Broadband Potential
& ITU Vision for Promoting
Broadband Deployment

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Agenda

1. **Global Broadband Growth**

2. **Broadband Access Technologies**

3. **Broadband Services Positive Impact**

4. **ITU vision for promoting Broadband deployment and related National Strategies**

5. **Conclusion and recommendations**

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Fast Broadband Deployment

- **Broadband deployments are accelerating rapidly worldwide**
   - fixed broadband services: 206 economies in 2011 vs. 166 economies in 2006
    - Mobile broadband services : 160 economies in 2011 vs. 80 economies in 2006

Growth in broadband worldwide, 2001-2011
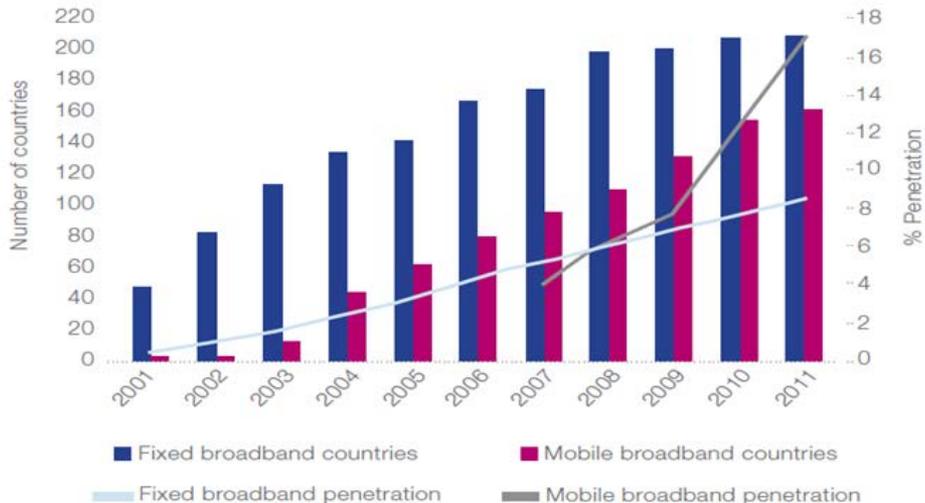
Significant growth of mobile broadband deployments that exceeds fixed ones

Broadband Subscription Penetration (Fixed & Mobile)

Estimated active and fixed mobile broadband subscriptions per 100 inhabitants, 2013

Region	Active mobile broadband	Fixed broadband
Europe	67.5	27.0
The Americas	48.0	17.1
CIS	46.0	13.5
Asia & Pacific	22.4	7.6
Arab States	18.9	3.3
Africa	10.9	0.3
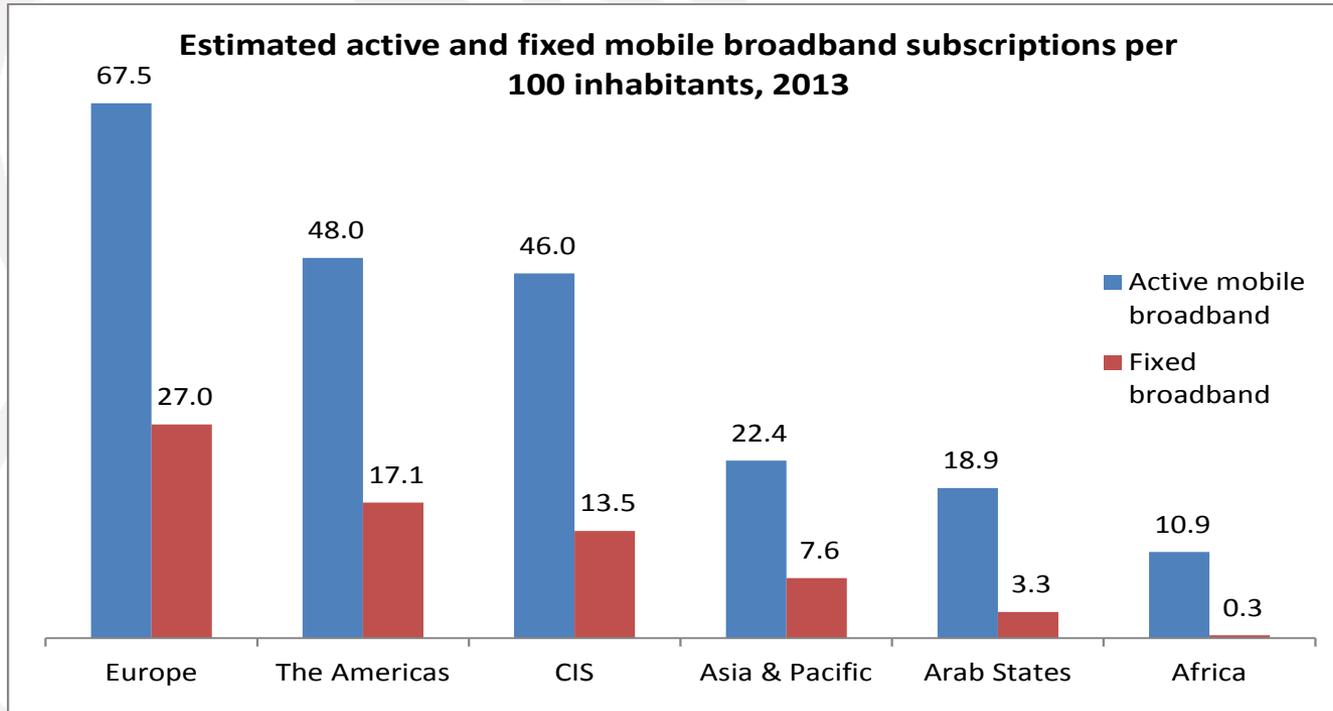
High penetration of mobile and fixed Broadband in European countries compared with African and Arab states

Source: ITU World Telecommunication Regulatory Database

Mobile Broadband Connections in Arab States

Total mobile broadband connections in the Arab States (2011–2017)
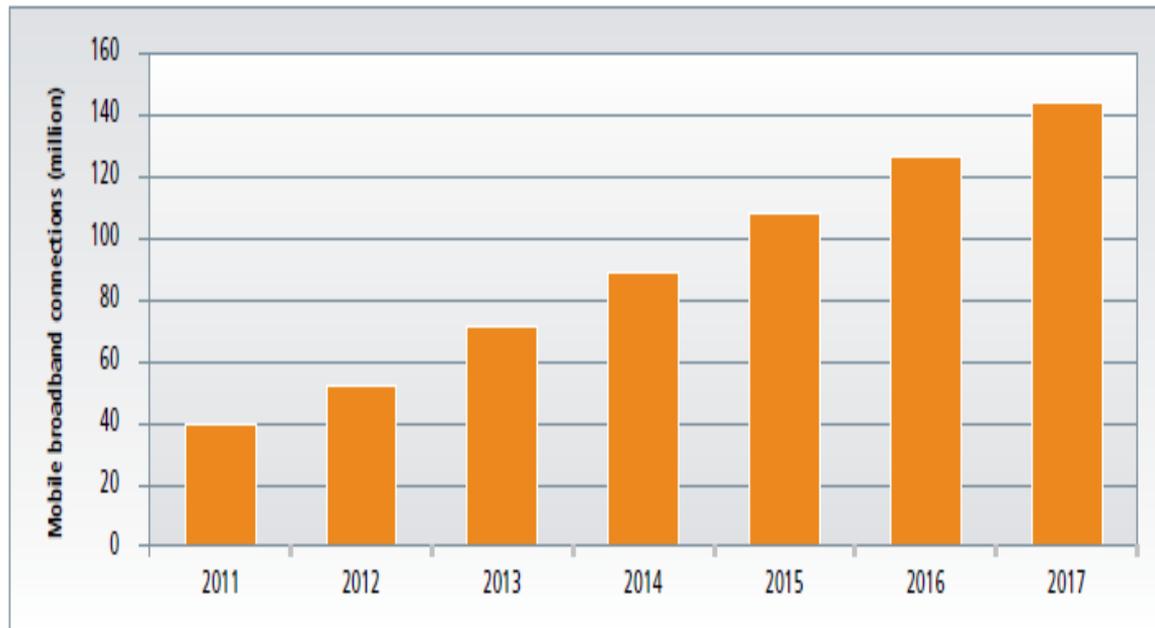
Source: Wireless Intelligence and Deloitte analysis

