

Role of Government in Increasing Broadband Penetration

Lessons from Asia

Helani Galpaya
LIRNEasia

*Lima, Peru
18 May 2011*

This work was carried out with the aid of a grant from the International Development Research Centre, Canada and the Department for International Development, UK.

Agenda



- **Korea:** everyone's benchmark
- Can Korea be replicated in emerging Asia?
- **Hong Kong:** a more achievable strategy?
- **Sri Lanka:** somewhere in between
- **Conclusion**

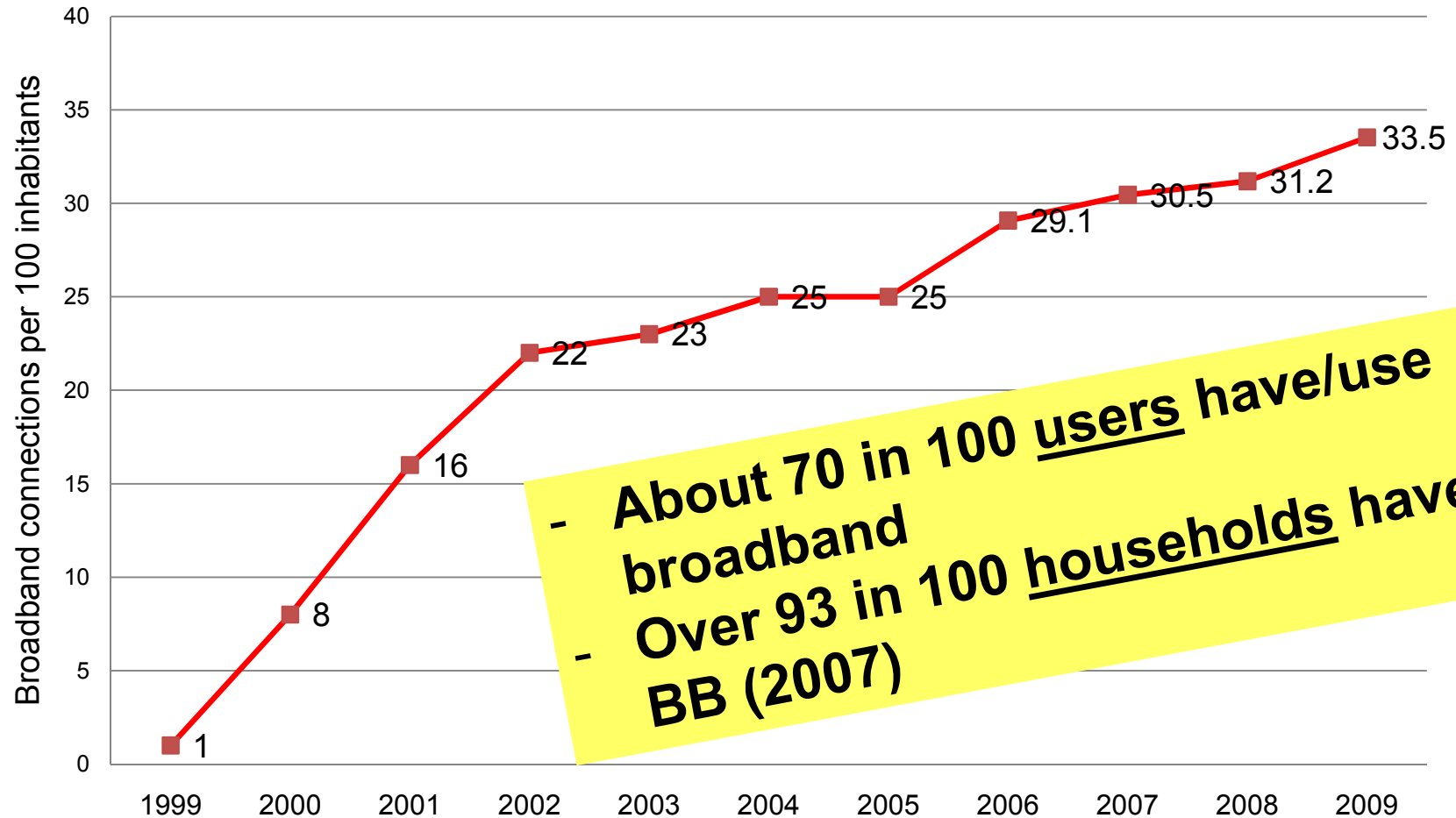




KOREA

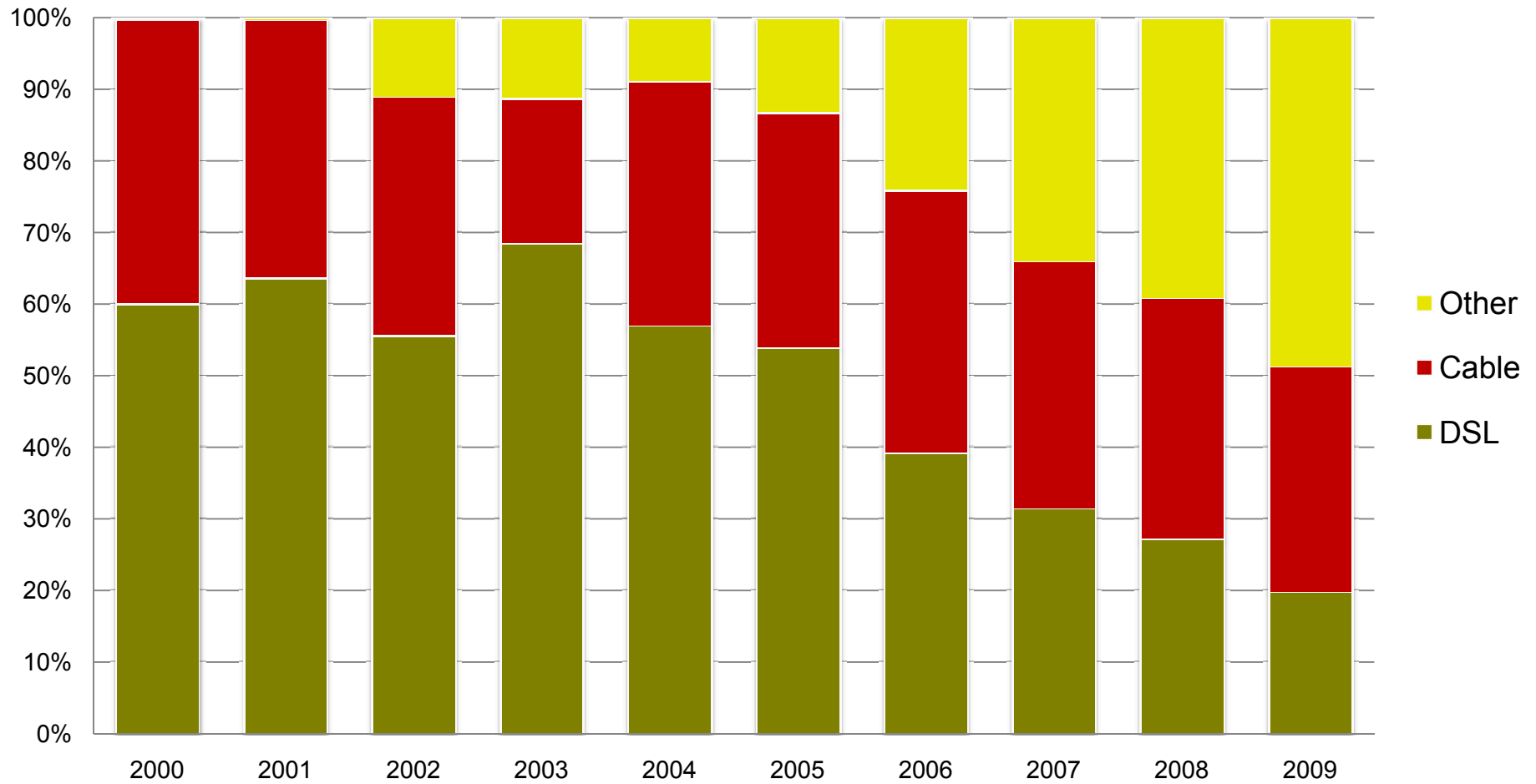


Korea is everyone's benchmark. High BB access, useage



Source: OECD Communication Outlook Documents, 1999 – 2009; Gartner, 2008

A mix of FTTx, Cable, xDSL, other technologies for BB



Source: OECD Communication Outlook documents

How did Korea get there?



- Advantages of high population density & most people living in high-rises
- Early start
- Consistent policy development: successive policies correcting the errors of previous policies
- Consistent implementation
- Liberalization, privatization, competition
- Money! Lots of money.
- Supply push and demand pull
 - Some random events too

Gathering momentum, 1980-1994



- Large investment in backbone infrastructure 1980s
- National Basic Information System (NBIS) 1984
 - Focus: building 5 national (physical) networks and related systems
 - National Administration Information System (IS): central & local govt. offices
 - Financial IS: 140 banks, financial services companies
 - Education & research IS: 20+ universities & research orgs
 - Defense & Security IS
 - Public Health and Social Welfare IS
- NBIS: Supply push with limited success
 - Shortfalls in funding, absence of strong industry capability and failure to stimulate domestic demand.
- Included encouragement of production of low-cost computers for Korean households (more successful)

Source: Among others, Harindranath & Liebenau, *National Information Infrastructure Policies in*

IRSI International Perspective. Available at <http://www.docin.com/p-68100028.html>

Gathering momentum, 1980-1994 ...contd.



