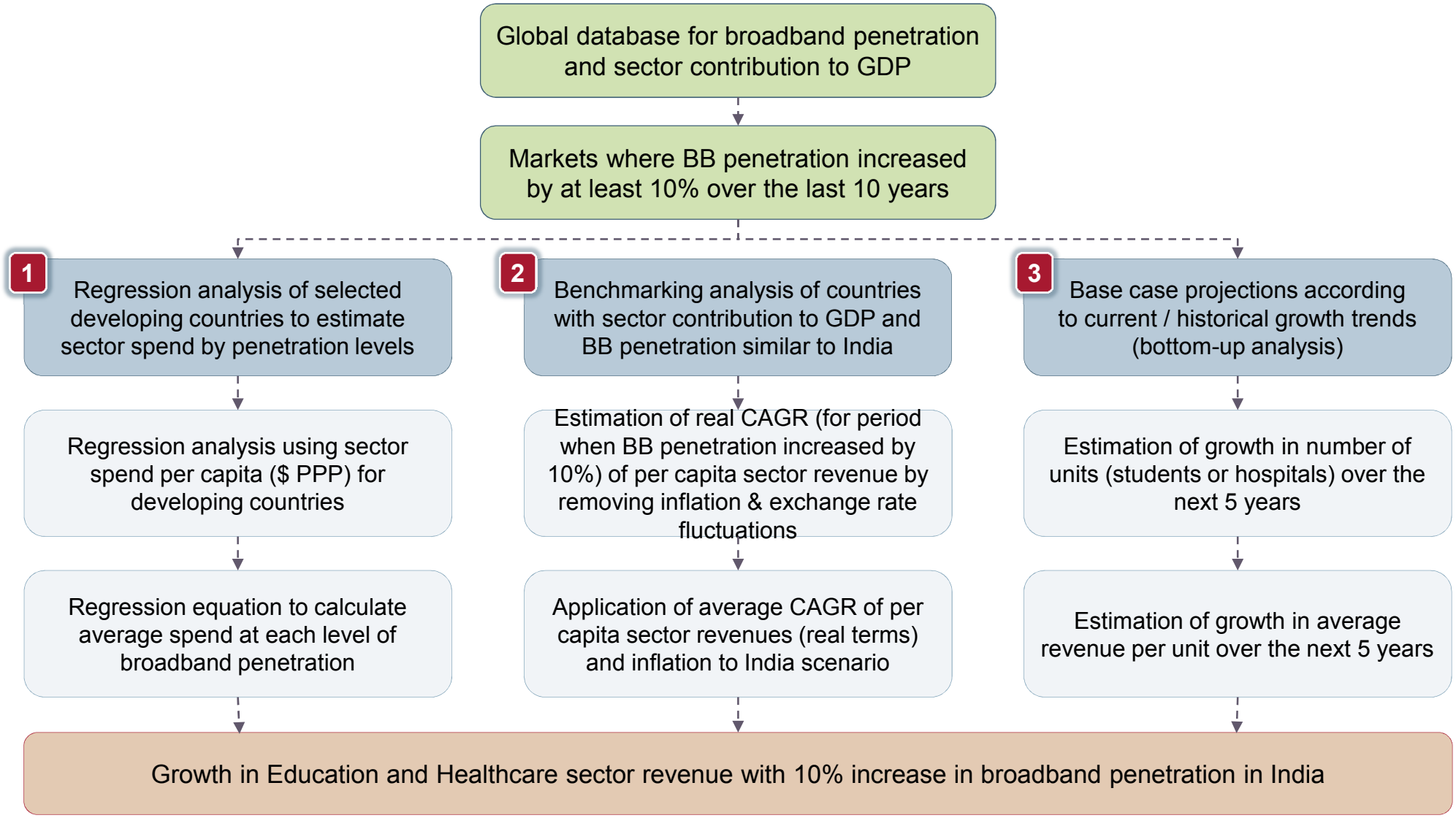
Contents

Approach and Results Summary

Overview of Education Sector and Impact of Broadband

Overview of Healthcare Sector and Impact of Broadband

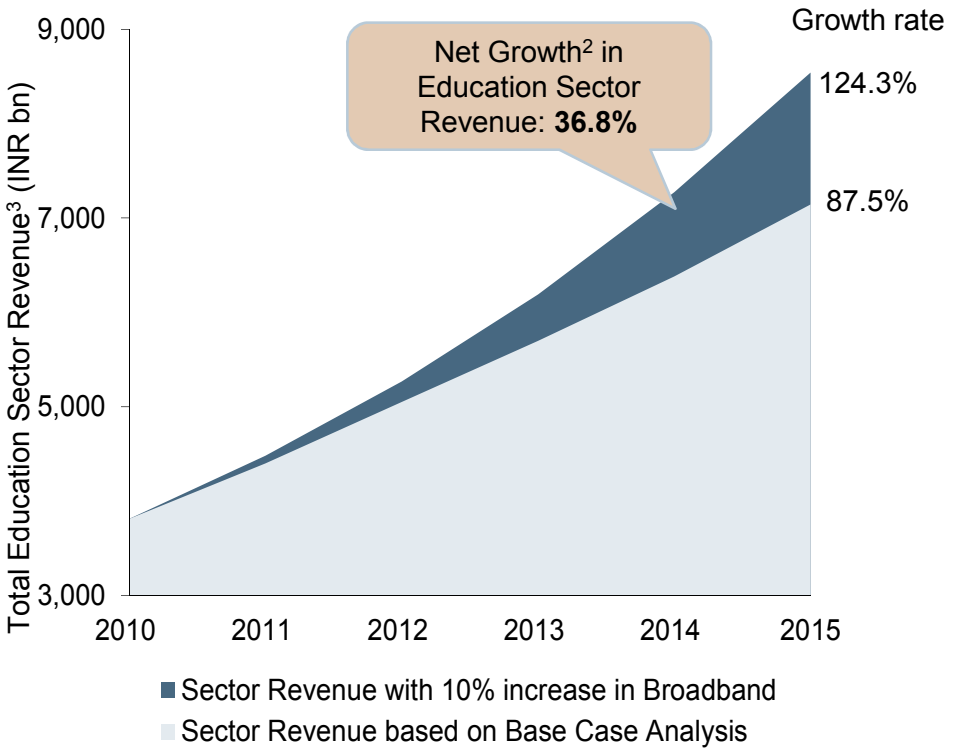
We used three approaches to estimate growth in education and healthcare sector revenue for a 10% increase in BB penetration



Source: Analysys Mason

A 10% increase in broadband penetration is expected to result in a 37% growth in education sector revenues…

Impact of 10% Increase in Broadband Penetration on Education Sector Revenue in India[1]



BB Penetration	0.9%	1.7%	3.5%	6.2%	9.5%	12.5%

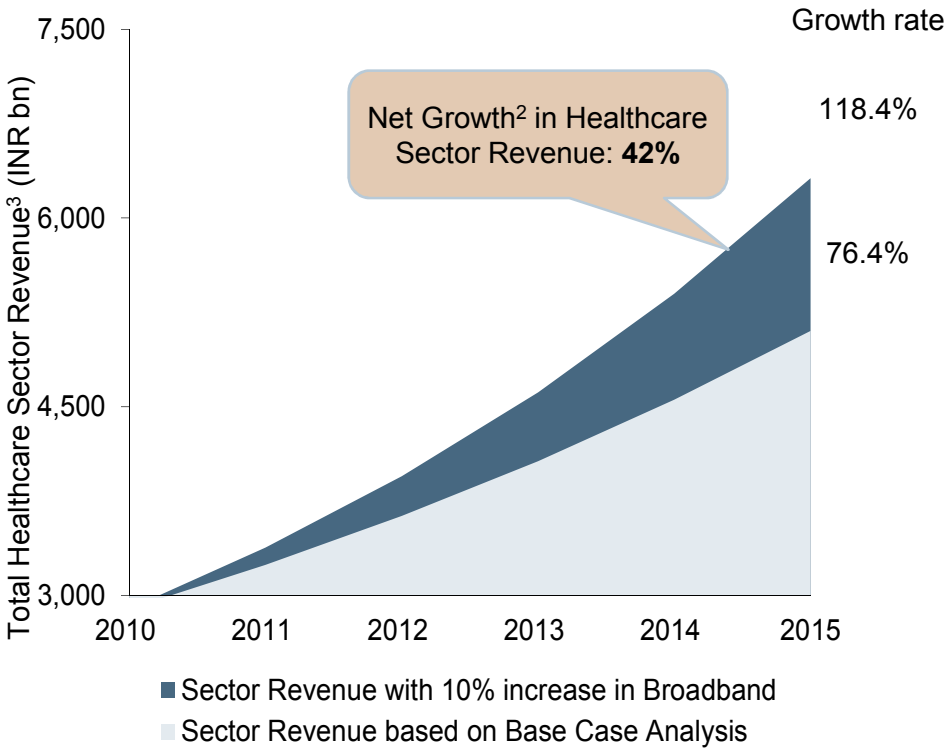
Approach 1: Regression analysis of selected developing countries (on PPP basis)	
Growth in education sector revenue	*95.6%*
Approach 2: Benchmarking analysis of countries similar to India in terms of sector contribution to GDP and broadband penetration (using per capita data)	
Growth in education sector revenue	*124.3%*
Approach 3: Base case projections according to current / historical growth trends	
Growth in education sector revenue	*87.5%*

Note: 1. Based on Approach 2: Benchmarking analysis of similar countries; 2. Net growth due to various factors including increase in broadband penetration; 3. Sector revenue have been estimated in INR to avoid exchange rate fluctuations

Source: Analysys Mason, TRAI

… and 42% growth in healthcare sector revenues in India

Impact of 10% Increase in Broadband Penetration on Healthcare Sector Revenue in India[1]



BB Penetration	0.9%	1.7%	3.5%	6.2%	9.5%	12.5%

Approach 1: Regression analysis of selected developing countries (on PPP basis)	
Growth in healthcare sector revenue	*131.3%*
Approach 2: Benchmarking analysis of countries similar to India in terms of sector contribution to GDP and broadband penetration (using per capita data)	
Growth in healthcare sector revenue	*118.4%*
Approach 3: Base case projections according to current / historical growth trends	
Growth in healthcare sector revenue	*76.4%*

Note: 1. Based on Approach 2: Benchmarking analysis of similar countries; 2. Net growth due to various factors including increase in broadband penetration; 3. Sector revenue have been estimated in INR to avoid exchange rate fluctuations

Source: Analysys Mason, TRAI

Contents

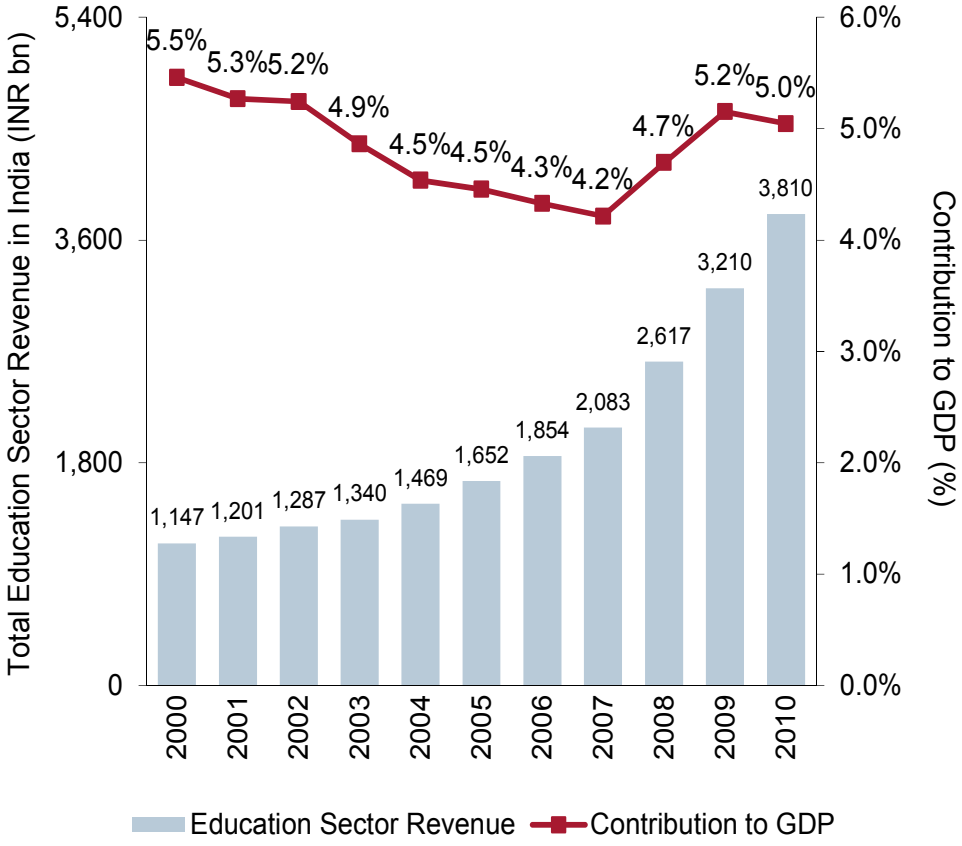
Approach and Results Summary

Overview of Education Sector and Impact of Broadband

Overview of Healthcare Sector and Impact of Broadband

Education spend in India has increased from INR 1,147 bn in 2000 to INR 3,810 bn in 2010, and currently contributes to ~5% of GDP

Education Sector Revenue[1] (INR bn) and Contribution to GDP in India (%)



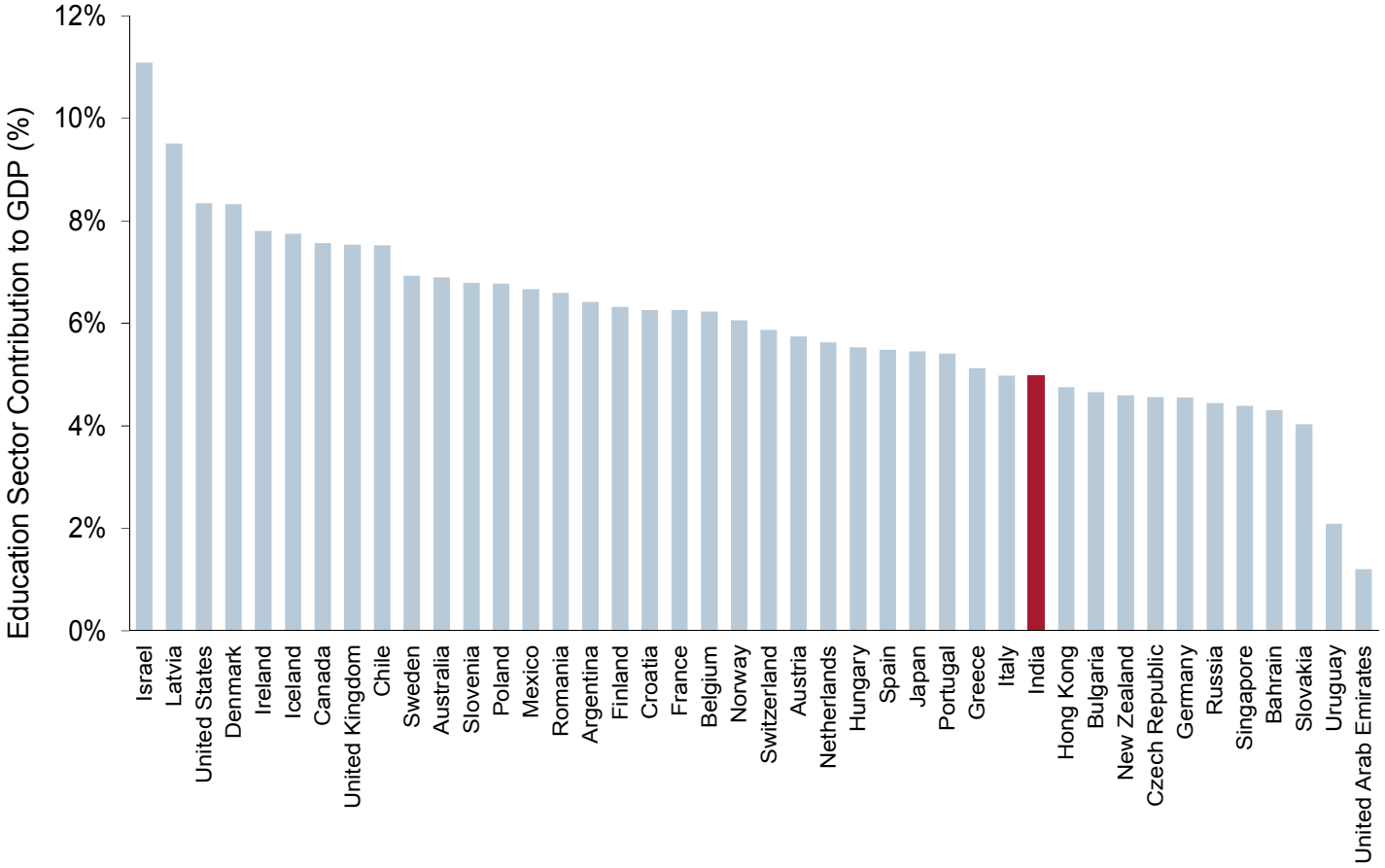
- Number of students enrolled in schools / colleges increased from ~99 mn in 2000 to ~190 mn in 2010
  - ~40% of population between 5-24 years age is enrolled in 2010, as compared to ~23% in 2000
  - The government of India aims to increase the GER in higher education to 20% by 2017 from current 14%
  - Spend per student admitted has also increased from INR 11.6 K in 2000 to INR 20.2 K in 2010
- This growth is primarily driven by public investment in building schools and providing subsidized education through initiatives such as Sarva Shiksha Abhiyan (SSA)
- There has also been an increase in the number of private schools and colleges, online and correspondence courses and partnerships with corporate institutes