Important growth of mobile broadband connections in Arab States mainly routed through UMTS/HSPA networks

LTE Global Penetration

Commercial LTE Networks Launches (Cumulative Totals)
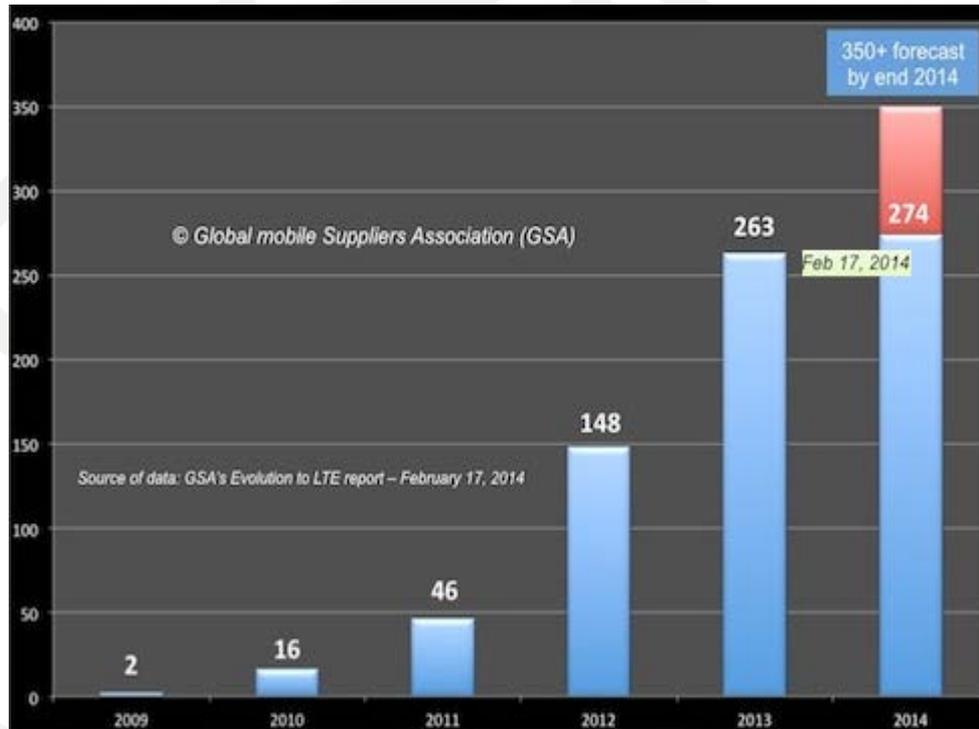
Source: LTE powering forward, 274 operators launched in 101 countries, February 19, 2014

3G/LTE Penetration
in Arab Region

3G/UMTS and 4G/LTE penetration (2012–2017)
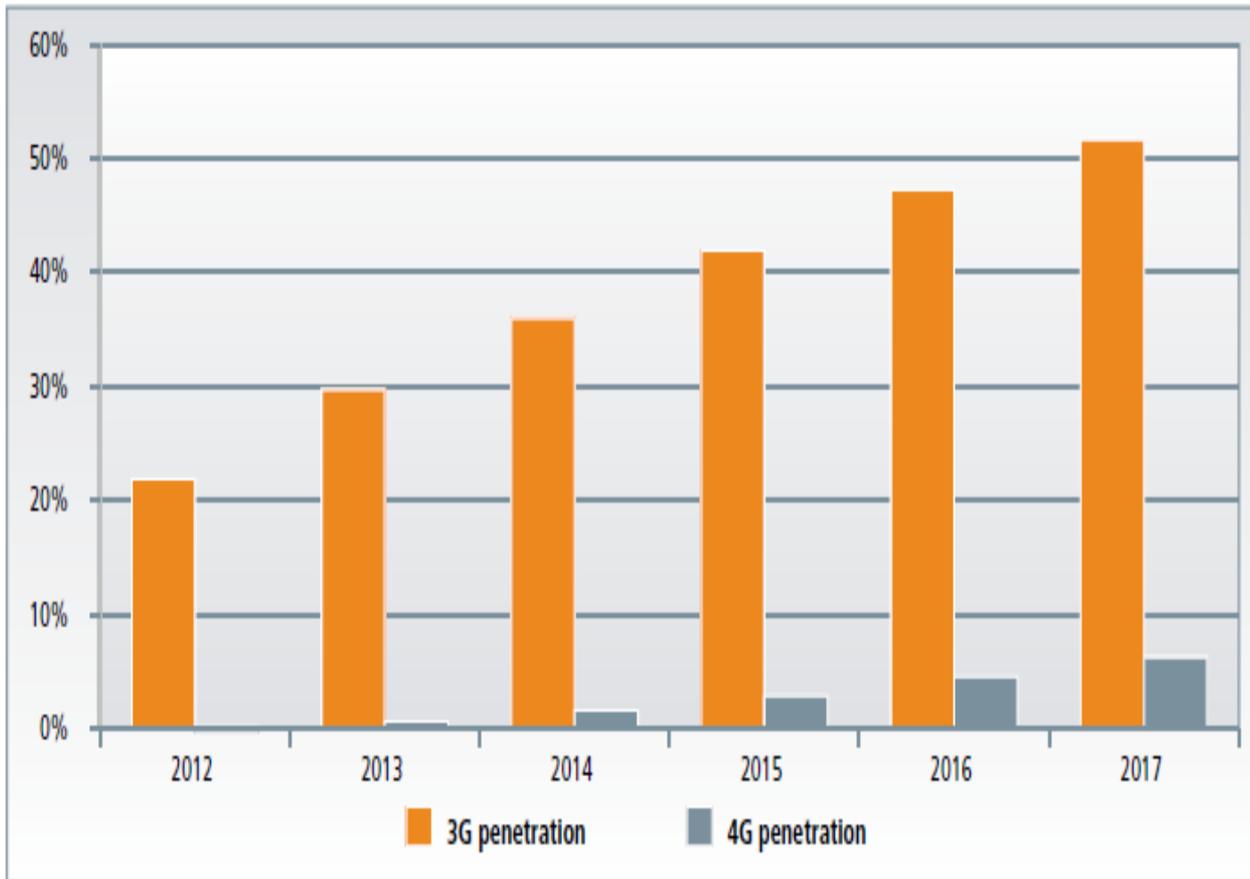
Source: Wireless Intelligence

Mobile Broadband Traffic Growth

Mobile Video Will Generate Over 69 Percent of Mobile Data Traffic by 2018

Exabytes per Month

61% CAGR 2013-2018

- Mobile File Sharing (2.9%)
- Mobile M2M (5.7%)
- Mobile Audio (10.6%)
- Mobile Web/Data (11.7%)
- Mobile Video (69.1%)