- Korean Information Infrastructure (KII), 1993
 - Emphasis on network expansion
 - Government high speed network (KII-G)
 - Public high speed network (KII-P)
 - Initially fiber backbone deployed to connect five metropolitan areas and nearby cities
 - Focus primarily on supply. Money from govt. Demand did not keep up
 - Result: lowered prices on leased lines (needed for ISPs)
 - KII Centrally coordinated; but decentralized strategies needed
- Deregulation, privatization, framework legislation
 - Korea Telecom privatized; market liberalized (int'l competition in 1991; mobile competition 1994; long distance competition 1995 etc)

Reform and take-off, 1994-2004



- GATS accession, 1994
 - Introduced regulatory reforms, significant tax breaks and eased FDI and foreign ownership restrictions
 - Entry and pricing rules relaxed
 - Exemptions from national taxes (1994-2004) and local taxes (1994-2009)
- Hanaro enters broadband market in 1997
 - Causing KT to aggressively respond
- Inflection point in growth of broadband and household computers (1999)
- Cyber Korea 21, 1999
 - Increase competitiveness of Korean industry
 - Enhance quality of life of citizens

Consolidating growth with global ambitions, 2004 -



- IT 839 (8 services, 3 infrastructures, 9 growth areas)
 - Infrastructure 3 (Broadband convergence network, U-sensor network, IPv6) intended to create a broadband service platform and give Korean businesses first-mover advantages
 - Renamed u-IT839 in 2006
- Massive outlays : USD 70 billion committed
- Criticized for being too supply-side and serving Chaebols more than the public interest
 - But goals are open a part of industrial strategy
 - To promote Korean industry (products, R&D)

Money!



Year	Policy	Investment, USD m
1984	National Basic Information Systems (NBIS)	200
1987-96	National Database Computerization Project	5,536
1992	Korea Information Infrastructure (KII), 1992	40,000
1993-02	Informatization Promotion Fund	7,800
1994	GATS	Tax concessions for those in high-tech and value-added sectors
1999	Cyber Korea 21	918
2004	Information Technology 839 (IT 839)	70,000
2006	e-Korea Vision	84.4
2007	Broadband IT Korea Vision	
2009-13	Ultra Broadband Convergence Network	62

Source: MIC, *A critique of Korean National Information Strategy: case of national informational infrastructure*, Dong Hee-Shin +

Demand pull: Gaming



- Gaming takes off in “cyber cafes” in 1994
- 24,000 PC rooms used for gaming by 2002 (USD 1/1 hour)
- Created demand for broadband even as gaming moved to the home
- Collateral effect: 60% of all stock exchange transactions over the Internet by 2002

Key themes in the Korean journey



- Willingness of govt. to continuously monitor and correct itself
 - Each plan had problems
 - Subsequent plans attempt to correct them
 - And match market/global/national needs and opportunities
- Protection of Korean industry
 - But with explicit deadlines for market opening
- Huge government investment/assistance
- Public-private partnerships
- Development of related industry key focus in early days

Can Korean model be replicated in emerging Asia?



- No luxury of time
- Lack of money
- Even if money IS available
 - Consistent policy making: rare
 - Effective implementation: rarer
- Wired broadband unrealistic
 - E.g. Sri Lanka

Why Korea cannot be replicated in Sri Lanka (& other emerging economies)

Population (mid 2009)	20.45 million
Wireless connections (2010 Q2)	15.86 m GSM +2.61 m CDMA= 18.47
Wireline connections (2010 Q2)	875,509
Cable households	Negligible (terrestrial & satellite TV dominate)
Estimated # of households	4,744,780
Maximum % of households with potential for wire-guided broadband, most generous assumptions	18%
Percentage of wireless-connected households, using harsh assumptions	-
Period of 3G supply by 3 operators	5 years; 3 years intense competition
E Sri Lanka project costs (USD 83 m, huge by LK standards) as percentage of Korean investment	Less than 1 percent

- Lack of funds
- Lack of existing copper access network (and declining)



HONG KONG

Drawing from presentation by Cheuk Sing Tak, Sanda, Head of Regulatory Affairs, OFTA, Hong Kong China at APT Policy & Regulatory Forum, July 2010



The Future Broadband Network: Market-Led or Government-Led?