Note: 1. Includes both public and private sector revenue. Private sector revenue covers educational services only. It does not include expenditure on educational materials, such as books and stationery or education support services, such as transport services, catering services and accommodation services etc. It includes education by radio or television broadcasting

Source: Analysys Mason, Euromonitor, MHRD, Industry Inputs

In majority of global markets where BB penetration has increased by 10%, the sector contribution to GDP is between 4% and 8%

Education Sector Contribution[1] to GDP in International Markets (2010)



- Globally, 41 markets have witnessed at least 10% increase in their broadband penetration between 1999 and 2010
- In developing countries, current education spend per capita varies between USD 250 and USD 1000, while in developed countries, it varies between USD 1,800 and USD 4,000

Note: 1. Includes both public and private sector revenue

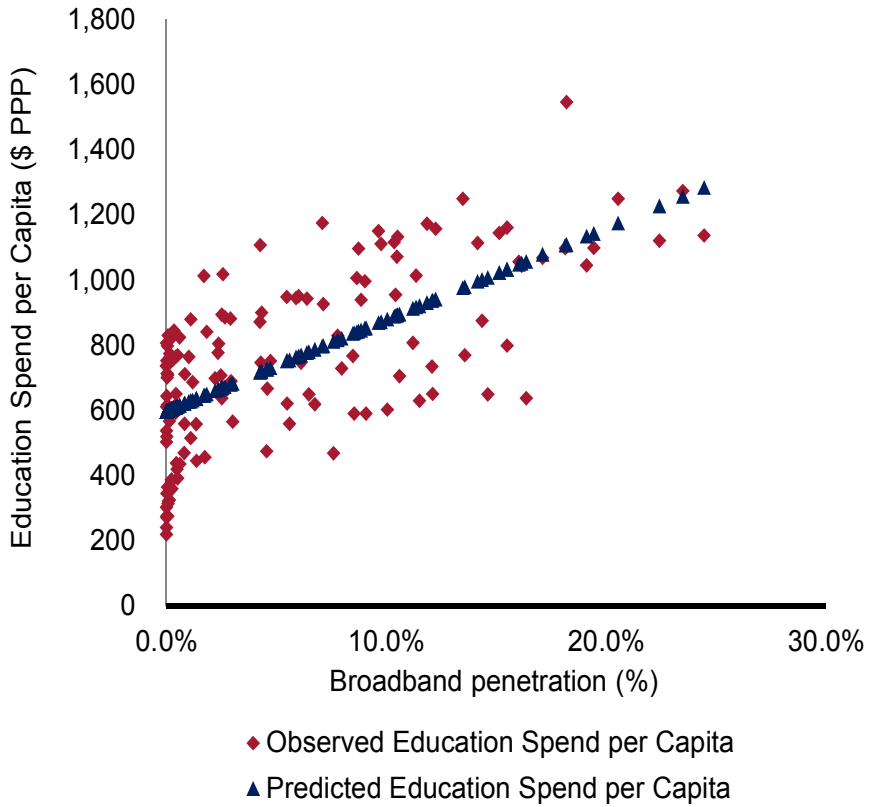
Source: Analysys Mason, Euromonitor

Regression analysis suggests a 96% growth in education sector revenue for a 10% increase in broadband penetration

1 *Regression Analysis*

Approach for Regression Analysis of Education Sector Growth in Selected Developing Countries

Regression equation → y = 2,806x + 599



- Out of the 41 countries which had experienced an increase of 10% broadband penetration over the last 10 years, the education spend per capita of developing countries (19) was analysed
- A regression analysis was performed on the data from 12 developing countries (after removing 7 outliers[1]) to obtain a regression equation to calculate average spend ($ in PPP) at each level of broadband penetration
- Based on regression analysis, it was observed that India's education sector could grow from INR 3,810 bn currently to INR 7,454 bn for a 10% increase in broadband penetration

- Education Sector Revenue Growth: **95.6%**

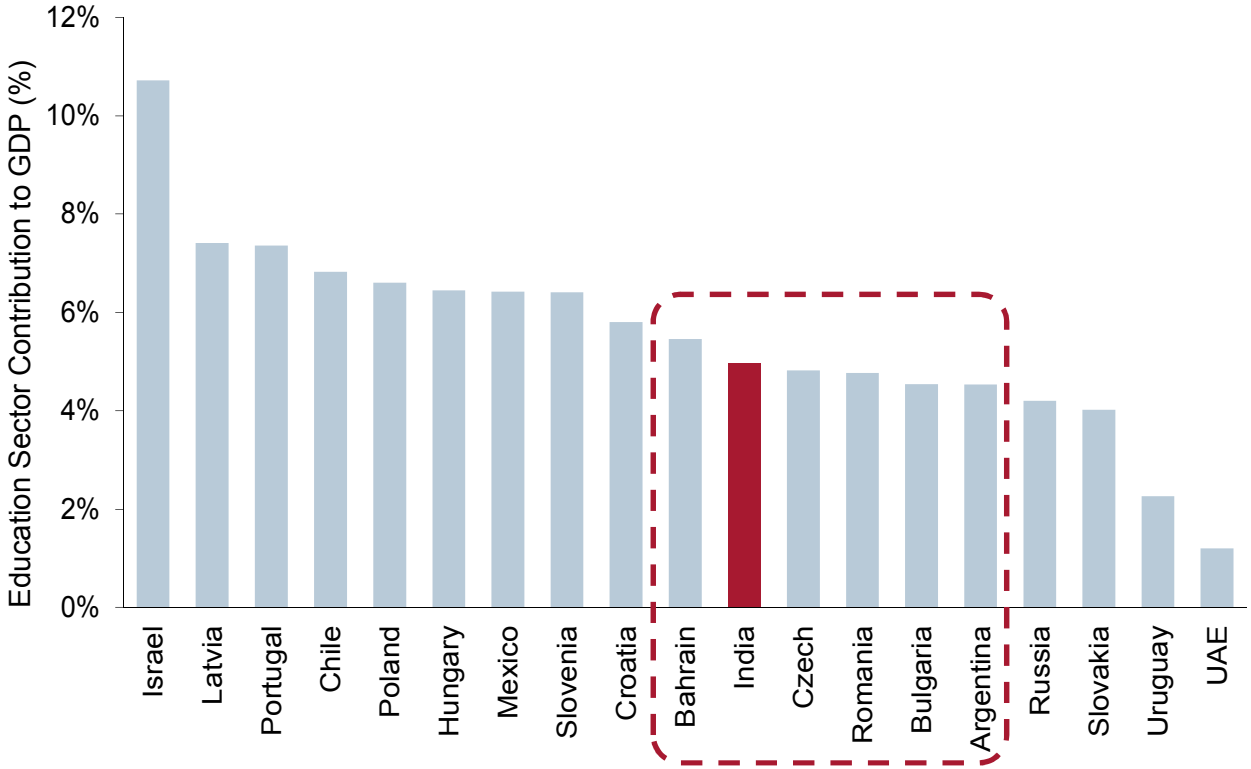
Note: 1. Outliers includes countries with an already high or low spend on education (by PPP)

Source: Analysys Mason, Euromonitor

There are five developing countries which had similar BB penetration (1%) & sector contribution (5%) parameters as India

2 Benchmarking Analysis

Contribution of Education Sector to GDP at ~1% Broadband Penetration[1] for Selected Developing Countries



Developing countries which have witnessed at least 10% growth in broadband penetration over 2000-2010[2]

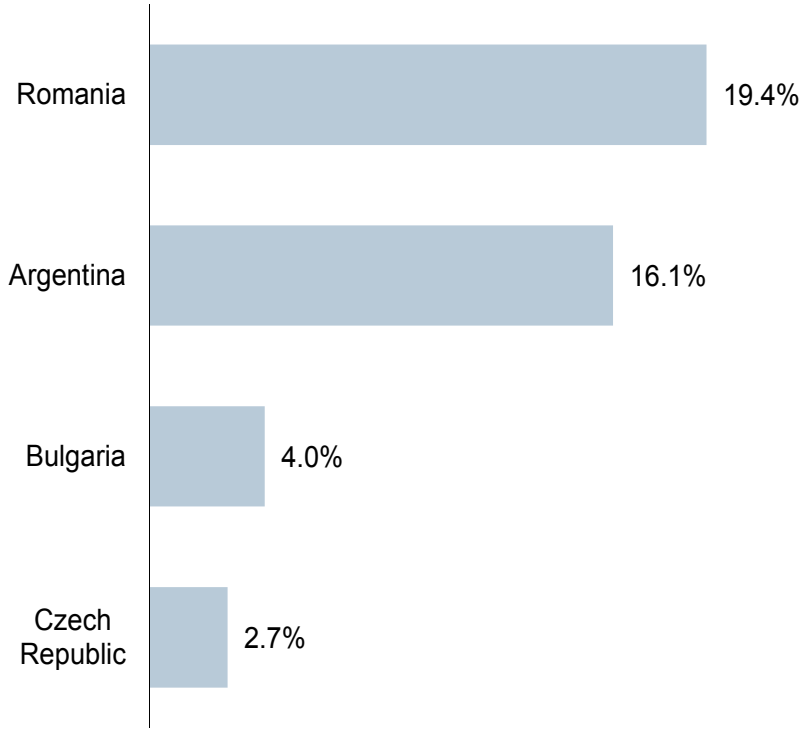
- Selected developing countries are further filtered to identify countries which had revenue contribution of education sector to GDP at ~5% when their broadband penetration was ~1%
- These countries represent the impact of broadband on the education sector at different stages of development of broadband (in terms of technology and bandwidth availability) and ICT enabled learning market

Note: 1. Each country had ~0.9% broadband penetration at different point of time; 2. Duration for a 10% increase in broadband penetration varies for each country

Source: Analysys Mason, Euromonitor

These countries have witnessed 3% - 19% real CAGR in education spend with a 10% increase in BB penetration

CAGR[1] of Education Sector Revenue per Capita with 10% increase in Broadband Penetration



CAGR in real education revenue per capita after adjusting for fluctuations in inflation and currency exchange rate

Education Sector Growth Drivers

- Improvement in quality of education through faculty training and curriculum development
- Increased focus on higher education in terms of opening of new colleges, universities and improvements in the upper-secondary vocational programs
- Government initiatives such as decentralization of control as well as introduction of subsidies for private schools
- Emergence of technological upgrades to connect institutions through ICT for better monitoring and management
- Growth in distance learning and online universities

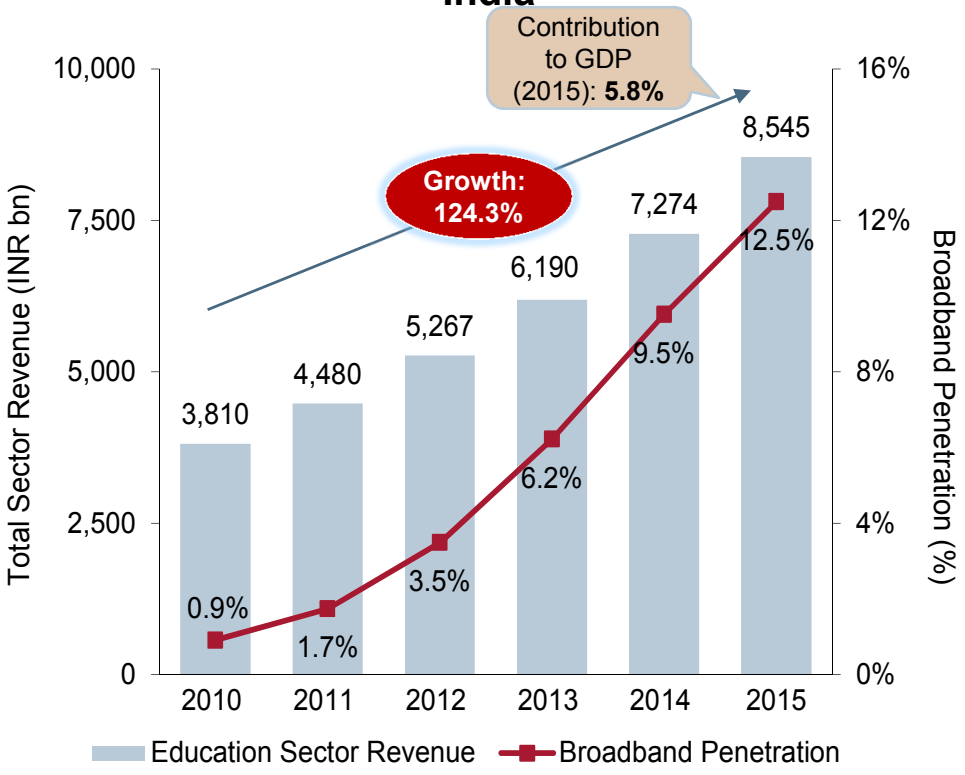
- Average nominal CAGR: **16.8%**
- Average real growth (after adjustment for inflation and currency exchange rate): **10.5%**

Note: 1. CAGR for period when broadband penetration in that country increased by 10%. Includes growth rate of per capita spend after adjusting for inflation and exchange rate fluctuations. Bahrain is not considered for the analysis due to disproportionate increase in population

Source: Analysys Mason, Euromonitor

Based on the analysis of these countries, India's education sector can realize 124% growth in education sector revenues

Growth in Education Sector Revenue (INR bn) with 10% Increase in Broadband Penetration in India



Growth Rate Calculation (2010 – 2015)

- Real CAGR of per Capita Spend: **10.5%**
- Average inflation from 2010 - 2015: **6.2%**