2013 2014 2015 2016 2017 2018

Figures in parentheses refer to traffic share in 2018.
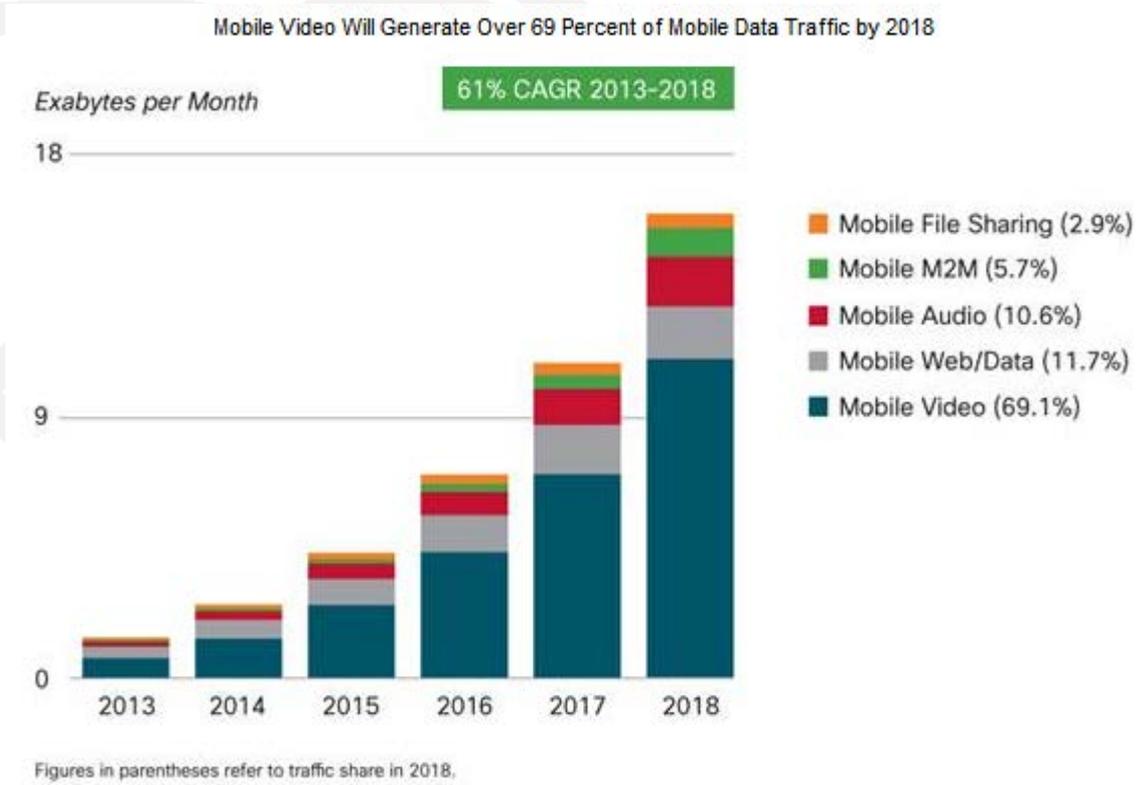
Source: CISCO VNI Mobile, 2014

Important growth of mobile broadband traffic mainly led by mobile video

# Mobile Broadband traffic EoY2013 compared to EoY 2012

x2 — Mobile connexions bitrates

+81 % — Global Mobile Data Traffic growth

+53 % — Mobile video traffic

+30 % — Data traffic generated by 4G connections

+45 % — Mobile Data Traffic offloaded to fixed networks via Wi-Fi or femtocell
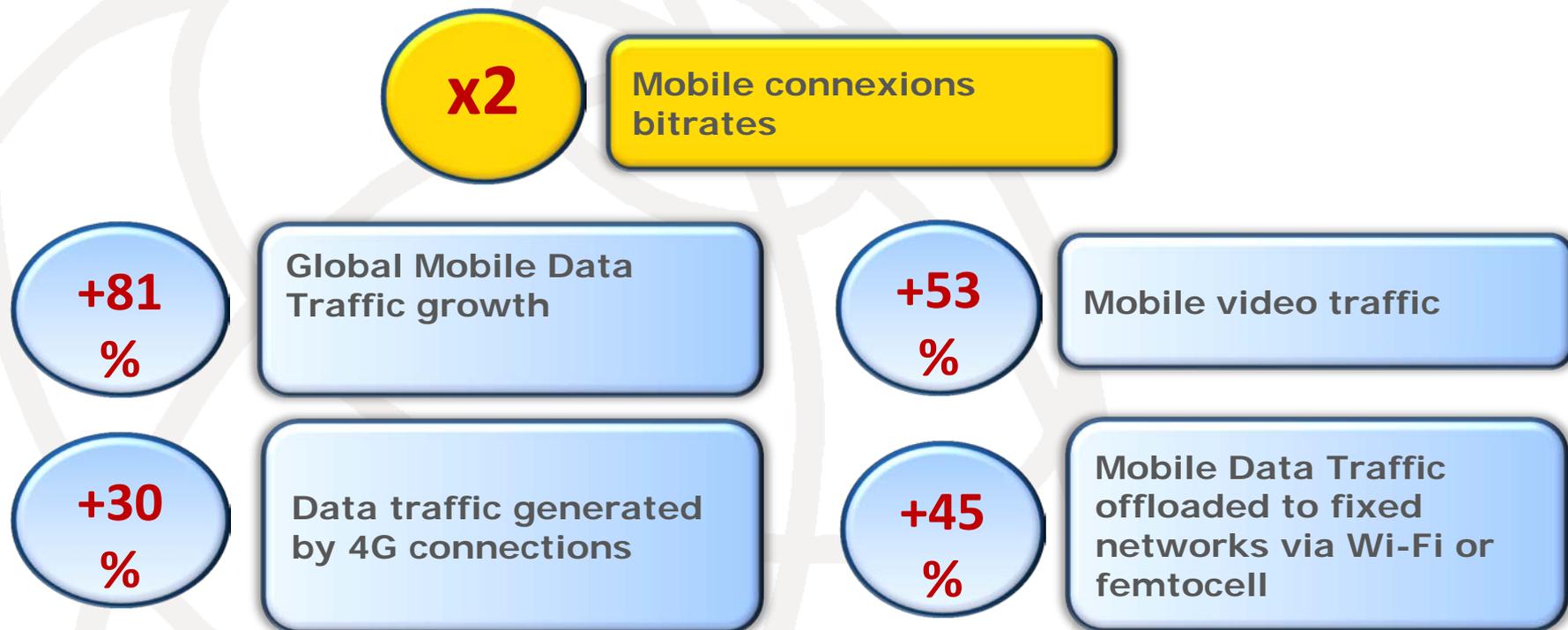
Note : Growth rates are given relatively to 2012

*Source:* Global Mobile Data Traffic Forecast Update 2013–2018, February 2014

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Broadband Access Technologies (Fixed & Mobile)