- Government-led approach
 - Government to drive broadband investment through incentive schemes, financial supports and even direct investments
 - Concerns are
 - Inadvertently affect the business case of private investors and could dampen investment sentiment
 - The public becomes overly reliant on government funding for future telecom infrastructure
 - Need to consider proper regulatory model
- Market-led approach
 - Market presumed to be better than government in making commercial investments
 - Concerns are
 - Could slow network rollout
 - Need to consider intervention if market fails to achieve public policy objectives (e.g. broadband coverage to remote areas)

Market-Led Approach has role for government



- But it's a different role
- Provide a clear, transparent and predictable regulatory regime
- Minimise regulatory barriers to market entry and exit
- Ensure effective competition and maintain a level playing field for all players
- Safeguard the consumer interest
- Facilitate the building of network infrastructure

- Hong Kong: best example of market-led approach

Telecommunications Policy in Hong Kong



- Pro-competition and pro-consumer policy objectives
 - the widest range of quality telecommunications services be available to the community at reasonable price
 - telecommunications services be provided in the most economically efficient manner possible
 - Hong Kong be the pre-eminent communications hub for the region

Telecommunications Policy in Hong Kong

- Market-driven approach
 - Fully liberalised market for telecom services
 - No upper limit of no. of licence to be issued
 - No deadline for application of licence
 - Telecom companies are entirely privately owned
 - no government participation / subsidy
 - no foreign ownership restriction
 - Minimum intervention; let market serve public interest to maximum extent
- ➔ *Market to decide form and pace of broadband deployment*

HK: Market-Led Approach



- Universal service obligation
 - A comprehensive review conducted in 2007 concluded that the scope of universal service should not be extended to cover broadband Internet access service.
- Network neutrality
 - OFTA conducted a review in 2009
 - There is sufficient competition in both the network and service markets
 - As long as the Internet services providers adopt a fair and open method to control the flow of Internet traffic on their networks, this should be tolerated
 - OFTA will closely monitor the market and will take appropriate action if adverse market situation arises

HK: Measures to Facilitate Broadband Deployment



- Coordination of Lands Development Projects and Public Works
 - Operators' infrastructural requirements will be included in future development and infrastructural projects
- Government Premises and Public Facilities
 - Allow use by operators for network rollout
 - Fixed network operators – public roads, highways, government bridges & tunnels
 - Mobile network operators – highway facilities (lamp posts, flyovers, footbridges) & government premises
 - Wi-Fi providers – public payphone kiosks for access points
 - Only a nominal rental fee is charged

HK: Measures to Facilitate Broadband Deployment



- Facilitate extension of mobile broadband coverage
 - Use of microwave links and hill-top sites to establish backhaul network and base stations
 - More viable and cost effective option for broadband access in remote and rural areas
- Timely Release of Radio Spectrum
 - release relevant radio spectrum through market-based mechanisms
 - Auction of spectrum in 2.3GHz and 2.5 / 2.6GHz bands in Jan 2009 for next generation mobile broadband services
 - Auction of spectrum in 850 / 900 / 2100 MHz bands in end 2010

HK: Measures to Facilitate Broadband Deployment



- Registration Scheme for Buildings With Optical Fibre-based Access Networks
 - A voluntary registration scheme
 - For residential buildings
 - Buildings are classified into
 - FTTH building; or
 - FTTB building
 - Registered buildings are permitted to use label identifying the broadband infrastructure provided
 - OFTA acts as the scheme administrator