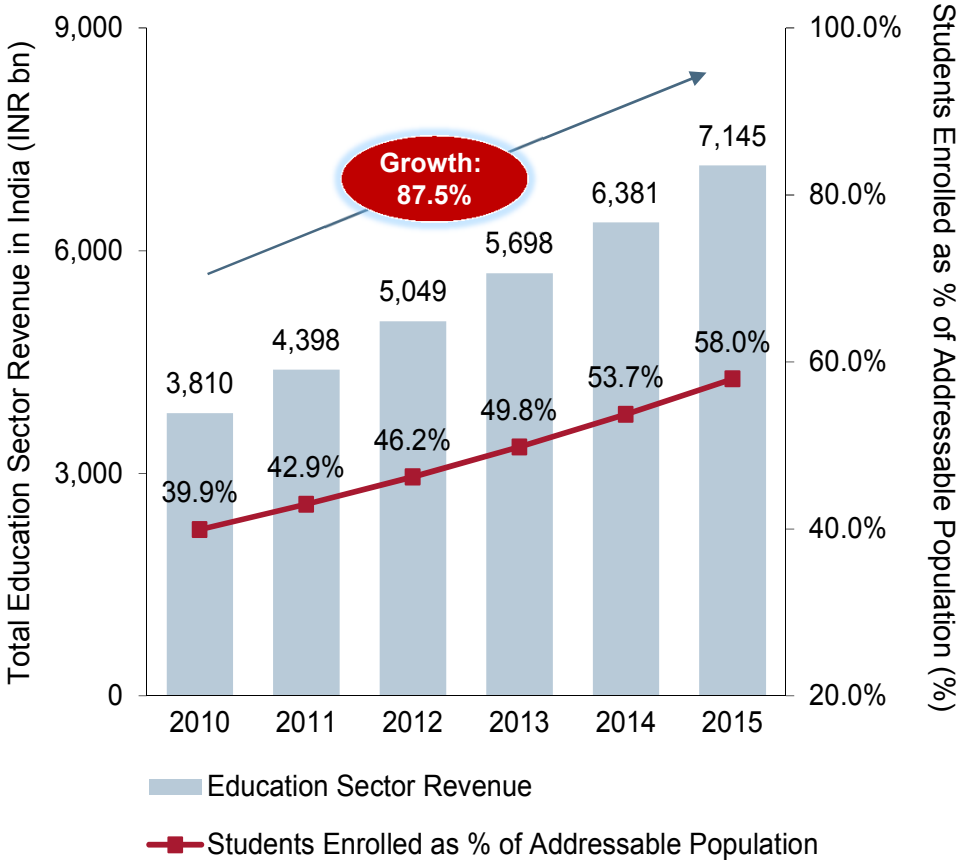
- Increase in education sector revenue with increase in broadband penetration will primarily be driven by growth in distance learning and e-learning market
- Number of students enrolled in distance higher education is growing at 35% currently, and is continue to grow with increased broadband penetration tier 3 and 4 towns
- This growth will be supported by initiatives by government and private sector for driving adoption of technology enabled learning
  - Government has been making significant investments in building National Knowledge Network to enable effective delivery of distance education and support advanced research
  - Similarly, private institutions are adopting ICT to offer online courses and enable multimedia based teaching

Source: Analysys Mason, Euromonitor, TRAI, Industry Inputs

Based on current growth trend, education sector revenue in India is expected to grow to INR 7,145 bn in 2015

3 Base Case Analysis

Education Sector Revenue (INR bn) and Student Enrolled as % of Addressable Population[1] (%)



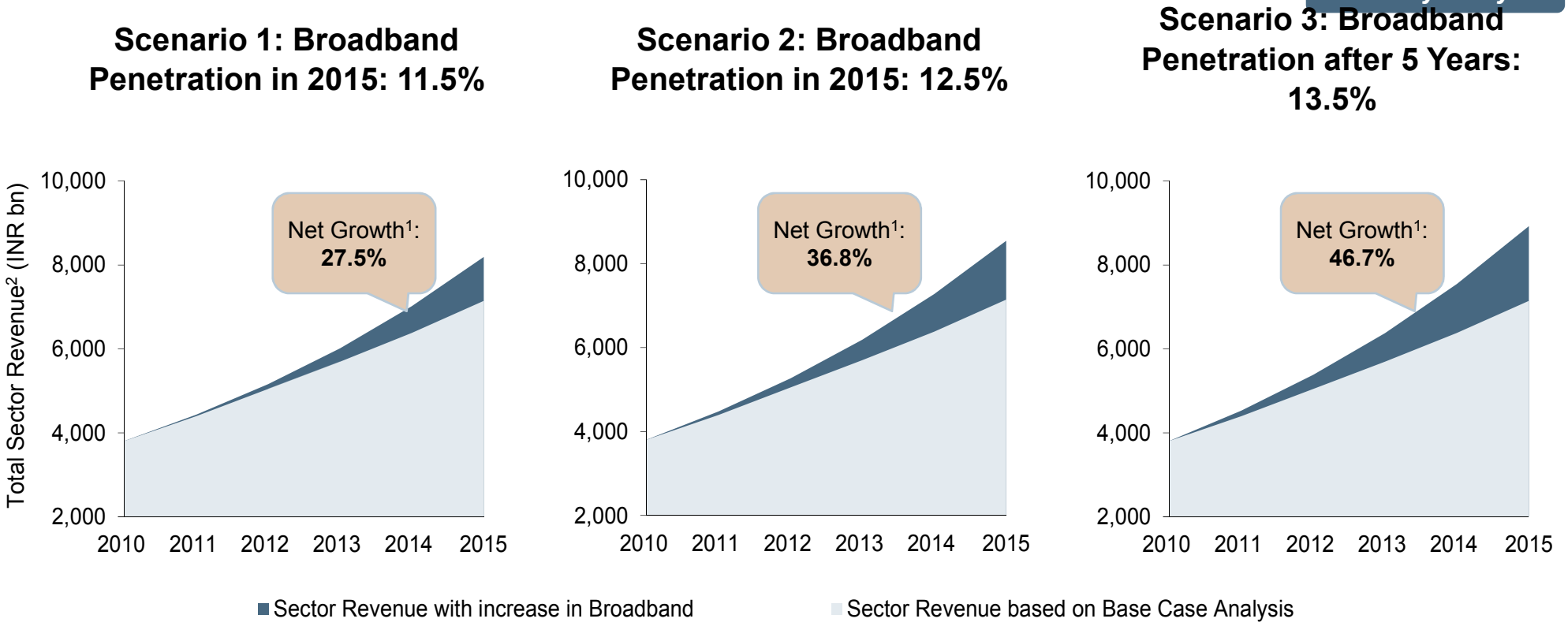
- Number of students enrolled have increased at a CAGR of 8% over the last 10 years to reach 188.9mn in 2010
- Student enrolment is assumed to grow at the same CAGR of 8% from 2010 to 2015
  - Share of addressable population (between 5 years and 24 years) enrolled in schools and colleges is expected to grow from ~40% in 2010 to ~58% in 2015
- Revenue per student enrolled is expected to vary with inflation from 2010 to 2015

Note: 1. Population between age 5 and 24 years

Source: Analysys Mason, Euromonitor, UN Data

Impact of growth drivers of sector revenue expected to increase with higher increase in broadband penetration in 5 years

Sensitivity Analysis



Growth drivers of education sector revenue, including broadband penetration, are expected to have an increasing impact on revenue with higher broadband penetration in 5 years

Note: 1. Net growth due to various factors including increase in broadband penetration; 2. Sector revenue have been estimated in INR to avoid exchange rate fluctuations

Source: Analysys Mason

Contents

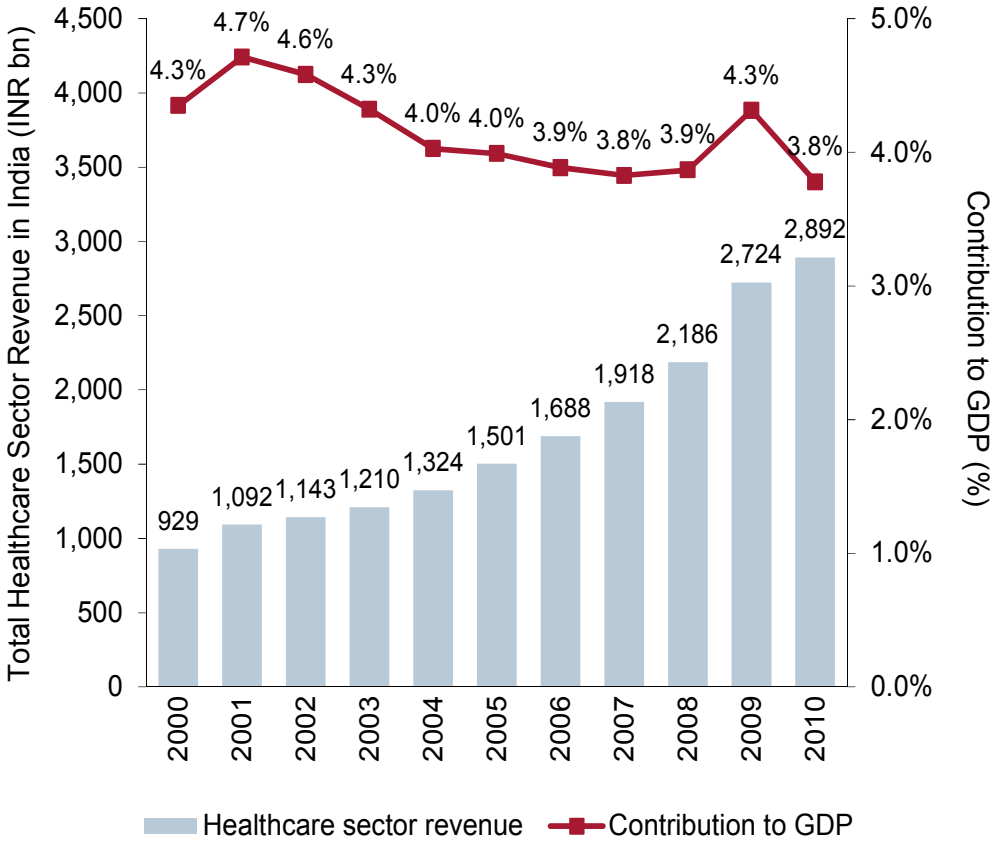
Approach and Results Summary

Overview of Education Sector and Impact of Broadband

Overview of Healthcare Sector and Impact of Broadband

Healthcare spend in India has increased from INR 929 bn in 2000 to INR 2,892 bn in 2010 and currently contributes ~3.8% of GDP

Healthcare Sector Revenue[1] (INR bn) and Contribution to GDP in India (%)



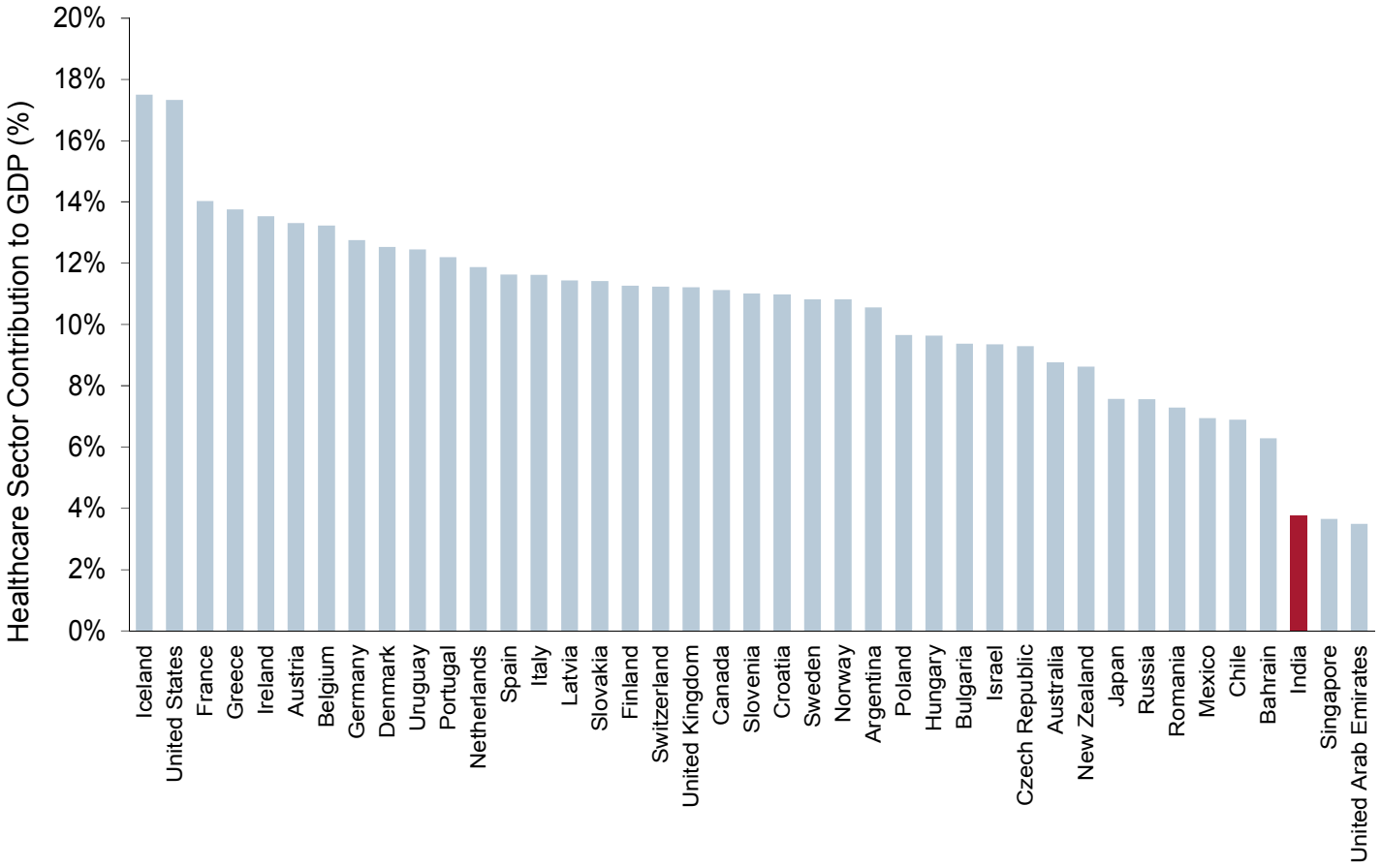
- Healthcare spend per capita has increased at a CAGR of 10.4% over 2000 and 2010 to grow from INR 898 to INR 2,408
- As of Sept, 2010, government had established 146,036 health sub-centres, 23,458 primary health centers and 4,276 Community health centers in the country
- However, private spending dominates the total healthcare sector revenue in India, contributing ~75% of total healthcare sector revenue
- Private spending accounts for over 75% of the human resources and advanced medical technology and 68% of all hospitals (15,097)
- Further, healthcare facilities are limited to top few cities with 80% of doctors catering to top 20% of population

Note: 1. Includes both public and private sector revenue

Source: Analysys Mason, Euromonitor, Ministry of Health and Family Welfare, Industry Inputs

This is much lower than the contribution of healthcare sector to overall GDP for a majority of other international markets in 2010

Healthcare Sector Contribution[1] to GDP in International Markets (2010)



- Developed countries are characterised by relatively higher spends as % of GDP and per capita on healthcare
- For developing countries, current healthcare spend per capita varies between USD 500 and USD 2000, while for developed countries, it varies between USD 4,000 and USD 6,000