Mobile Broadband

Fixed Broadband

WIFI · Satellite · LTE · 3G · WIMAX · 1xEVDV · 1x EVDO · Broadband Technologies · xDSL (Copper) · Optical Fiber · Cable
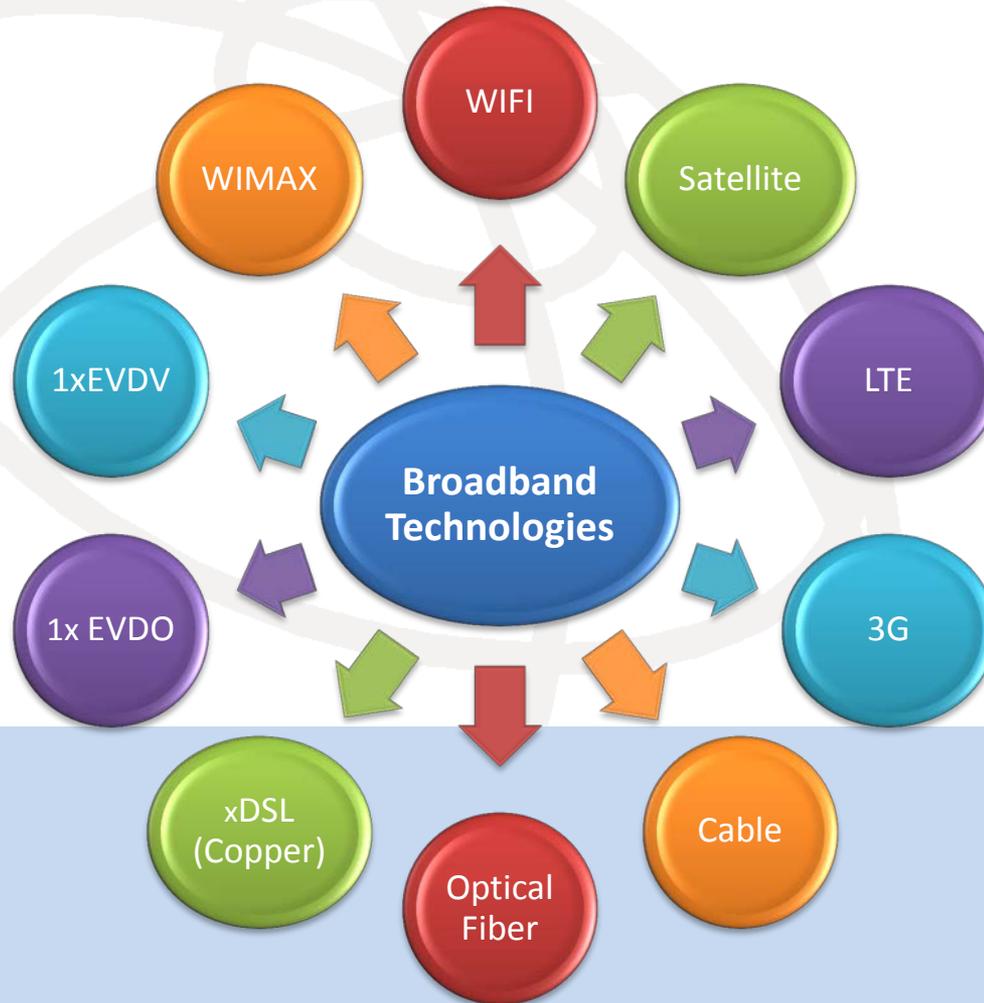
NGN implementation example – A layered architecture with access network technology independence
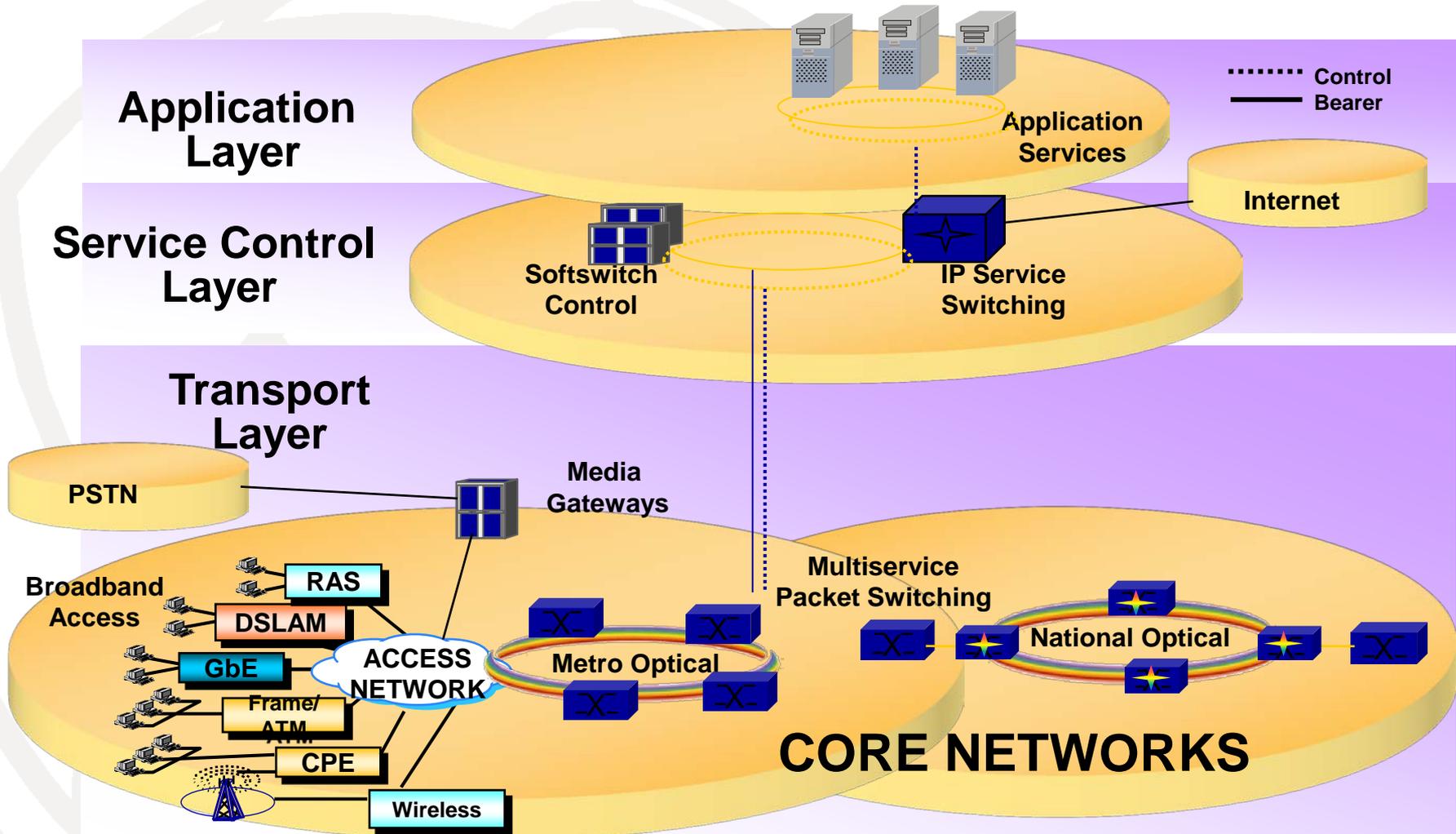
Q4/SG13:Identification of evolving IMT systems and beyond

As the mobile systems evolve beyond the original requirements set for IMT-2000, the SDOs will continue to deliver various releases of their respective systems. The ITU development of networks in the future and the continuation of the FMC work will further propel the evolution of common core networks. New Recommendations will need to be produced to identify those evolving IMT systems, specifically for IMT-Advanced and beyond.

Q5/SG13:Applying IMS and IMT in developing country mobile telecom networks

This Question, Applying IMT and IMS in Developing Country mobile telecom networks, focuses on studying the needs of the eco-system as a whole of developing country telecom networks in terms of applying IMT and IMS as they deal not only with the increasing shift towards mobility, but with the shift towards convergence of previously discrete areas, namely telecoms, data and entertainment under their own specific circumstances.

Cellular Technologies Enhancement
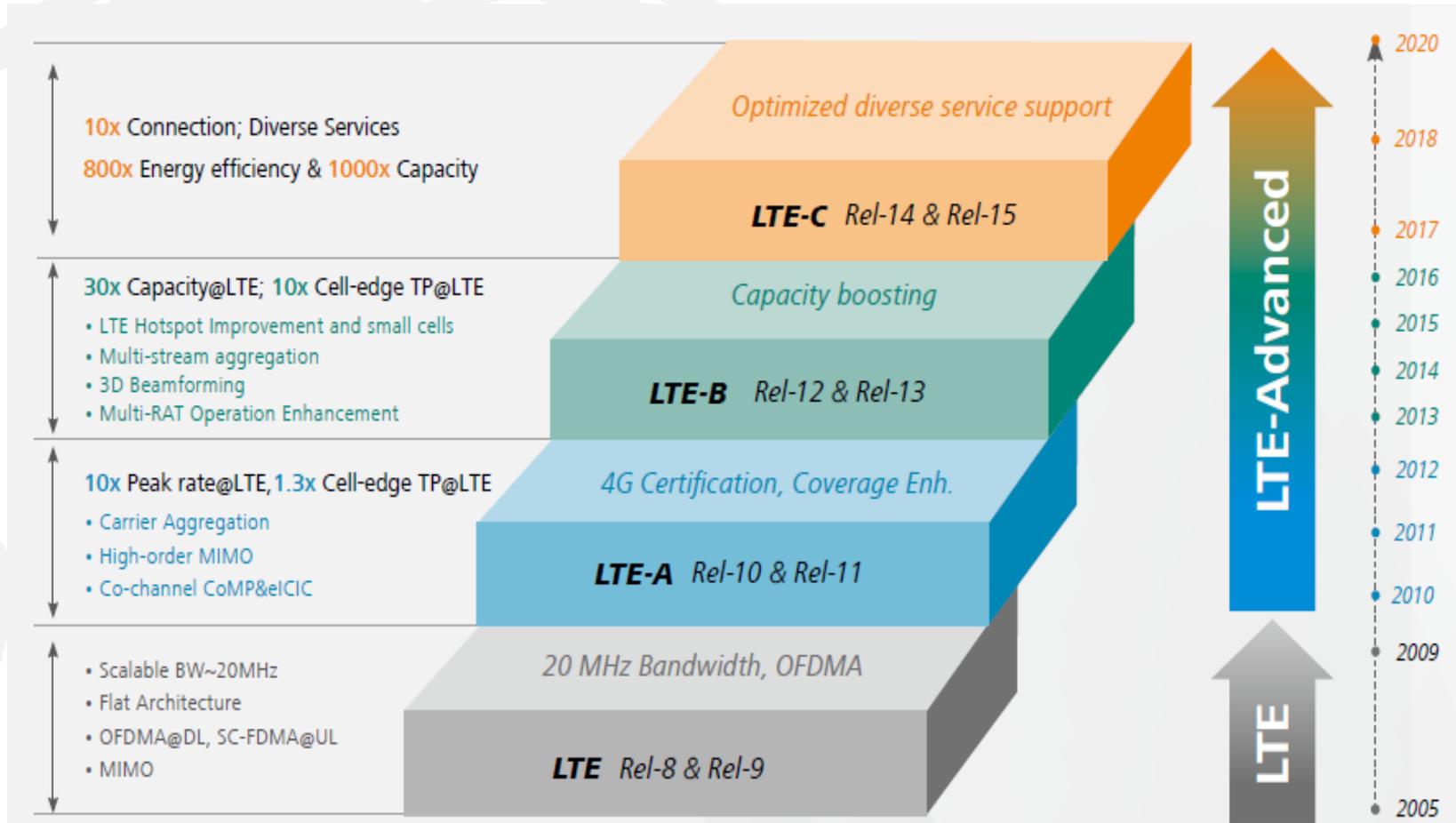
Source : The second phase of LTE-Advanced - LTE-B : 30-fold capacity boosting to LTE