HK: Measures to Facilitate Broadband Deployment



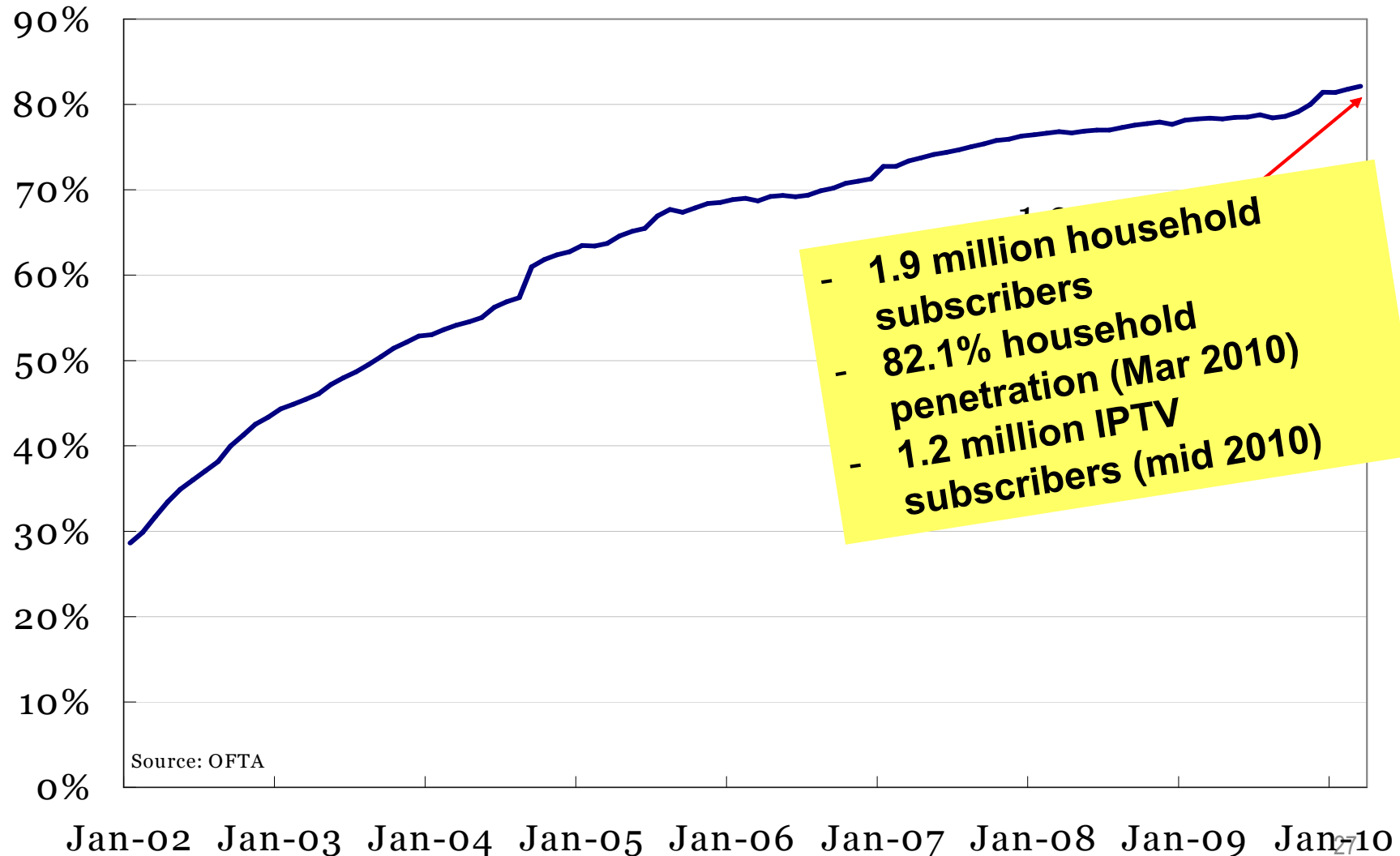
- Facilitate landing of submarine cables in Hong Kong
 - Increasing transparency of application procedure
 - Enhancing coordination between government departments
 - Considering relaxation of government subsidised land for operating cable landing stations
 - Better use of existing spaces in cable landing stations