Note: 1. Includes both public and private sector revenue

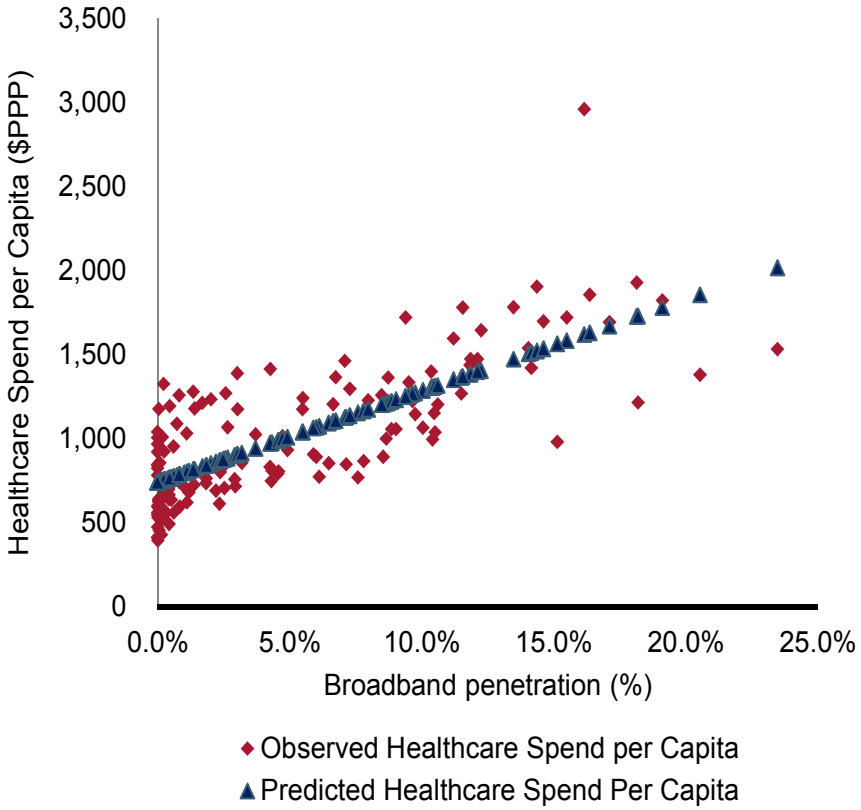
Source: Analysys Mason, Euromonitor

Based on the regression analysis, 10% increase in broadband penetration can lead to a 131% growth in healthcare sector

1 *Regression Analysis*

Approach for Regression Analysis of Healthcare Sector Growth in Selected Developing Countries

Regression equation → y = 5,427x + 741



- Out of the 41 countries which had experienced an increase of 10% broadband penetration over the last 10 years, the healthcare spend per capita for 19 developing countries was analysed
- A regression analysis was performed on the data from 12 developing countries (after removing 7 outliers[1]) to obtain a regression equation to calculate average spend ($ in PPP) at each level of broadband penetration
- Based on regression analysis, it was observed that India's healthcare sector could grow from INR 2,892 bn currently to INR 6,689 bn over a 10% increase in broadband penetration

- Healthcare Sector Revenue Growth: **131.3%**

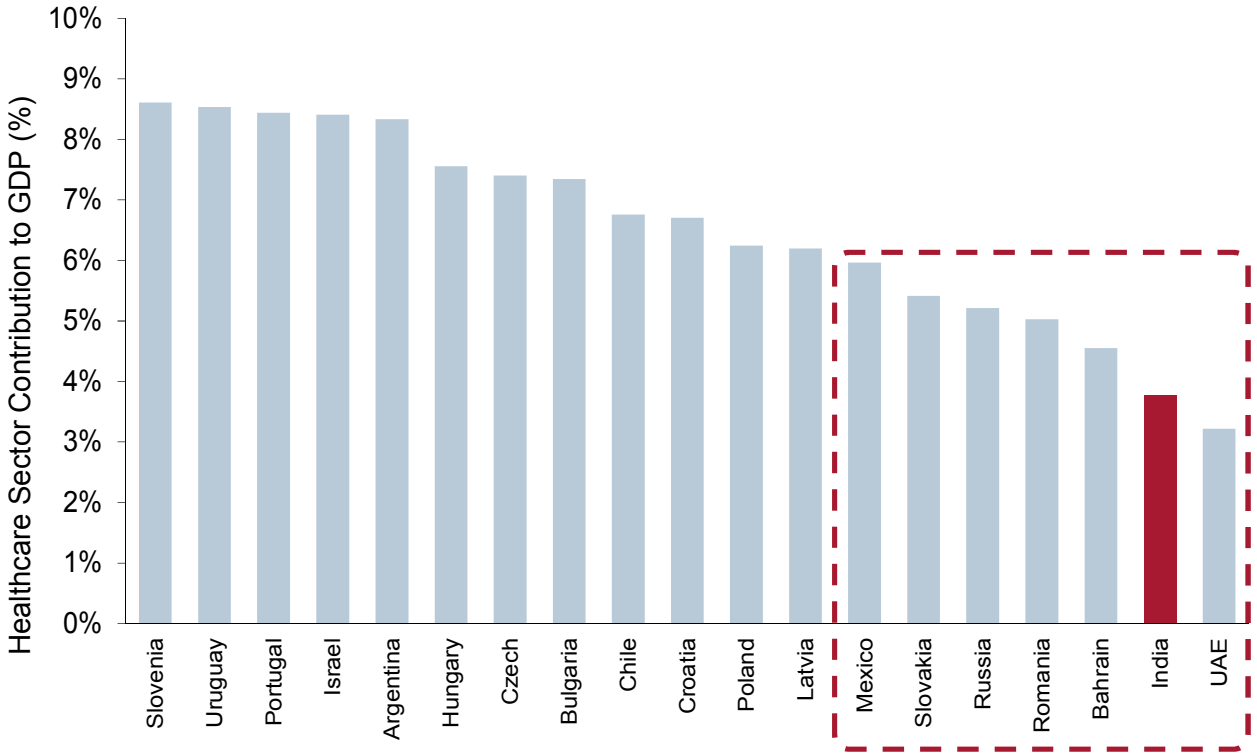
Note: 1. Outliers includes countries with an already high or low spend on healthcare (by PPP)

Source: Analysys Mason, Euromonitor

There are six developing countries which had a contribution of healthcare to GDP ~4%, when broadband penetration was ~1%

2 Benchmarking Analysis

Contribution of Healthcare Sector to GDP at ~1% Broadband Penetration[1] for Selected Developing Countries



Developing countries which have witnessed at least 10% growth in broadband penetration over 2000-2010[2]

- Among developing countries, there are six such countries which, when at a broadband penetration of 0.9%, had observed a c.4% contribution to GDP by their healthcare sector
- Time taken by these countries to witness a c.10% increase in broadband penetration varies between 4 to 7 years

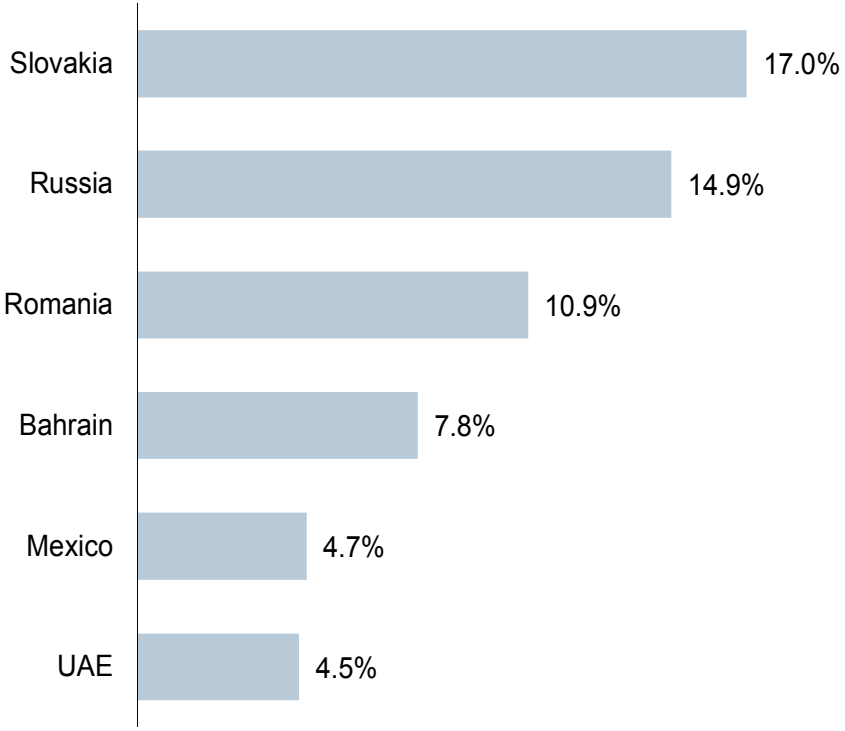
Note: 1. Each country had ~0.9% broadband penetration at different points of time; 2. Duration for 10% increase in broadband penetration could vary for each country

Source: Analysys Mason, Euromonitor

These countries have witnessed 5% - 17% real CAGR in healthcare spend with a 10% increase in BB penetration

2 Benchmarking Analysis

Real CAGR[1] of Healthcare Sector Revenue per Capita with 10% increase in Broadband Penetration



CAGR in real healthcare revenue per capita after adjusting for fluctuations in inflation and currency exchange rate

Healthcare Sector Growth Drivers

- Increase in private investments and industry consolidation for medical infra, resulting in the establishment of specialty hospitals
- Increasing affluence, rising prevalence of lifestyle diseases, as well as increasing incidence of epidemic outbreaks have increased out of pocket spend on healthcare
- Rapid medical inflation, especially in the treatment of cardiovascular diseases, organ transplants and specialist services also contributes to the increase in expenditure
- Governments policy initiatives aim to establish small-scale primary healthcare clinics, national health databases and staff training programs

- Average nominal growth: **15.5%**
- Average real growth (after adjustment for inflation and currency exchange rate): **10%**

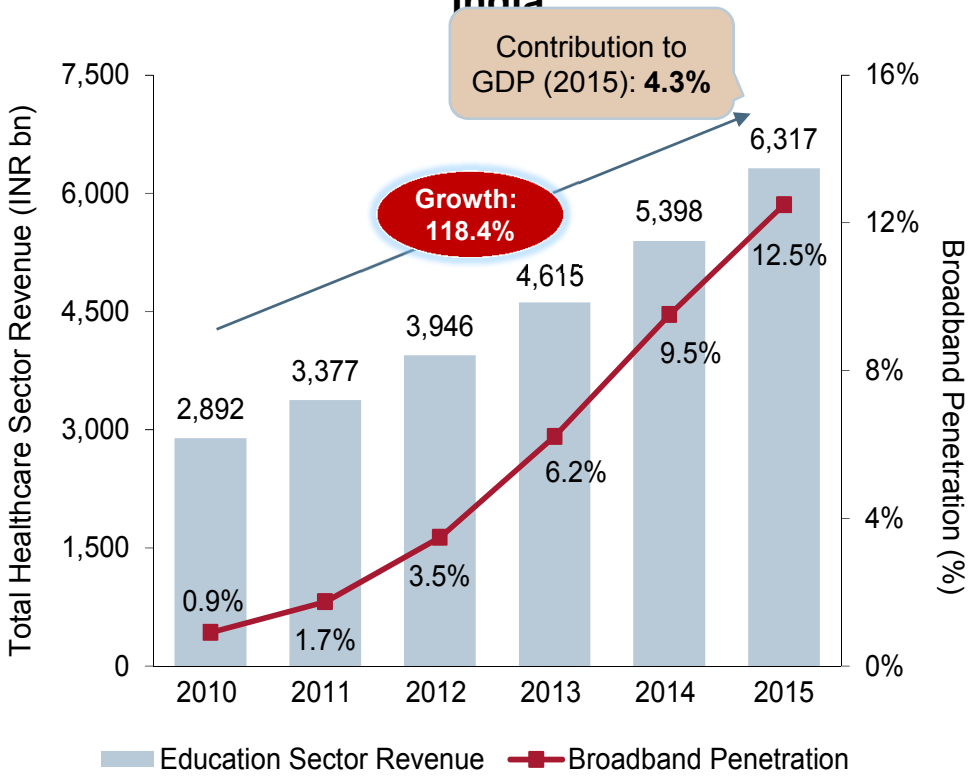
Note: 1. CAGR for period when broadband penetration in that country increased by 10%. Includes growth rate of per capita spend after adjusting for inflation and exchange rate fluctuations

Source: Analysys Mason, Euromonitor

Based on the growth rate analysis of these countries, India is expected to witness 118% growth in healthcare sector revenues

2 Benchmarking Analysis

Growth in Healthcare Sector Revenue (INR bn) with 10% Increase in Broadband Penetration in India



Growth Rate Calculation (2010 – 2015)

- Real CAGR of per Capita Spend: **10.0%**
- Average inflation from 2010 - 2015: **6.2%**

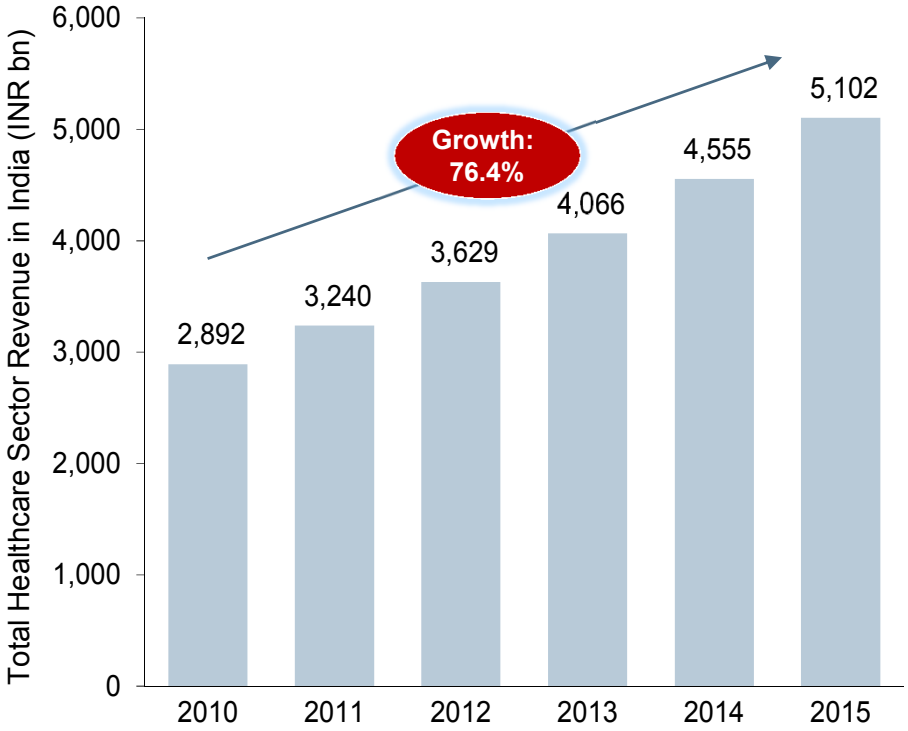
- Increase in healthcare sector revenue with increase in Broadband penetration will primarily be driven by growth in telemedicine clinics, mobile health monitoring and survey data collection
- Further, this growth will be supported by initiatives by government as well as private players
  - Policy changes such as allowing FDI for medical equipment, de-regulation of health insurance and budgetary considerations for pharmaceutical and biotech organizations drive growth in this sector
- However, in addition to broadband availability, reliability of broadband access (uptime of 99%) and reduction in service costs will be required to drive growth of telemedicine
- As per XIth five year plan (2007-12), govt. plans to increase its spend on health sector to 2-3% in 2012

Source: Analysys Mason, Euromonitor, Industry Inputs

Based on historical growth trends, healthcare sector revenue in India is expected to grow by 76% to reach INR 5,102 bn by 2015