Optical Fiber
Technical Advantages (1)

- **High throughputs** reaching **2 Gbps** UL & DL
  ➜ultra fast connections + fast data transfer

- **Very low signal strength attenuation**: only **0.2 dB / km**

Copyright Copper DSL Speed Evolution has reached its limit
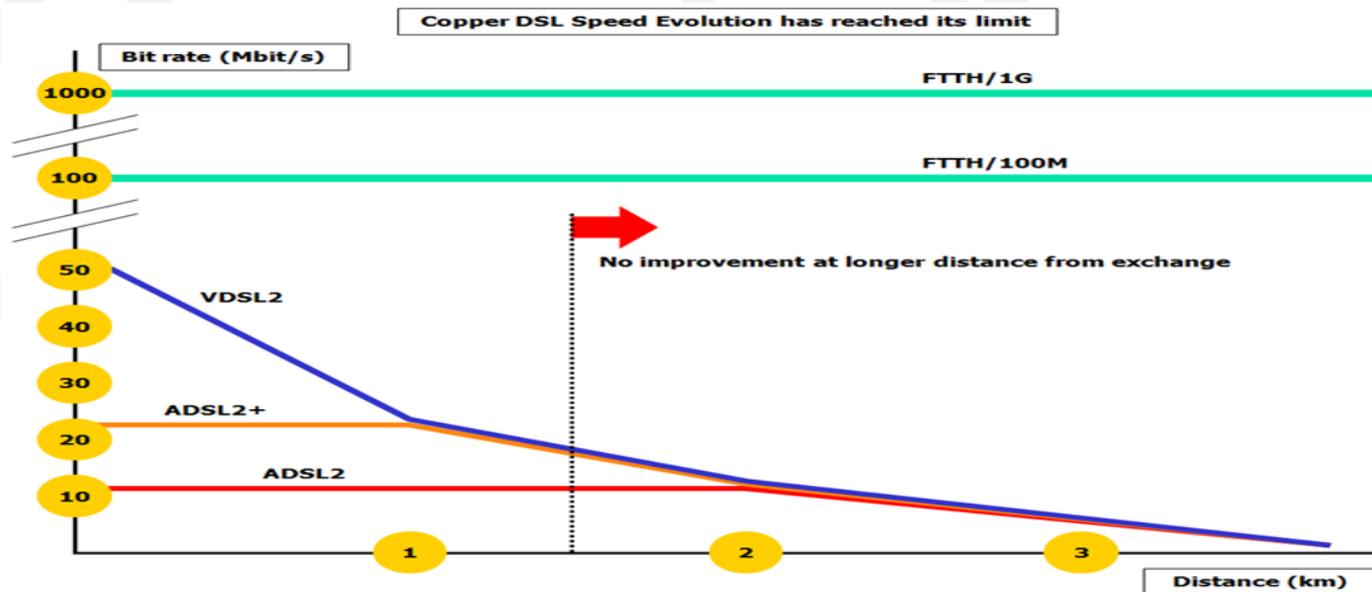
Optical Fiber
Technical Advantages (2)

- **High speed transmission** (= speed of light attenuated by 35%)

- **Immunity to electro-magnetic interference**

- **Less latency** (useful for real-time applications)

- **Less jitter** ➔ more stable transmission delay

- **Less error rate** ➔ less lost or corrupted packets
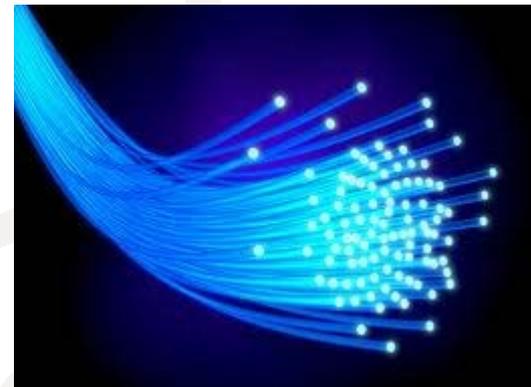
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Broadband Penetration Impact on GDP Growth

Broadband benefits the lower to middle-income economies more than higher-income ones

1.38 additional percentage growth to GDP for every **10** percentage point increase in broadband penetration

Additional percentage growth in GDP for every 10-percentage-point increase in technology penetration

	high-income economies	low- and middle income economies
Fixed	0,43	0,73
Mobile	0,60	0,81
Internet	0,77	1,12
Broadband	1,21	1,38
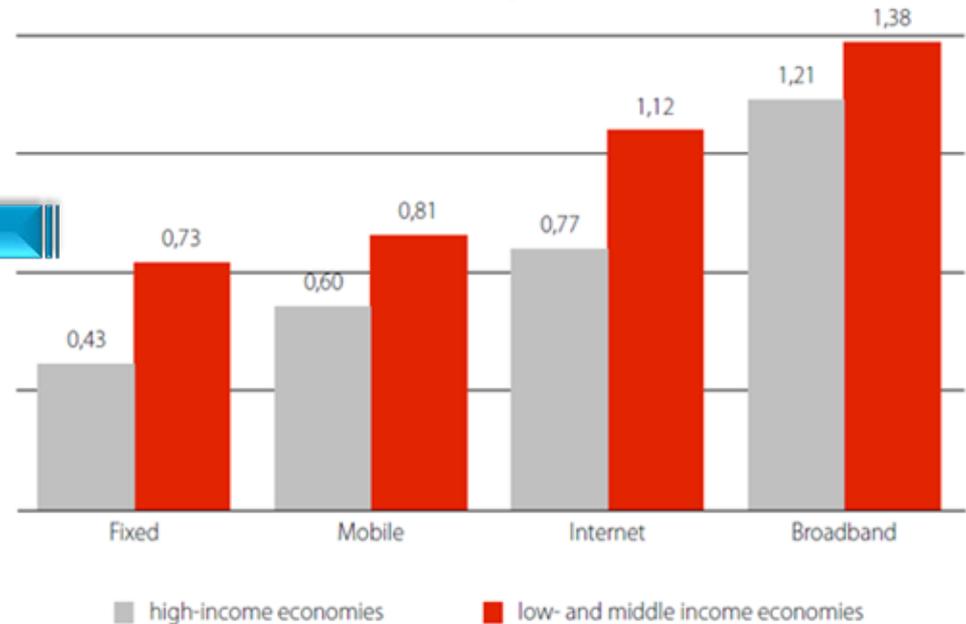
Source: World Bank Study (2009)

Broadband Penetration Impact on Employment

Increased broadband penetration leads to significant job growth

4 ways for Jobs creation :