HK: Measures to Facilitate Broadband Deployment

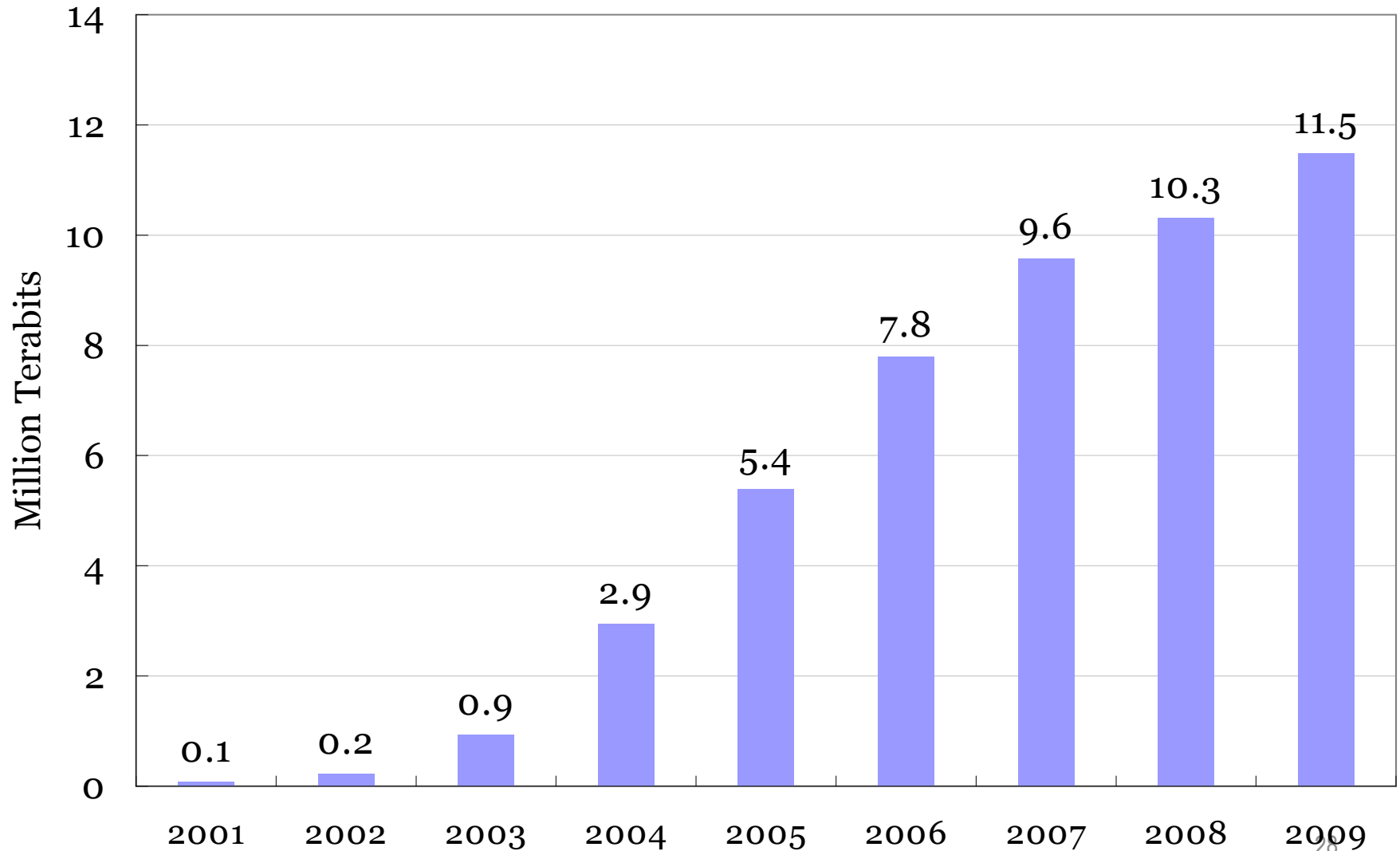


- Improving access to broadband for needy families
 - Provision of cash subsidy for low income families with children attending primary or secondary school to have broadband access
 - USD 167 per year
 - Special Purpose Vehicle (SPV) established by government to provide low cost broadband services, low-cost new computers, and training / technical support
 - Aimed at mitigating the impact of the digital divide on the quality of learning of children and young people

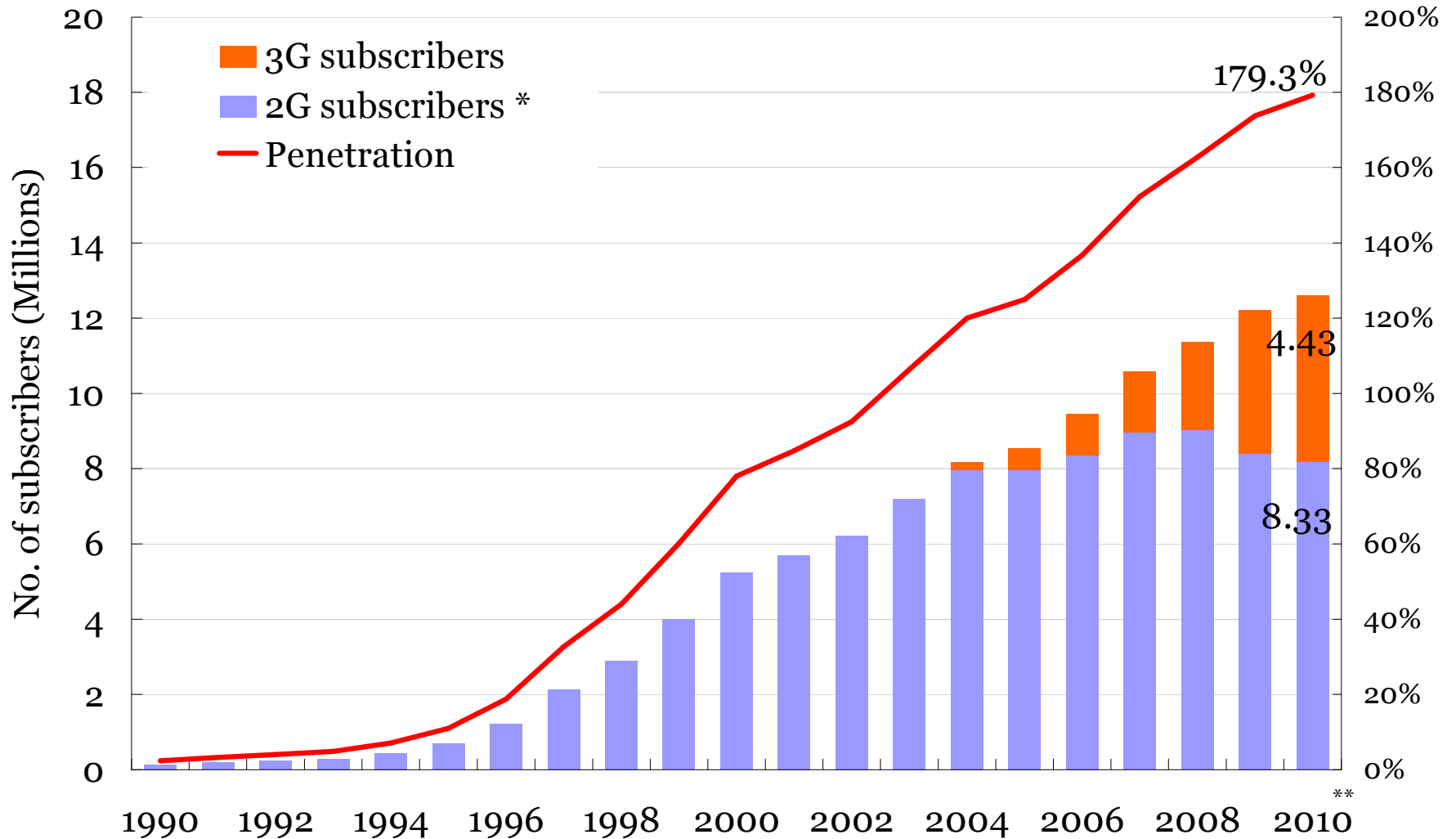
Hong Kong: Fixed Broadband Penetration by household