3 Base Case Analysis

Healthcare Sector Revenue (INR bn) based on Historical Growth

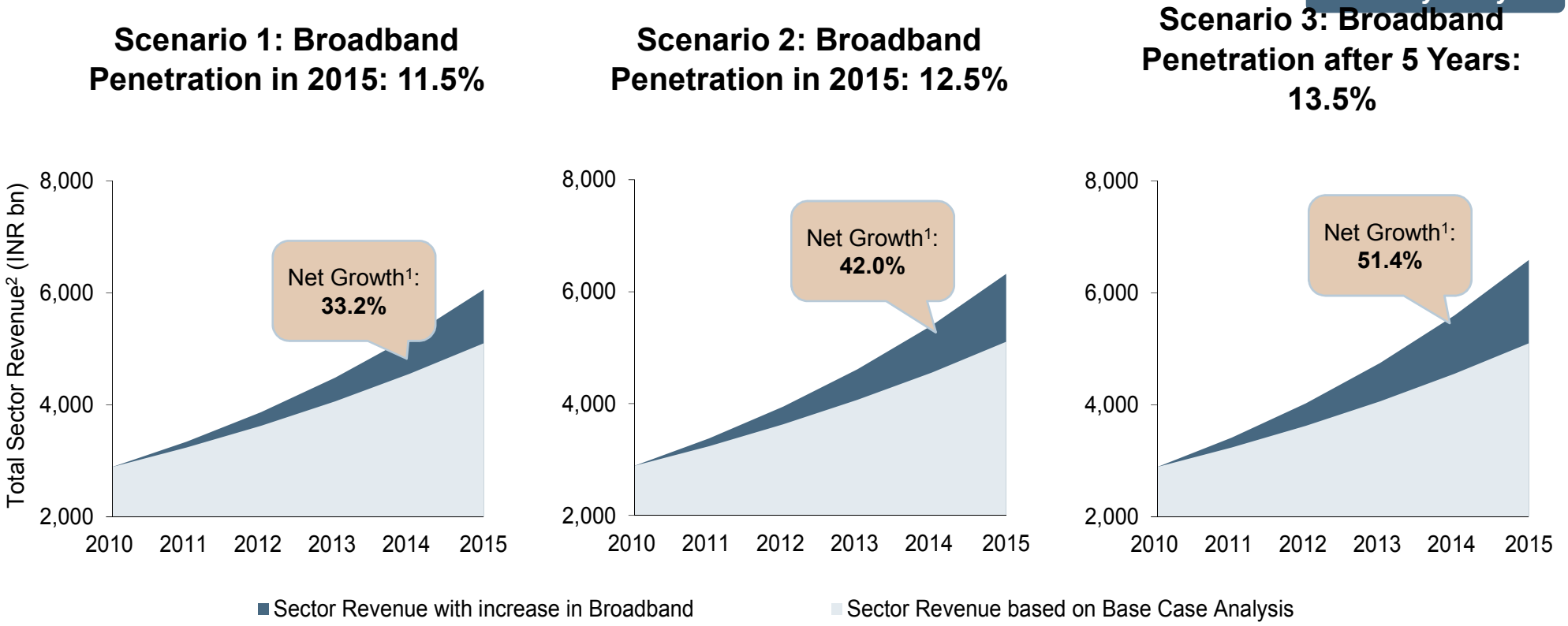


- As per base case analysis, the healthcare sector in India is expected to grow by 76.4% over 2010-2015 to reach INR 5,102 bn
- According to Ministry of Health and Family Welfare, there were 1,78,601 public health institutions (govt. hospitals, HSC, PHC and CHC) and 10,266 private hospitals in India in 2010
- Revenue per health institution is assumed to vary with inflation from 2010 to 2015
- By 2015, the number of number of govt. health institutions are expected to increase to 195,000 while private hospitals are expected to increase to 15,000 resulting in an increase of 76.4% in sector revenues

Source: Analysys Mason, Euromonitor, Ministry of Health and Family Welfare

Impact of growth drivers of sector revenue expected to increase with higher increase in broadband penetration in 5 years

Sensitivity Analysis



Growth drivers of healthcare sector revenue, including broadband penetration, are expected to have an increasing impact on revenue with higher broadband penetration in 5 years

Note: 1. Net growth due to various factors including increase in broadband penetration; 2. Sector revenue have been estimated in INR to avoid exchange rate fluctuations

Source: Analysys Mason

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GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

Questions and Answers session along with Tea & Coffee service

GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

Deloitte.

Consumer Enterprise Survey and the need for additional spectrum

Mr. Hemant Joshi, Partner,
Deloitte Haskins & Sells

Deloitte.

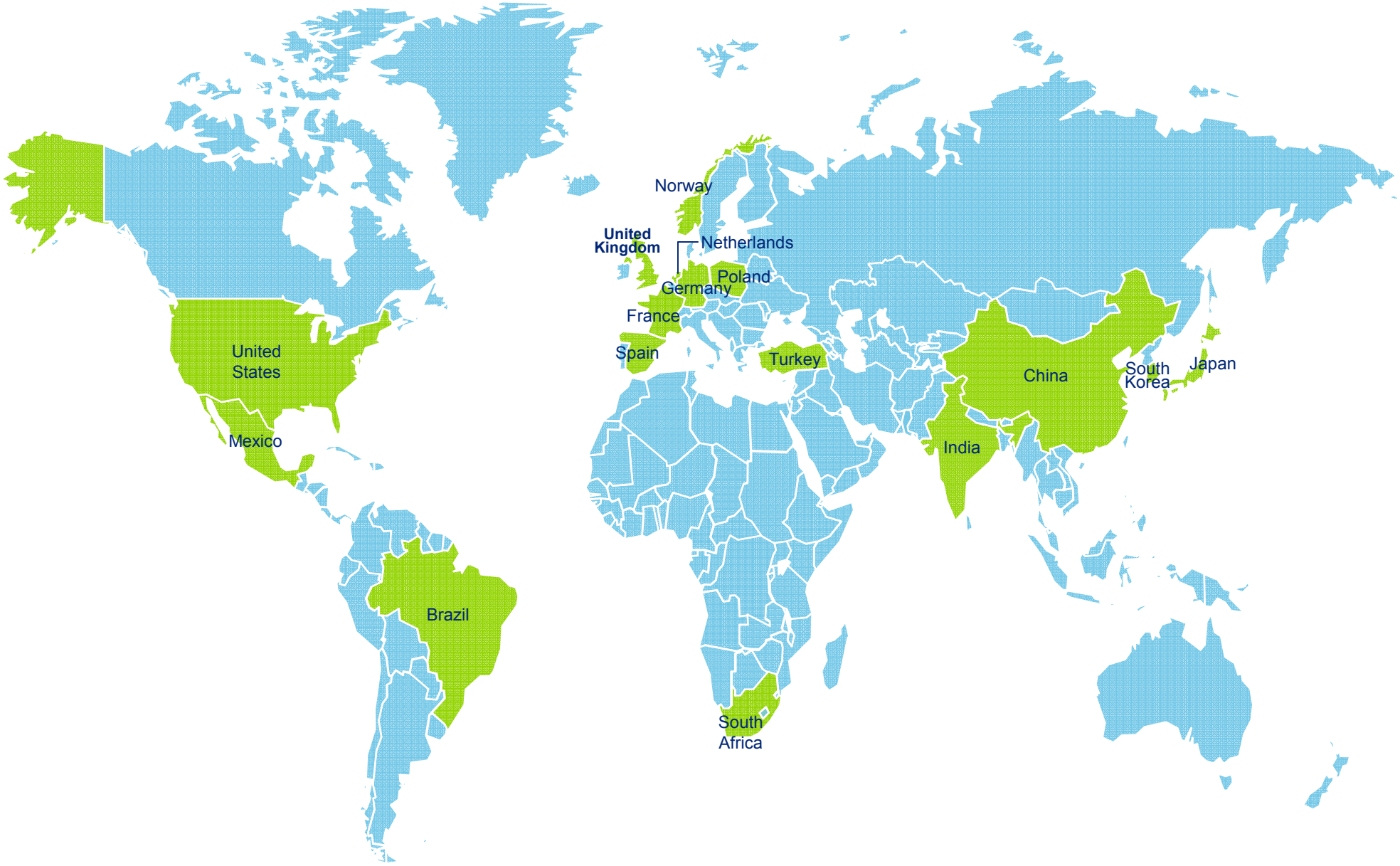
Addicted to connectivity
Perspectives on the Indian mobile consumer, 2011



Hemant Joshi, Partner

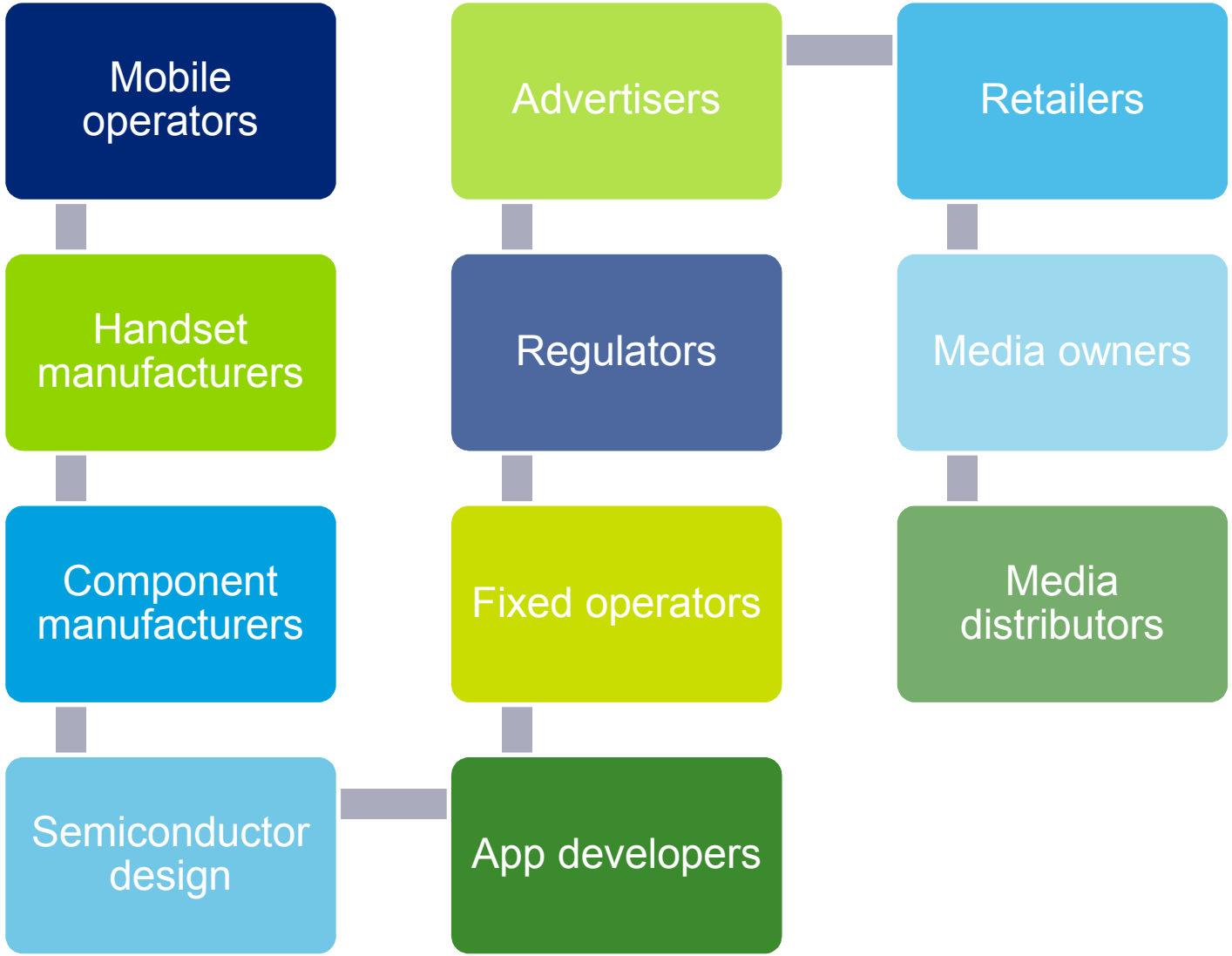
May 23, 2011

Deloitte's Global Mobile Consumer Survey, 2011
34,000 responses, 17 countries, 5 continents



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Deloitte's Global Mobile Consumer Survey, 2011: target audience



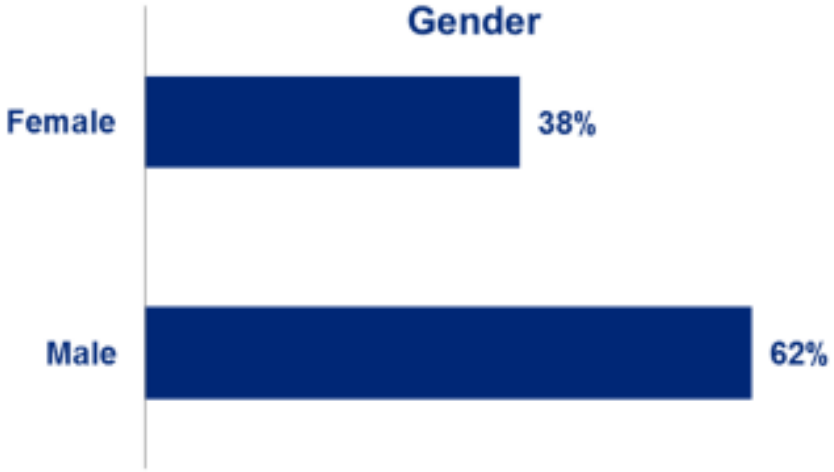
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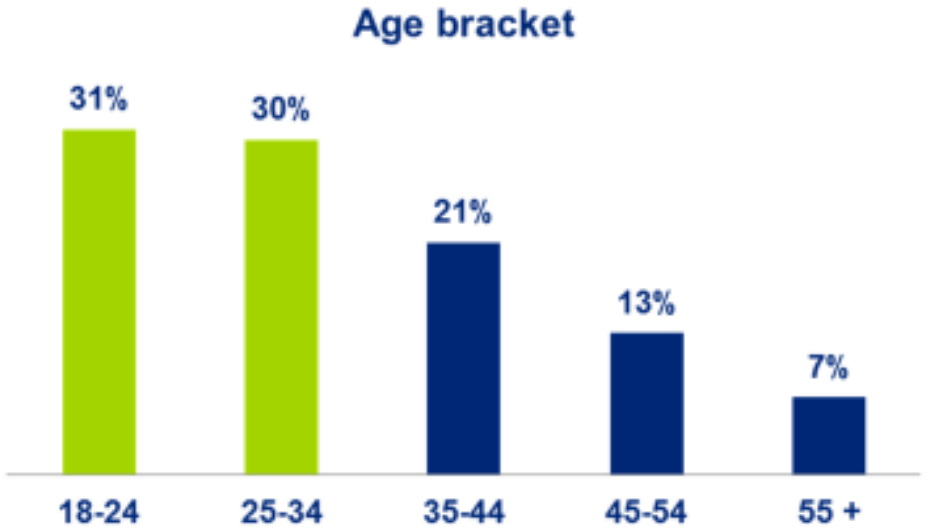
Deloitte's Global Mobile Consumer Survey, 2011: methodology

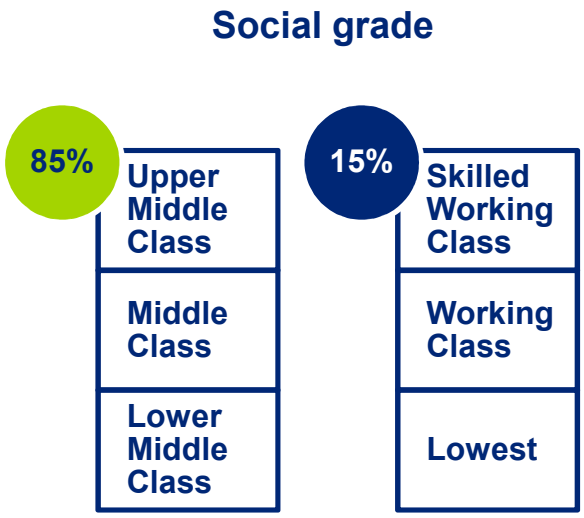
- Field work took place in January and February 2011.
- All research has been undertaken via online research, which results in a high concentration of urban professionals.
- The questions for this survey were written by Deloitte.
- The online research program was managed by Deloitte.
- In all, 2028 responses from India were included in the study.
- The question set for this survey was standard, except where information about the local market was specifically requested. In India, additional questions about characteristics specific to this market were asked, for example the adoption of dual SIM handsets.
- Questions pertaining to spend were all asked in local currency. Currency ranges were tailored to local purchasing power where appropriate.
- The scope of survey ranges from quantifying ownership of multiple mobile-enabled devices to a ranking of the most popular mobile internet applications.