→ **Direct job creation** *through the construction of broadband networks*

→ **Indirect job creation**

→ **Induced job creation**

→ **Transformational job creation**

Broadband impact on job creation

Country	Authors – Institution (*)	Objective	Results
United States	Crandall *et al.* (2003) – Brookings Institution	Estimate the employment impact of broadband deployment aimed at increasing household adoption from 60% to 95%, requiring an investment of USD 63.6 billion	• Creation of 140,000 jobs per year over ten years • Total jobs: 1.2 million (including 546,000 for construction and 665,000 indirect)
	Atkinson *et al.* (2009) – ITIF	Estimate the impact of a USD 10 billion investment in broadband deployment	• Total jobs: 180,000 jobs-year (including 64,000 direct and 116,000 indirect and induced
Switzerland	Katz *et al.* (2008b) – CITI	Estimate the impact of deploying a national broadband network requiring an investment of CHF 13 billion	• Total jobs: 114,000 over four years (including 83,000 direct and 31,000 indirect)
United Kingdom	Liebenau *et al.* (2009) – LSE	Estimate the impact of investing USD 7.5 billion to achieve the target of the *"Digital Britain"* Plan	• Total jobs: 211,000 jobs-year (including 76,500 direct and 134,500 indirect and induced)

Broadband Penetration Impact on Business

- **Improving employees' satisfaction and performance**

- **Offering new Marketing channels**

- **Taking benefit from cloud services**

- **Purchasing inputs and making sales online** (new markets, best prices...)

- **Minimizing travel costs**

- **Managing new and direct relationships with customers** (web-based)

- **Selecting the most suitable suppliers** (possibility of comparison)

Broadband Penetration Impact on Healthcare

- *Improving care quality, safety, efficiency and reducing disparities*

- *Engaging patients and families in managing their health*

- *Enhancing care coordination* (between institutions, hospitals, doctors...)

- *Improving public health* (especially in rural areas)

- *Ensuring health information privacy and security*

- *Garantee cost effective Healthcare*

Example: *A study from the University of Texas Medical Branch estimates that the U.S. health care system can saves $4.28 billion from the elimination of patient transfers alone*
[source : Communication Workers of America, 2009]

Broadband Penetration Impact on Education

- *Expanding the reach and equity of education* over the country

- *Ensuring personalized learning*

- *Building new communities of learners*

- *Powering anywhere, anytime learning*

- *Providing immediate feedback and assessment*

- *Enhancing seamless learning*

- *Bridging formal and informal learning*

- *Minimizing educational disruption* in conflict and disaster areas

- *Assisting learners with disabilities*

- *Improving communication and administration*

- *Maximizing cost efficiency*

Source : Technology, Broadband and Education, ITU, UNESCO
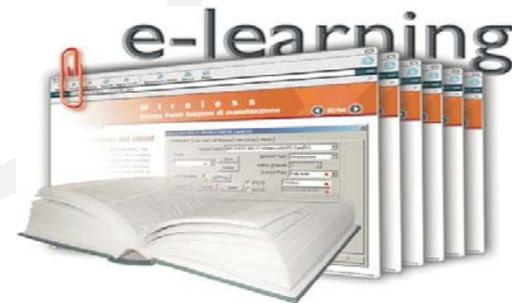
Broadband Penetration Impact on Agriculture

- *Boosting productivity*

- *Monitoring and responding to weather variability* (soil temperature, precipitation, humidity, leaf wetness, soil moisture...)

- *Exchanging ideas and information* between farmers, agricultural researchers, suppliers and buyers as well as conducting business with each other

- *Increasing the amount of information farmers can process*

- **Researching new methods of farming** to increase outputs

- *Creating new markets* for existing rural businesses

- *Purchasing inputs and making sales online* (Machinery, seed chemicals...)

Broadband Penetration Impact on Community

•**Government-to-Government**
Utilizing technology to improve public administration processes for service delivery.
•[e-Government Gateway- such as e-Tourism and e-Judiciary]
•[e-secured government documents management -such as Parliament articles]
•[e-Natural Resource Managemnet] and More

•**Government-to-Citizen**
Utilizing technology to integrate public, civil society and private sector interest
•[e- Citizen Automated Citizen registry]
•[e-Health]
•[e- Education]
• [Social services such as e-Loan and e-Grants]and More

G2G   G2C

G2E   G2B

•**Government-to-Employee**
Utilizing technology to improve administration processes for employee.
•[e- Account]
• [e-Human Resource Management] and More

•**Government-to-Business**
Utilizing technology to improve the lives of citizn
•[e- Payments]
•[e-Filing]
•[e- Taxation] and [Business services such as e-permits/licenses]

Wide range of interactive and practical services targeting different actors

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ITU Vision

"Build on broadband" networks

and everything else

will follow...
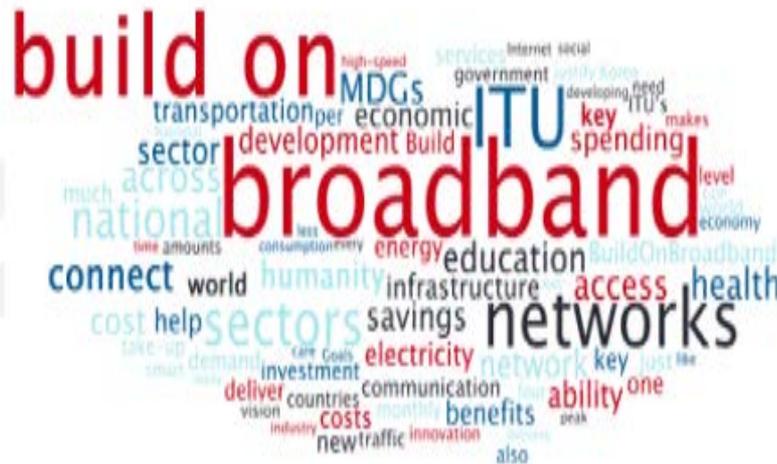
ITU-D Work on Broadband (1)

Question 7-3/1: Implementation of universal access to broadband services

Focus on the regulatory implications related mainly to:

- **Synergies among telecommunications/ICT stakeholders**

- **Financing and allocation of funds for universal service**

- **Capacity building in rural and/or underprivileged communities**

- **Development of local content, including services and applications**

ITU-D Work on Broadband (2)

Question 7-3/1 (Study Period 2010-2014)
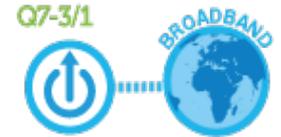
Expected output analysis on:

- **Optimum coordination among stakeholders in the development of universal service for broadband** (policy-makers, regulators, operators and other stakeholders)

- **Diversification of means of financing universal access**

- **Optimizing funds and allocating them more effectively** for universal access to broadband services

- **Capacity building in rural and/or underprivileged communities**

- **Development of local content**, including services and implications

ITU-D Work on Broadband (3)

Question 25/2: Access technology for broadband telecommunications including IMT, for developing countries

- Identify the factors influencing the effective deployment of broadband wireline, wireless and satellite access technologies and their applications

- focus on technologies and/or standards recognized or under study by the other two ITU Sectors

ITU-D Work on Broadband (4)
Question 25/2 (Study Period 2010-2014)

Q25/2

Main expected outputs:

- **Yearly progress report on the group study items**

- **Analysis of the factors influencing the effective deployment of broadband access core technologies**

- **A set of guidelines for broadband access deployment**

- **A handbook on IMT deployment in developing countries** to replace the Handbook on Deployment of IMT-2000 systems (2003).