Hong Kong: Fixed Broadband Traffic



Hong Kong: Mobile Data Service Penetration

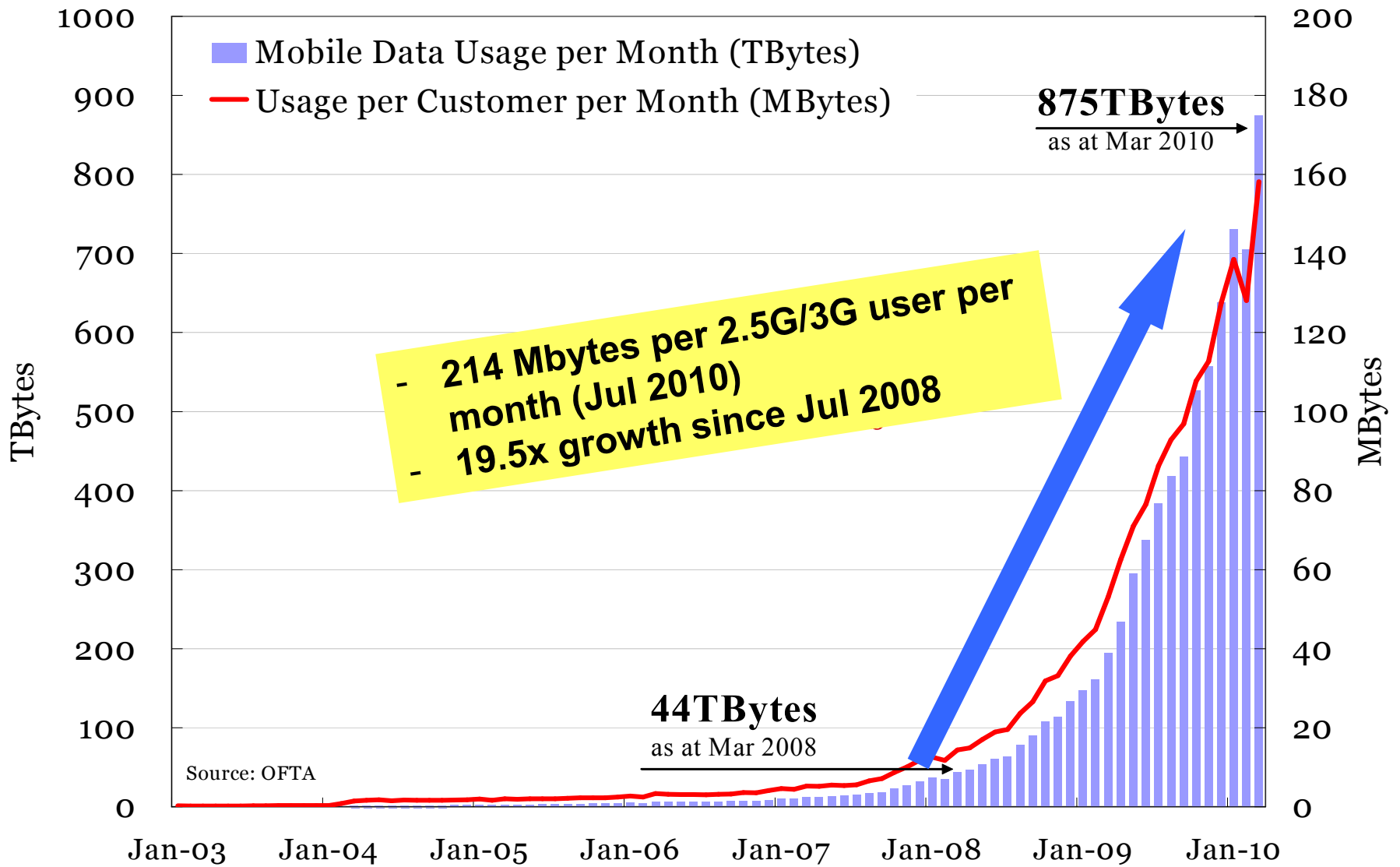


* The figures of 2G subscribers include those who subscribed 2G plan or using 2G prepaid card but occasionally use 3G services.