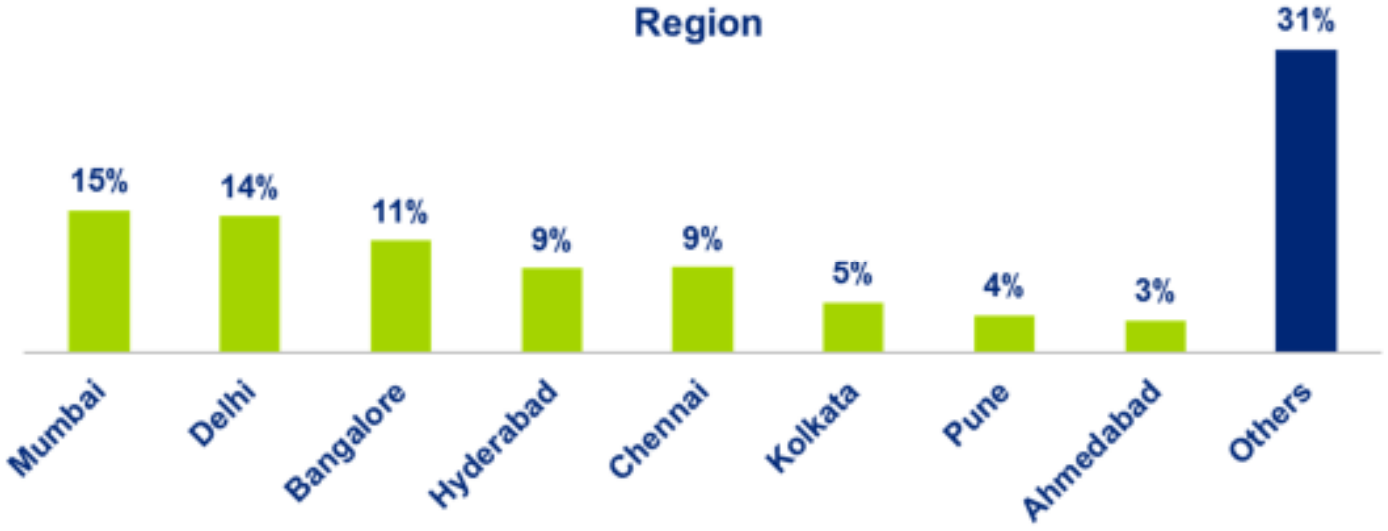
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Respondents profile









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Unique features of telecom sector in India

- Indian market is dominated by prepaid users with 96.6% share of total subscriber base.
- Prepaid ARPU declined to ` 88 in December 2010 while Postpaid ARPU increased to ` 572.
- Multiple SIM card phones, the fastest growing segment, is growing at nearly 100%.
- 6-7 new Indian handset manufacturers have captured about 12% market share in just a year.
- Telecom space faces intense competition among 15 operators in 22 circles of India and hence is seeking consolidation.

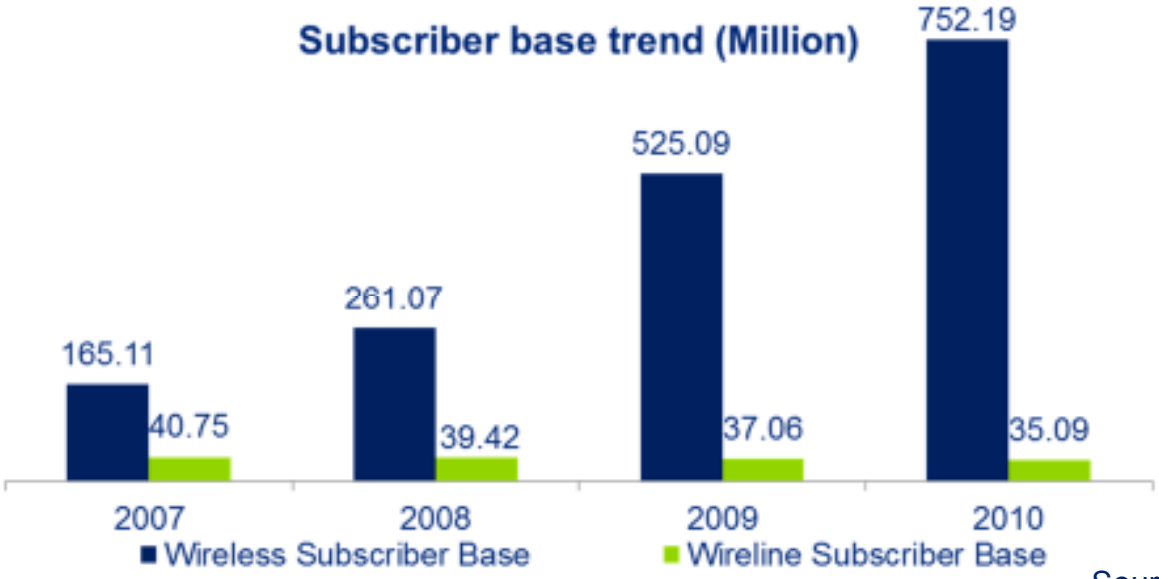
Idea, Tata Teleservices Limited, Vodafone, Airtel, Reliance — **All India**	**All India (except Punjab, Gujarat, Rajasthan)** — Aircel	BSNL, MTNL — **Together all India**
AP, Bihar, Delhi, Haryana, Karnataka, Kerala, Kolkata, Maharashtra, Mumbai, Rajasthan, Tamil Nadu, West Bengal — MTC	**Bihar, HP, Orissa** — S Tel	**Mumbai** — Loop Mobile
AP, Bihar, Gujarat, Karnataka, Kerala, Kolkata, Maharashtra, Mumbai, Orissa, Tamil Nadu, UP, West Bengal — Uninor	**Gujarat, Haryana, Kerala, Tamil Nadu & Mumbai** — Videocon	**Punjab** — HFCL

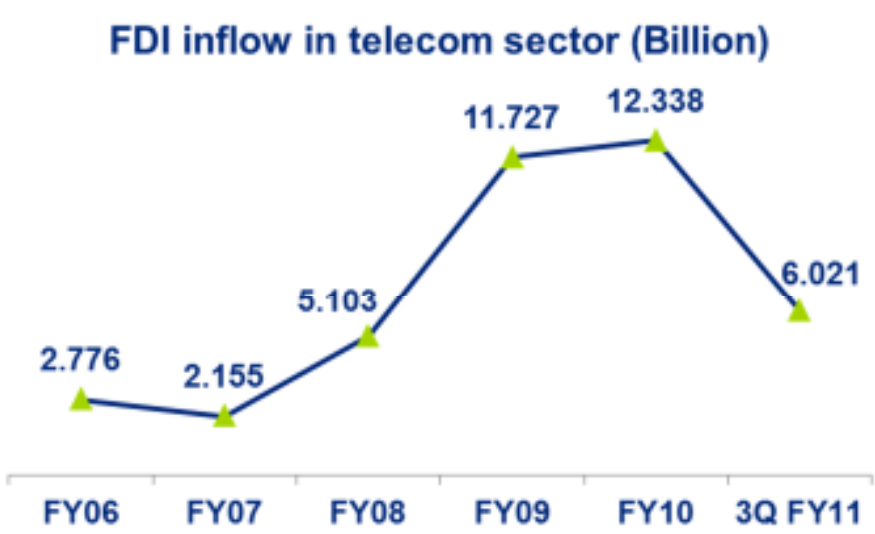
Etisalat only soft launch

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Length & breadth of telecom sector in India

- With 811 million wireless subscribers as on March 2011, Indian telecom industry has the highest growth rate in the world.
- The wireline subscriber base is continuously declining every quarter by about 4%.
- Teledensity of 157% in the urban markets vis-à-vis 33% in rural markets at the end of March 2011.
- The diversity in languages in India creates a large potential market for regional content.
- The cumulative flow of FDI in the sector during April 2000 and October 2010 was $9,993 million.





Source: TRAI

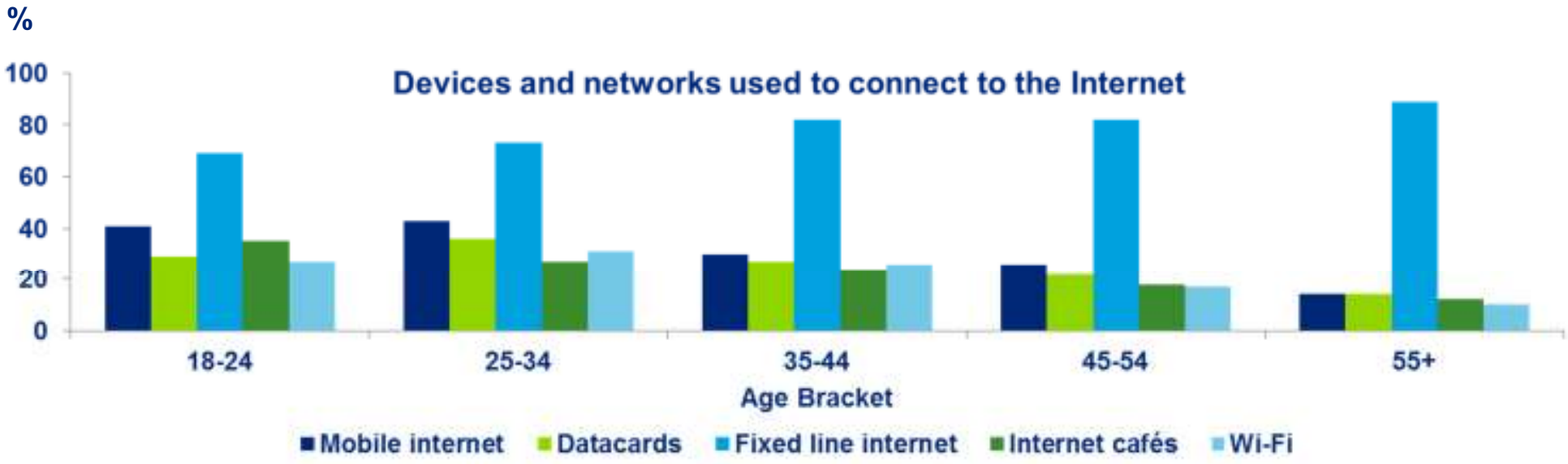
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For few years now it is common place for an individual to have two mobile phones in cities: this is the principal factor for urban teledensity reaching in excess of 100%.

Mobile operators need to be more versatile and pragmatic when it comes to addressing mobile consumers' connectivity needs

In the face of convergence, people today use broad range of wireless and fixed line technologies to always stay connected.

Mobile internet and data cards are more popular among younger generation who constitute about 50% of the Indian population today.



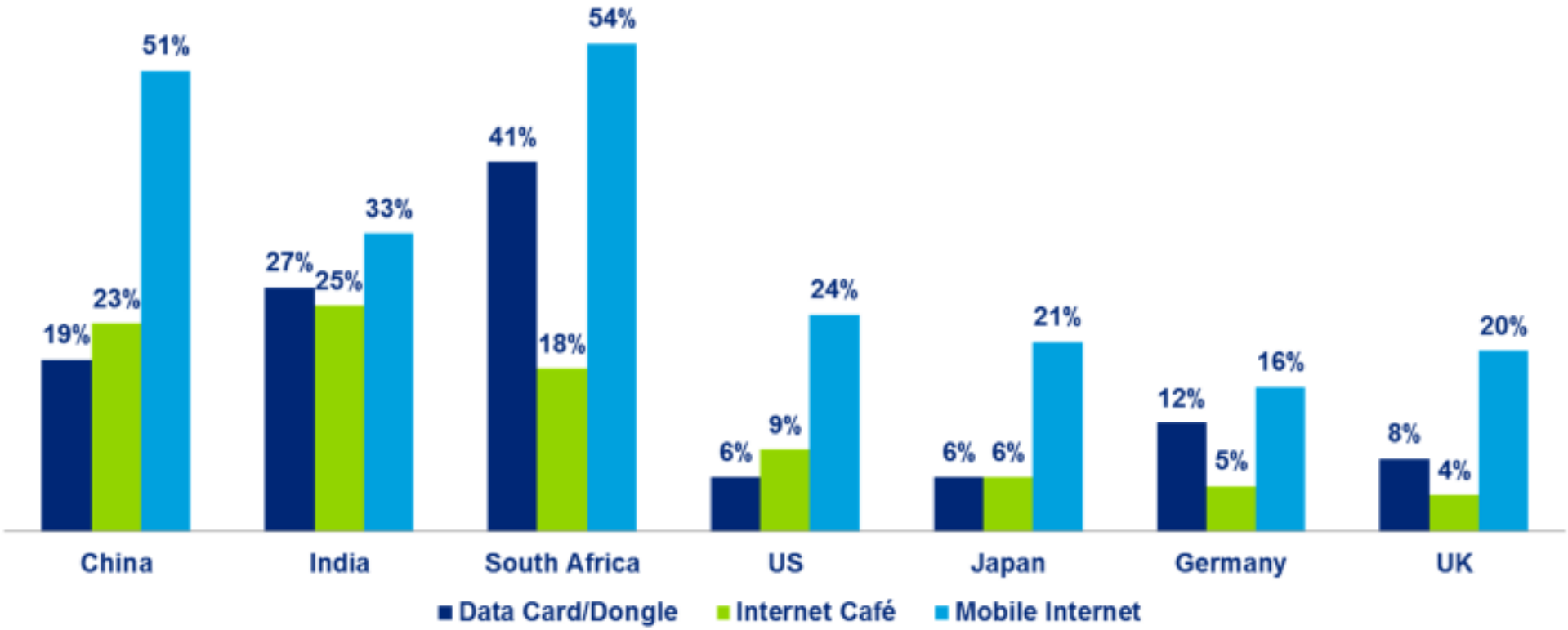
Source: Deloitte Global Mobile Consumer Survey, 2011 Base: All respondents (2028)

While the computer and internet empowered urban India, it is the mobile which is bridging the digital divide and making it the perfect medium for delivering a variety of services and content to the common man through MVAS.

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Diversity of devices driving internet connectivity

Difference in basic characteristics such as price, usability, power supply and operating conditions of the devices lead to different ways to access internet in the advanced (US, Japan, UK) and the emerging economies (India, China, SA).