- **Draft Recommendation(s)**, as appropriate and if justified

ITU-T Study Groups
Working on Broadband related Subjects

- **Study Group 9:** Broadband cable and TV

- **Study Group 13:** Future networks including cloud computing, mobile and next-generation networks *(IoT, IMT, NGNe, Cloud,...)*

- **Study Group 15:** Networks, Technologies and Infrastructures for Transport, Access and Home *(DSL, FTTH, ...)*

- **Study Group 16:** Multimedia coding, systems and applications *(standards for video-based services)*

- **Study Group 17:** Security *(security of applications and services for IoT, smartphones, web services, social networks, cloud computing, IPTV, telebiometrics ...)*

ITU Recent Publications on Broadband

Best practice guidelines (1)

on regulatory approaches to advance the deployment of broadband, encourage innovation and enable digital inclusion for all

Funding mechanisms for promoting the deployment of broadband infrastructure

- **Leveraging partnerships** (between public and private sector)

- **Modernizing universal service programs and funds** to make USAF serve as :

  - ☐ a facilitator of the market, piloting innovative rural services and applications, creating demand for advanced ICT connectivity and services

  - ☐ and/or a funding mechanism for broadband networks into rural and high-cost areas through support both at the retail and wholesale ends

Best practice guidelines (2)

on regulatory approaches to advance the deployment of broadband, encourage innovation and enable digital inclusion for all

Fostering private investment in broadband through incentive regulation

- **Providing overall direction through a national policy**

- **Rationalizing licensing regimes**
  → facilitate entry in the broadband market and increase competition at all network layers

- **Making spectrum available for mobile broadband**

- **Removing barriers to broadband build-out and access to broadband networks**

- **Granting tax incentives**

Best practice guidelines (3)

on regulatory approaches to advance the deployment of broadband, encourage innovation and enable digital inclusion for all

Stimulating innovation and development of applications and services

- **Nurturing the creation and adoption of applications, services and digital content**

- **Spurring investment in R&D activities**

- **Enforcing Intellectual Property Rights**
  Creating intellectual property regimes that balance monopoly use of inventions with building a rich public domain of intellectual materials

Best practice guidelines (4)

on regulatory approaches to advance the deployment of broadband, encourage innovation and enable digital inclusion for all

Expanding digital literacy

- **promoting a first-class training system in all countries** to provide creative human resources

- **facilitating investment in all forms of education and particularly in ICT education** (in the area of R&D, ICT knowledge transfer, development of digital applications and content...)

- **Providing sufficient and sustainable funding** to universities, computer labs and other public research institutions, leveraging international partnerships when possible and advantageous

# Broadband Commission for Digital Development

- Launched in **May 2010**, in response to UN Secretary-General Ban Ki-moon's call for more concerted efforts by the UN system to help achieve the MDGs

- Created by ITU in partnership with UNESCO

- **Five ambitious but achievable targets**

  ➔ making broadband policy universal

  ➔ boosting affordability and broadband uptake to ensure the benefits of broadband are made available to all

**BROADBAND COMMISSION**
FOR DIGITAL DEVELOPMENT

Advocacy Target 1:
Making broadband policy universal

By 2015, all countries should have a NBP or strategy or include broadband in their Universal Access/Service Definition
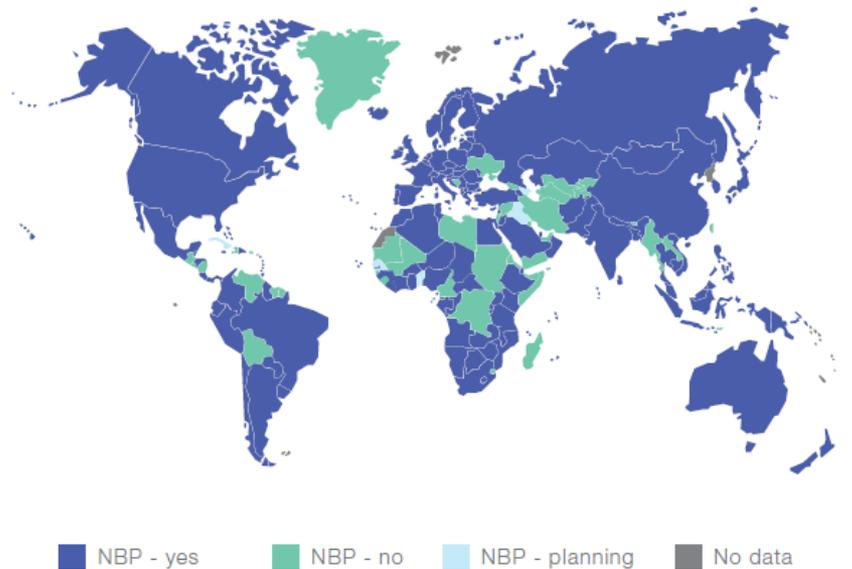
Growth in National Broadband Plans, 2005-2013

Legend: NBP - yes | NBP - no | NBP - planning | No data
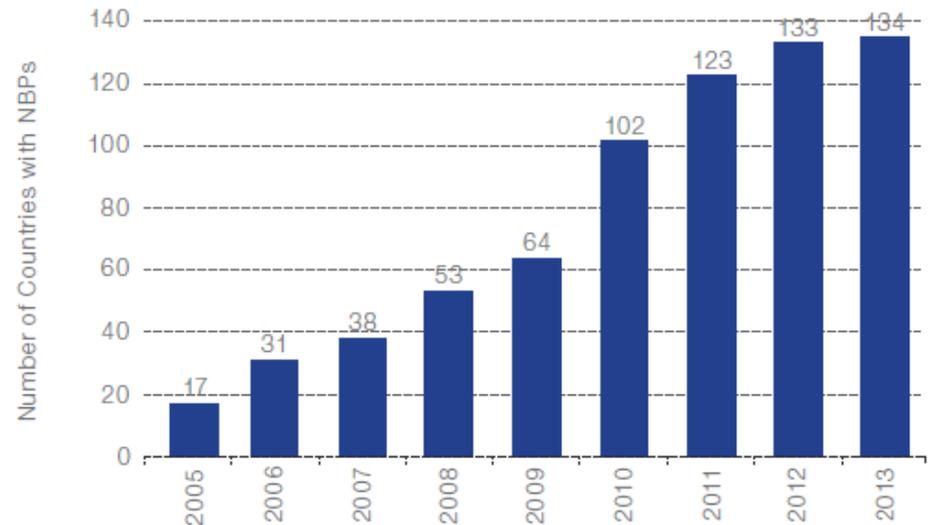
# Advocacy Target 2:
Making broadband affordable

By 2015, entry-level broadband services should be

made affordable in developing countries

Advocacy Target 3:
Connecting homes to broadband

By 2015, 40% of households in developing countries should have Internet access

Proportion of Households with Internet Access in Developing Countries, 2002-2015
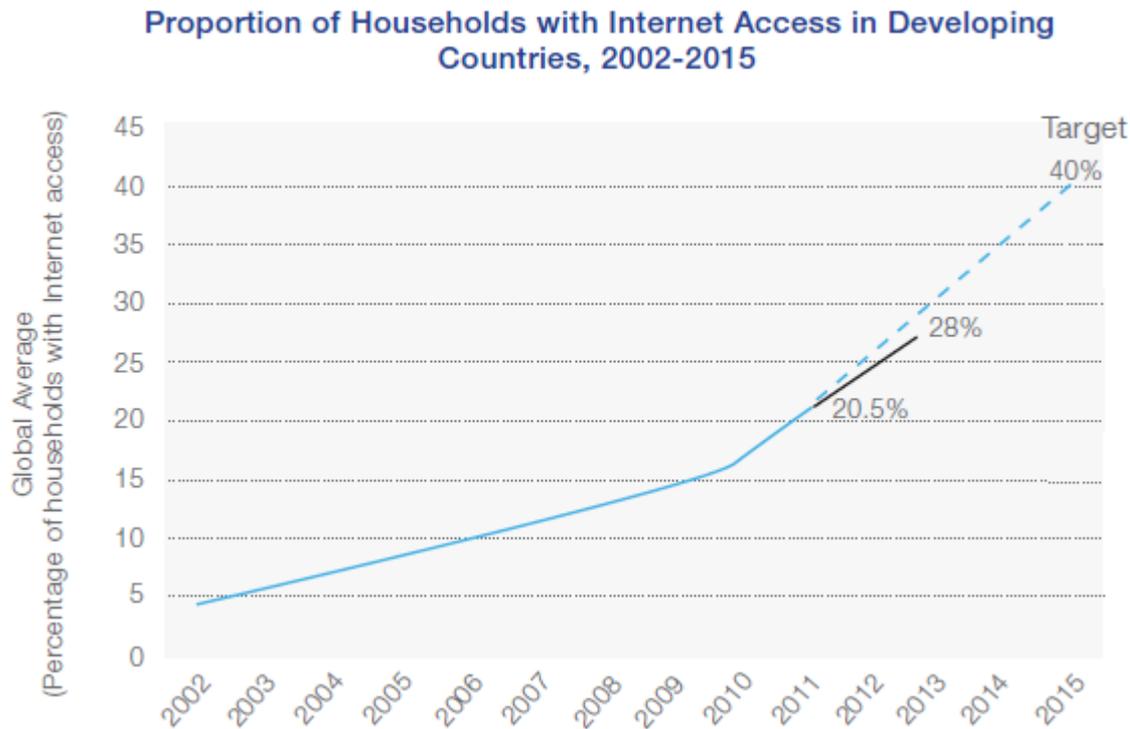
Source: ITU World Telecommunication/ICT Indicators database