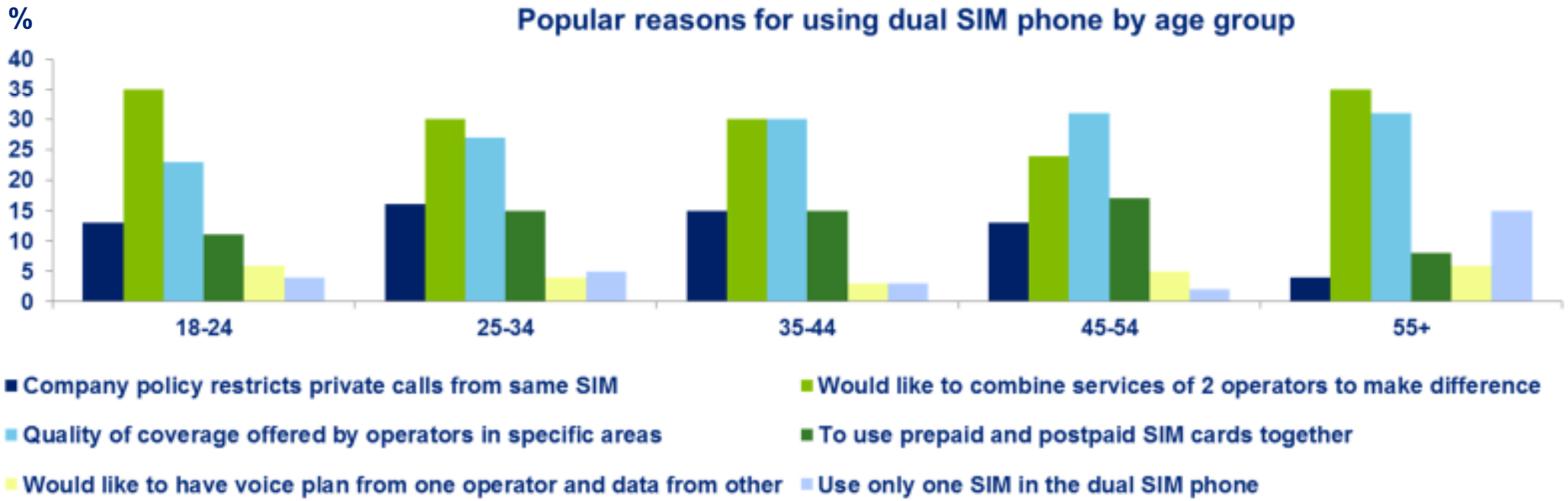
Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All respondents in respective countries

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Dual SIM: catering to people's multiple needs

Most of the respondents want two or more service providers in order to have different services from different operators.



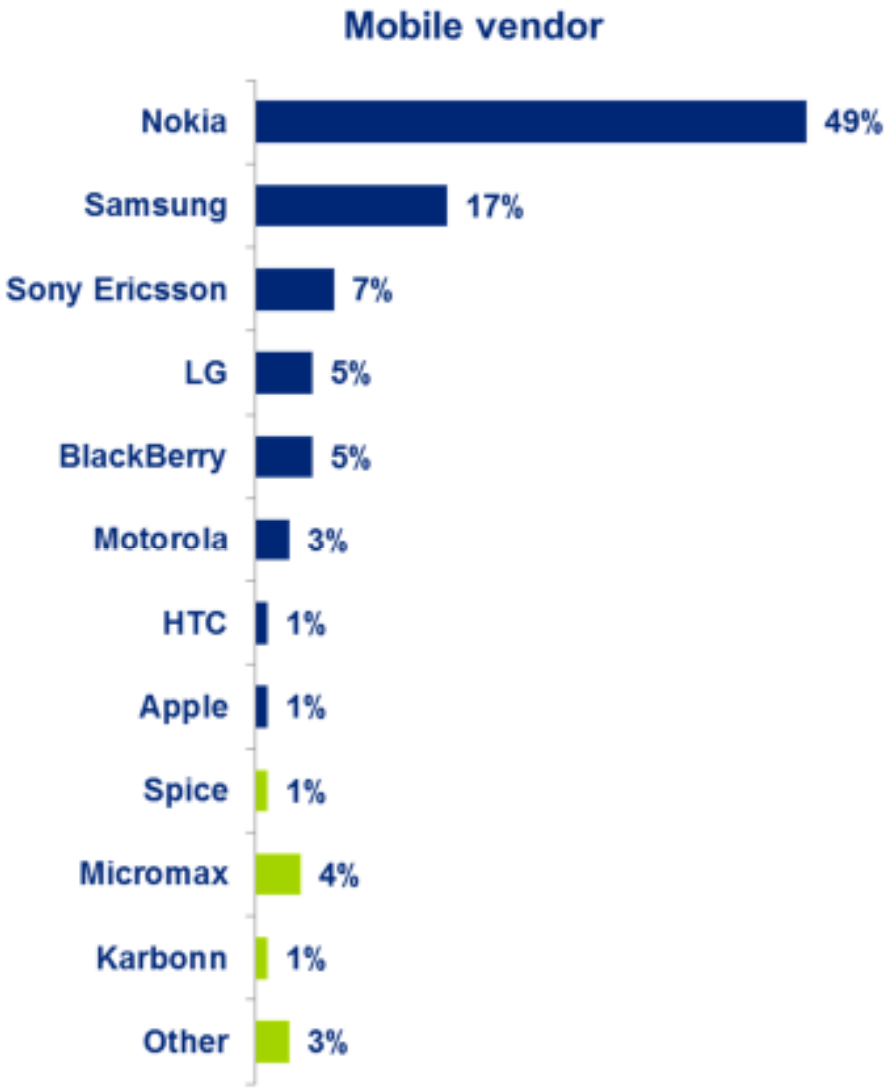
Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All respondents that have a dual SIM phone (1024)

In rural India, benefits of using mobile range from mobility and convenience to easy access to customized content. Use of mobiles has created new opportunities to make a living, to be more productive and hence earn more, for migrants from rural areas to the cities.

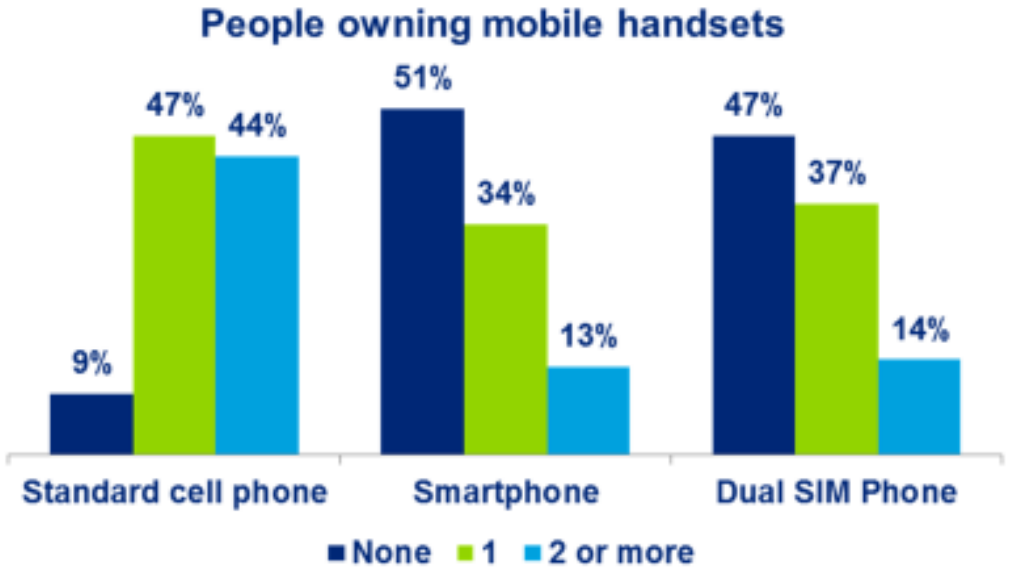
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Indian mobile phone vendors are welcome if mobile is reliable and of good quality



Falling prices of handsets and increasing competition from local vendors are forcing the global mobile phone manufacturers to differentiate through services like application stores.

Millions of living rooms now boast more phones than cushions



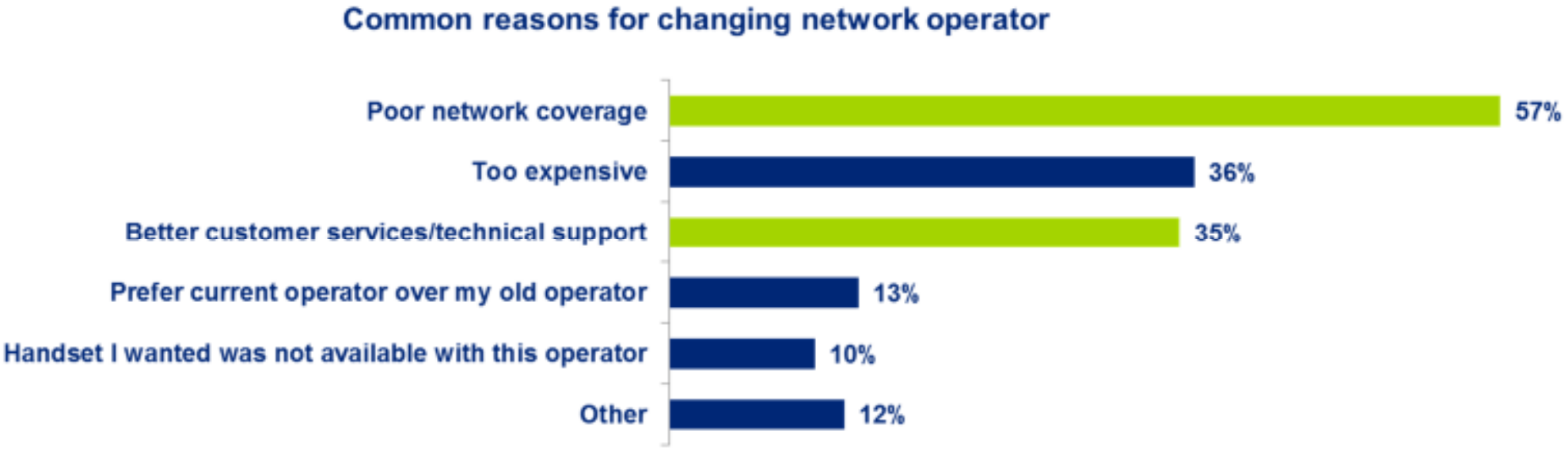
Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All that have a handset

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Earlier mobile operators were judged mostly on their engineering prowess; today they need to tick that box, direct or via a third party, and also be a leading edge retailer

Increasing disposable incomes have boosted willingness to spend on services that bring value among the upwardly mobile citizens today, but network coverage and customer service are the uncompromising needs to stay always connected.



Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All that have switched operators (1394)

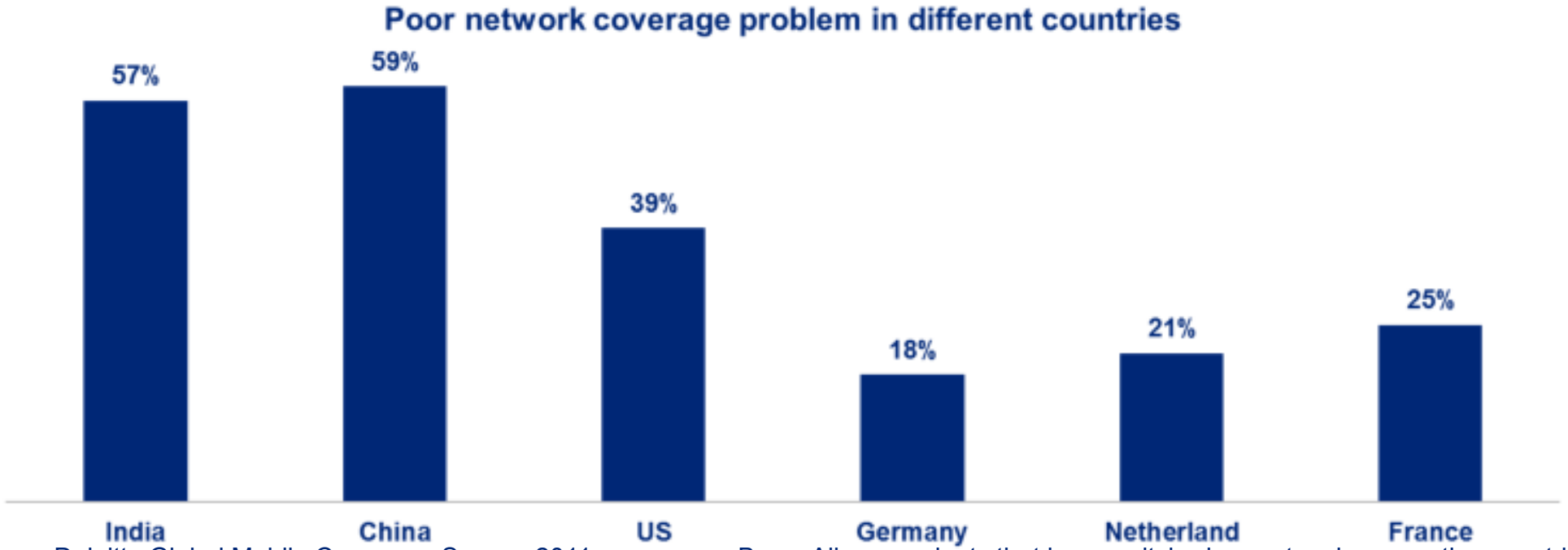
Operators need support of industry players such as banks, educational institutions, healthcare providers, etc. to expand their services to semi-urban and rural areas.

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Large countries struggling to have the last mile coverage

Network coverage problems are not limited to rural and isolated areas with some city-dwellers struggling to get good connections, but are also faced in the most developed of countries like US, the survey suggests.

Network problems in different countries could be explained based on diverse factors such as geography, size, teledensity, telecom infrastructure, technology, frequency band…



Source: Deloitte Global Mobile Consumer Survey, 2011

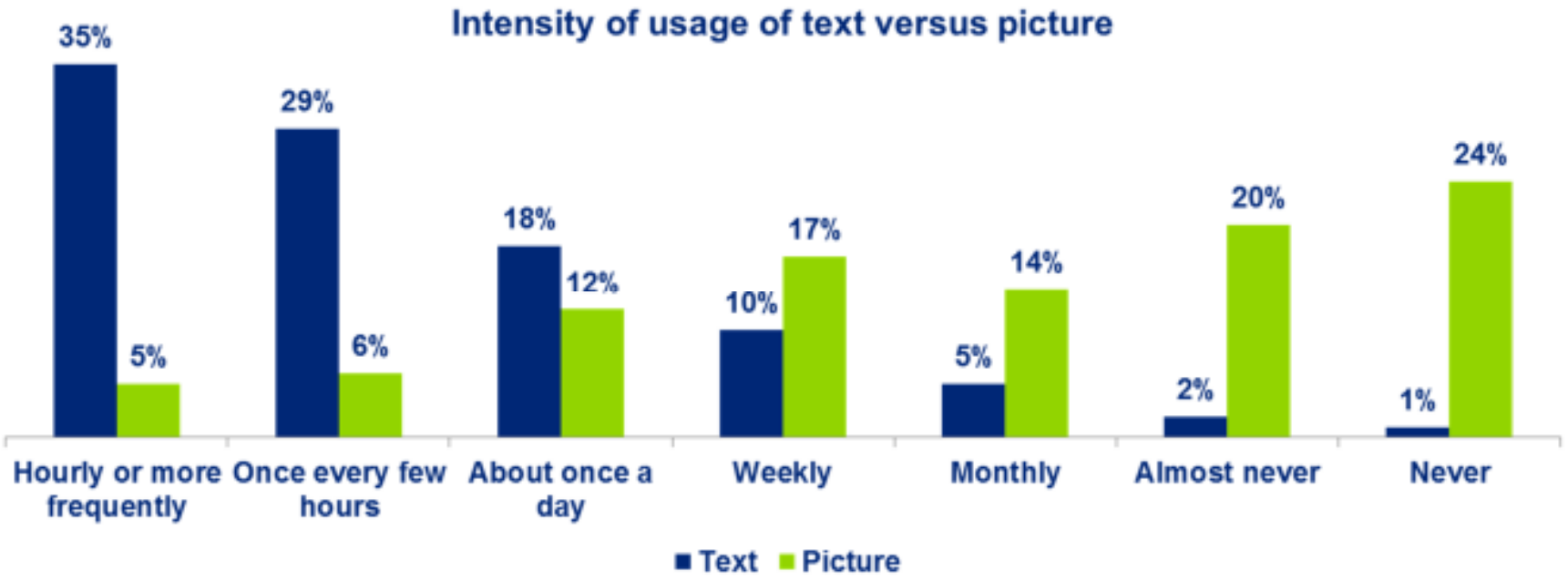
Base: All respondents that have switched operators in respective countries

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SMS may serve as an entry point for other mobile data services

The frequency of usage of text messages remains high. The most enthusiastic users are the 18-24 year olds: a half claim they text every hour.