Advocacy Target 4:
Getting people online

By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in LDCs


Internet User Penetration, 2000-2015
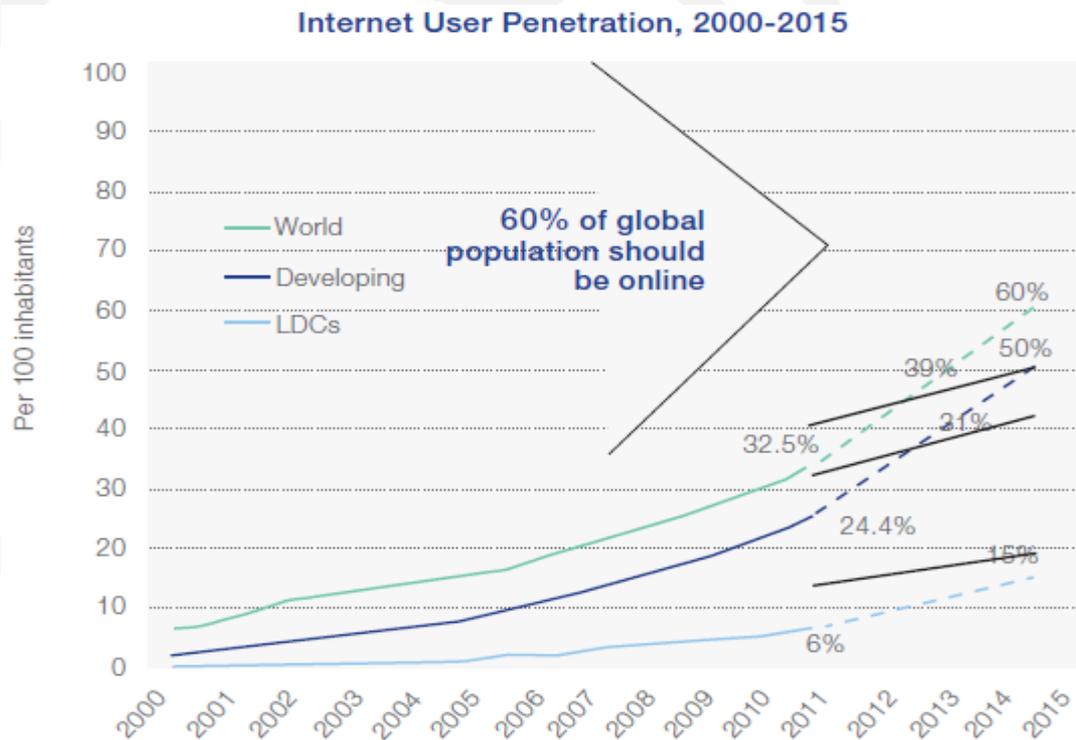
Source: ITU

Advocacy Target 5:
Achieving gender equality in access to broadband by 2020

Source: ITU World Telecommunication/ICT Indicators database

The Gender Gap: men and women online, totals and penetration rates, 2013
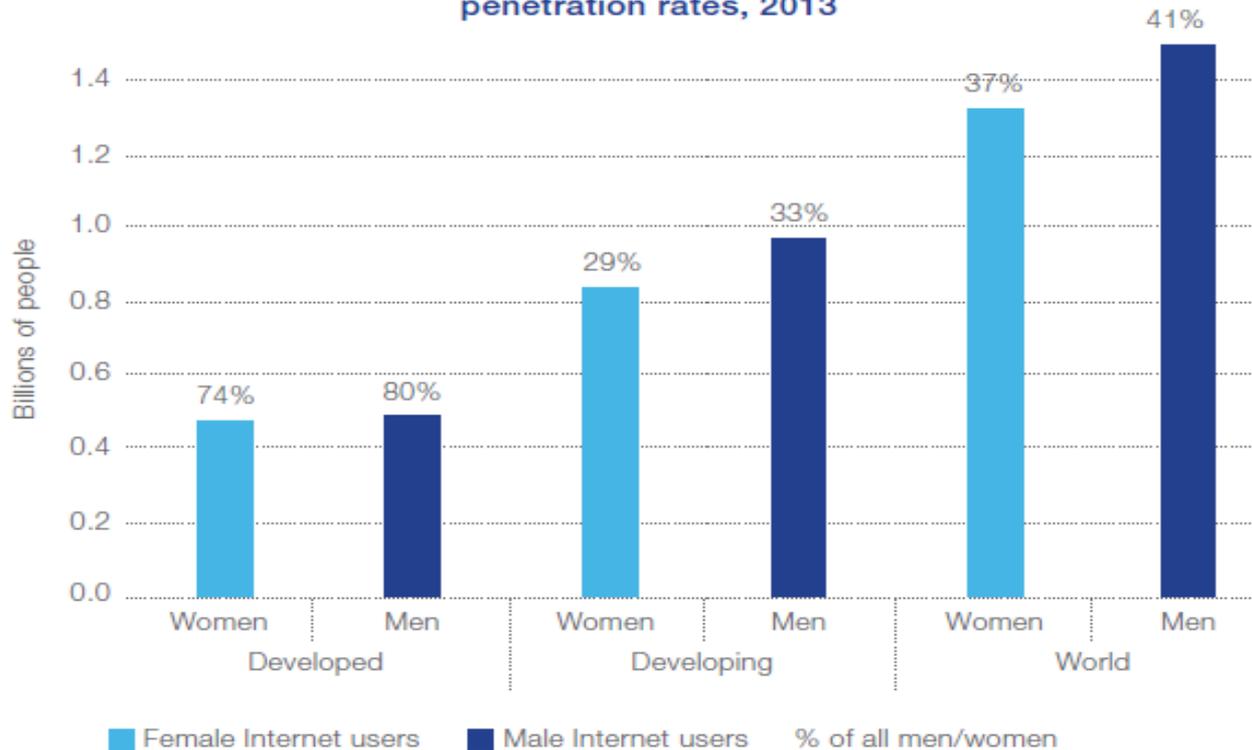
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Conclusion

- *The Broadband markets worldwide are more and more growing,* driven by the important Broadband advantages through different access technologies and mainly cellular ones

- *Broadband Services are means for enabling sustainable economic well-being* by increasing countries wealth, creating job opportunities and providing a wide range of innovative and practical services in several domains

- *ITU believes that Broadband is crucial as a transformative step towards socio-economic development for mankind,* and it builds many activities around Broadband concept through its T, D and R sectors

- *A review of the regulatory landscape in the world and the Arab region is essential* in order to advance the deployment of broadband, encourage innovation and enable digital inclusion for all, and that, taking into account the Best practises guidelines

Recommendations

- *Open a high level dialogue on Broadband between all stakeholders* on strategies & policies aiming at Broadband development and finding new ideas on how to foster demand for broadband and e-services

- *Develop innovative business models and financing arrangements* for Broadband access

- *Work on developing new services, personalized applications and fully multilingual content* to maximize the potentiality of Broadband

- *Find solutions for reducing the international interconnection costs and the terminating costs* for allowing operators to offer Mobile Broadband Services to their customers at affordable prices

Workshop on Best practices for successfully implementing of Broadband network in the Arab region

(Rabat-Morocco, 4-5 March 2014)

Thank You for Your Attention

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