Text messaging is also relatively popular among those using their phone in roaming.



Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All that have a handset

Considering the literacy rate (~26%)special handsets/software that supports SMS in Indian languages will be a breakthrough for rural subscribers.

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SMS: An innovative content delivery mechanism

- SMS can be used as a tool to access the most important byte-sized information. e.g. short cricket clip, movie trailer, news clip, etc
- SMS can encourage to access additional video and audio information at reasonable price
- Operators can give access to customized and local regional content through SMS
- Location based services could be accessed by sending SMS
- Mobile data services can be used to assign new jobs to an employee on the move or to provide a service technician with detailed information on a customer's problem
- Integration of the mobile device into the supply chain
- Access to financial information in banks, insurance companies, etc is possible through SMS



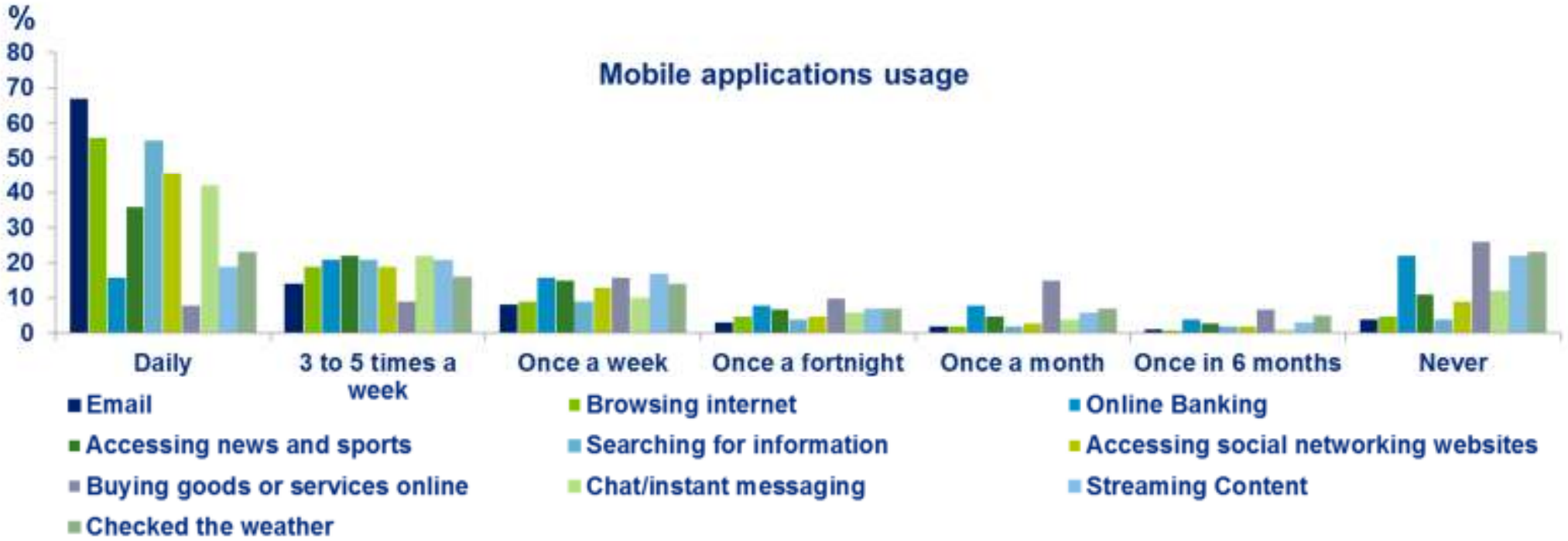
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The first thing to check for in the morning is not whether they have received any SMS, but rather to check on updates to their social network.

Consumers will be inclined to choose a connectivity provider which best meet their evolving requirements, regardless of the underlying technology

87% respondents having smartphone access internet through their smartphone.

Mobiles have surpassed their primary role of voice communications and have become more of an infotainment device for mobile users.



Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All that have a smartphone or PDA and use the internet (617)

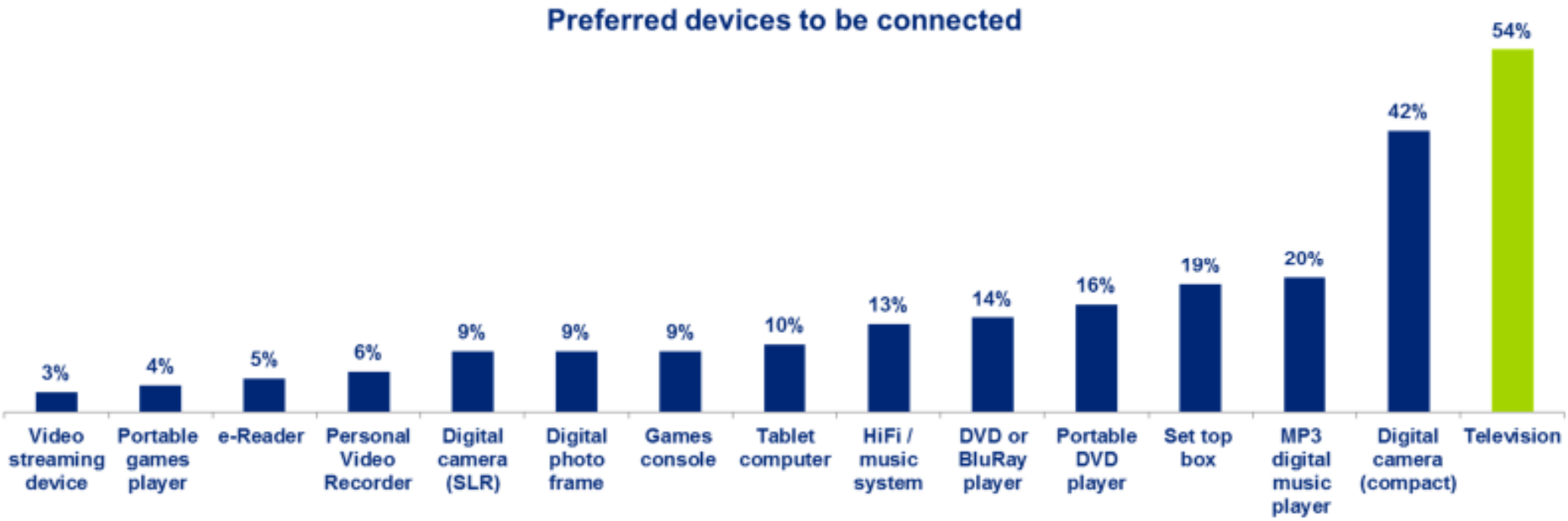
Some key non-entertainment services for the rural and urban segments will be in the areas of governance, commerce, health and education, with a need for customization according to the demographic segment.

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Mobile industry: from niche B2B to most ubiquitous consumer technology

62% respondents are ready to pay a premium for connecting devices.

Urban India wishes to combine TV, which dominated their lives for longest period, with internet that empowered them.



Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All respondents that have devices (1996)

Subsidized services to the rural segments could ensure mass reach and adoption.

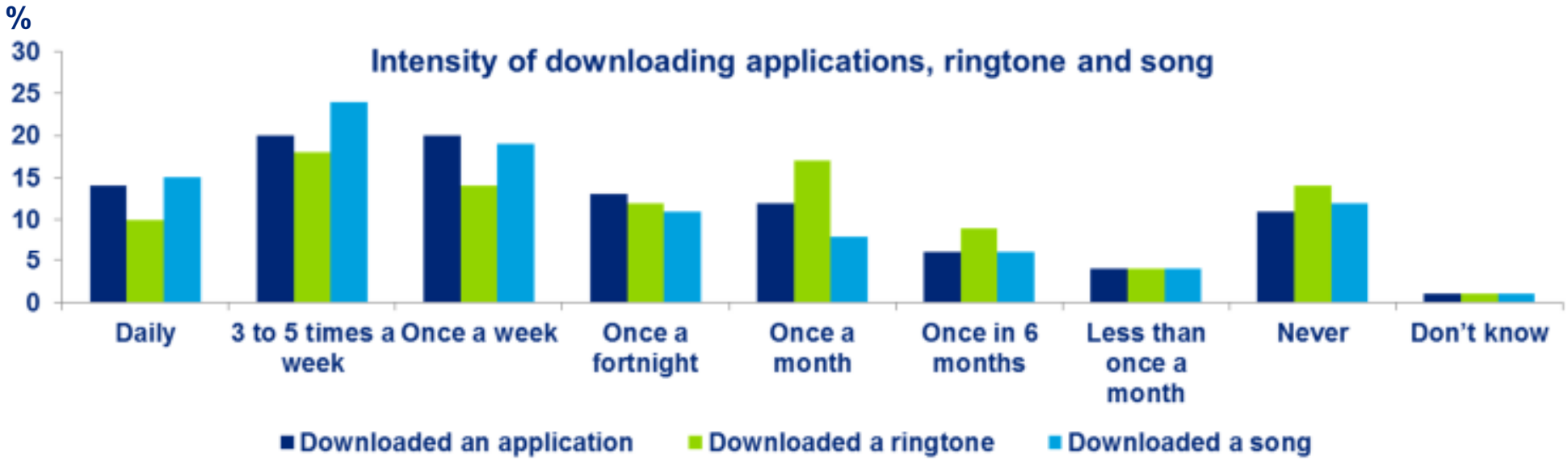
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Operators need to consider which networks are best placed, from technical and economic perspectives, to support each type of connected device.

MVAS: rejuvenating the highly competitive and pressurized telecom market

There is adequate consumer demand for MVAS, but operators need to understand the unique needs of Indian consumer and innovate and promote adoption.

The top four to five products such as game based applications, music or ringtone download continue to form close to 80% of VAS revenues, and have become easily replicable.



Source: Deloitte Global Mobile Consumer Survey, 2011

Base: All that have a smartphone or PDA and use the internet (617)

Operators should provide access to business-critical information in atleast 10 languages in rural areas which directly results in supporting the livelihood of the farmers, fishermen, etc.

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3G preferred for connectivity over Wired and Wi-Fi

67% people would like to use 3G on prepaid plan.

The “must have” factors in 3G connection: faster speed and better network coverage

74% people would change operator if their current operator didn’t provide 3G access

Most popular services people look from 3G access are:

- Watch live TV
- Access the high speed internet
- Receive/Send emails
- Download music tracks
- Downloadable video of entertainment, news, current affairs and sport content
- Make video call

Consumers are also looking for diverse vernacular content at affordable prices. This would enable proliferation of 3G services across the country especially rural India.

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The seemingly unstoppable rise of smartphone is allowing the mobile adverts to become ever more visually compelling

80% respondents received mobile adverts of which only 36% took action about advertisement received.

Mobile will give advertisers a platform to target consumers in a specific geographical area and demographic segment instead of mass message broadcasting.



Factors that will drive greater acceptance of mobile advertising among users

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Factors pointing to the increasing demand for spectrum

- Increasing number and type of mobile devices such as smartphones, eReaders, tablets
- Increasing need of upwardly mobile citizens to be always online and access data on the move
- Growing demand for mobile data services
- Growing demand for bandwidth rich applications like HDTV, video-on-demand, etc
- Increasing substitution of fixed with mobile communication
- Growing demand of all sectors: healthcare, education, banking to provide mobile services
- Reducing revenues from voice services is forcing operators to concentrate on data services for better margins
- Domestic handset manufacturers have established a strong footprint in India with low priced handsets

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Network capacity needs to increase manyfold

- 332.43 million wireless subscribers had subscribed to data services by the end of December 2010
- 123% increase in Wireless Data Subscribers per annum
- High definition video, both broadcast television (HDTV) and multicast video-on-demand, requires 6 Mbps per video stream
- Video telephony, such as Skype, and websites, such as YouTube, require another 1–2 Mbps
- Cisco estimated that mobile data traffic grew 160% over the last year
- Most operators have been given up to 6.2 MHz and some 10 MHz of spectrum license in India. This will not be enough to meet the growing needs and hence result in negative economic development.
- Network offload technologies, which can help to offload about 10-20%, will also not be able to meet the demand.
- Deloitte's initial results of study show that traffic carried by operators might increase upto 300 times by 2025.
- More spectrum will be required to reduce the congestion in the networks.
- Since spectrum is a limited resource, spectrum allocation should be done more efficiently and spectrum harmonization should be considered to reduce the cost of handsets and other factors for mass adoption. This will need a global initiative.

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Challenges in Healthcare Sector

- 70% of the population resides in villages and 80% of the medical community lives in cities => huge imbalance in healthcare reaching people
- Extremely poor doctor to patient ratio (1:870)
- Only 42% births are supervised by health professionals. More women die in India during childbirth than anywhere else in the world



Challenges in Education Sector

- Relatively low literacy rate (~74% in 2011)
- High teacher-pupil ratio (1:30 for upper primary and 1:46 primary)
- *"Not For Profit"* policy of the government has affected the scalability of this sector leading to lack of private public partnerships



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Challenges in Banking & Finance



- Around **60% Indians** lack access to formal financial services and are largely **'unbanked**'.
- The financial institutions, private and public, are struggling to provide banking infrastructure in all the regions of a **vast country** like India.

Challenges in Agriculture Sector



- Farmers face many problems **like lack of information, exploiting middlemen, marginal land holding**, etc. As a consequence, the Indian farmer is deprived of a fair price for his produce.
- About **200,000** farmers committed **suicide** in India over the past 13 years due to unpayable debt, lack of organic farming skills, water shortage, etc.
- 10,688 lakh tonnes of **food grains** were found **damaged** in FCI depots, enough to feed over six lakh people for over 10 years.
- Rising issues around **food security** and food **price volatility**

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Disintermediation through Mobile Value Added Services

•The next growth driver for telecom industry is Value added services (currently a $ 2.1 billion industry expected to be $ 4 billion by 2013)

•MVAS offers the operators multiple revenue streams - from subscribers as well as advertisers and businesses

•Going forward VAS is expected to grow at very fast pace provided VAS provider come out with the products that are **beneficial for "Aam Aadmi", add value to their life and improve their earning potential**

•The opportunities for telecom industries combined with other industries are many fold and would also result in **improved quality of life of the common man**

•With 3G services, the Indian telecom industry is set for a second telecom revolution in wireless space along with the sectors in which these services will be offered, providing better infrastructure and services

•In India, the focus of operators is to provide MVAS services in the areas of

- Banking (better banking facilities, penetration)
- Healthcare (better infrastructure in rural areas)
- Education (better access to knowledge)

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UN and Indian government have common goals for the millennium

Eradicate extreme poverty and hunger, achieve universal primary education, empower women, reduce child mortality, improve maternal health

- RASHTRIYA SWASTHYA BIMA YOJANA has quadrupled health insurance penetration in 3 years
- State-sponsored schemes such as Bangalore's Narayana Hrudayalya has opened a 500-bedded super-specialty and heart hospital in Hyderabad
- Technology Development Program for Telemedicine by The Ministry of Information Technology aims to link three premier medical institutions for realizing tele-diagnosis, tele-consultancy and tele-education.
- Transformational initiative to assign a centralized unique identification number (UID) to all residents of India will serve as the basis for many e-Governance services incorporating online verification of a person's identity
- Government invest heavily in 'National Knowledge Network' to connect higher learning/research institutions to a high-speed digital network

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GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

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The role Mobile Broadband can play in delivering in India's National Broadband Plan

Telecommunications Regulatory Authority of India (TRAI)

GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

Open Question Panel

Moderator: Robindhra Mangtani, Senior Director, Government and Regulatory Affairs, GSMA

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Closing Remarks and Vote of Thanks

Rajan Mathews, Director General, COAI

GSMA Mobile Broadband Workshop

Connecting India Through Mobile Broadband

24th May 2011

Lunch, networking and device demonstrations