** For year 2010, figures of March 2010 are used.

Source: OFTA

Hong Kong: Mobile Data Traffic



Hong Kong and Korea outcomes and inputs



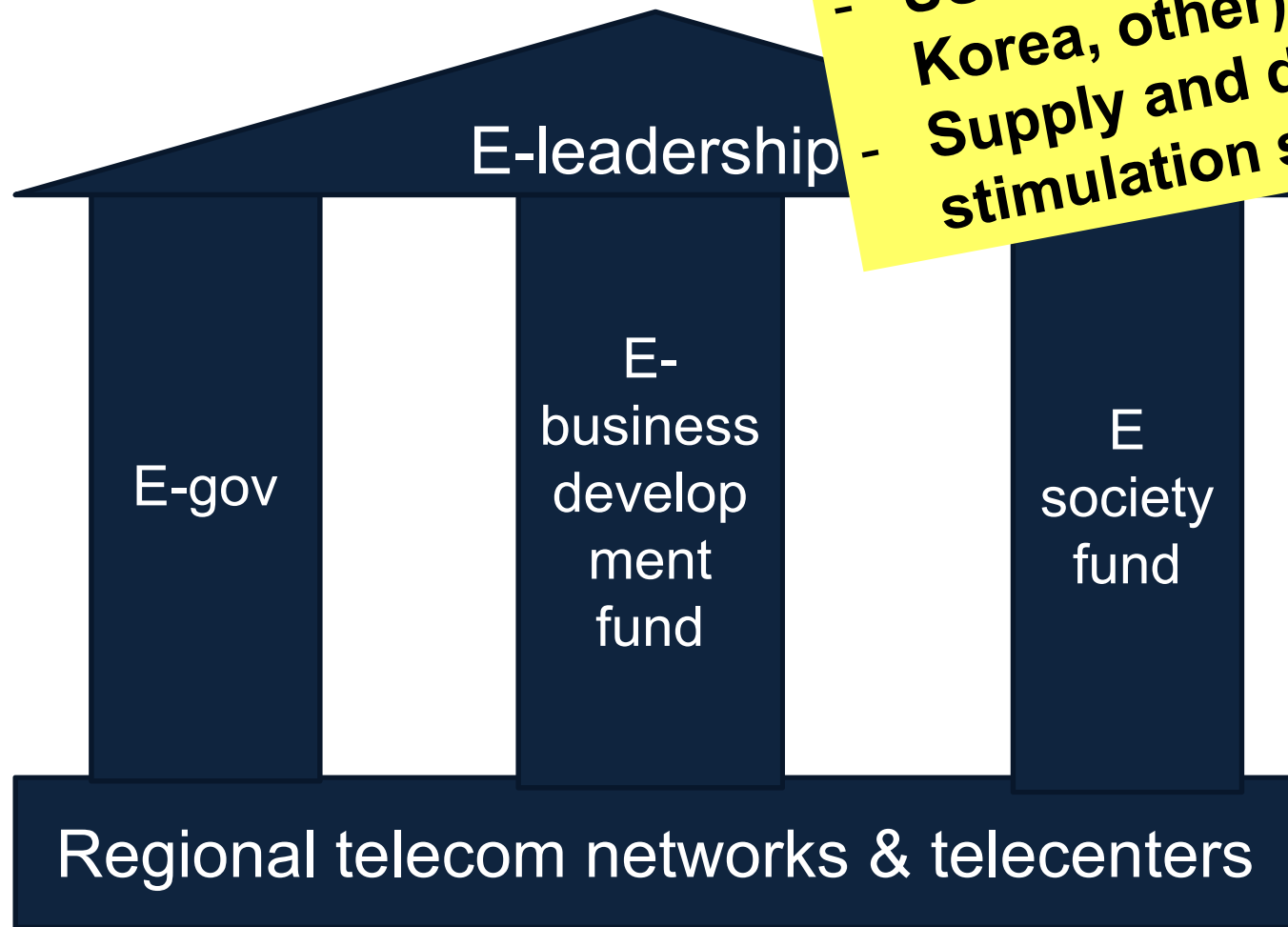
- Population and pop. density
 - Great Seoul-Incheon 24 million = 4 x Hong Kong population
 - Density Seoul 16,000 km² = 2+ x Hong Kong
- Importance of high-rise apartments in both countries
- Broadband penetration and use levels in same range
- Not very different results, but at much lower cost for Hong Kong



SRI LANKA



Example of programmatic approach: e Sri Lanka design (2002-04)



- USD 83+ million (WB, Korea, other)
- Supply and demand-stimulation strategies

Example of programmatic approach: e Sri Lanka design (2002-04)

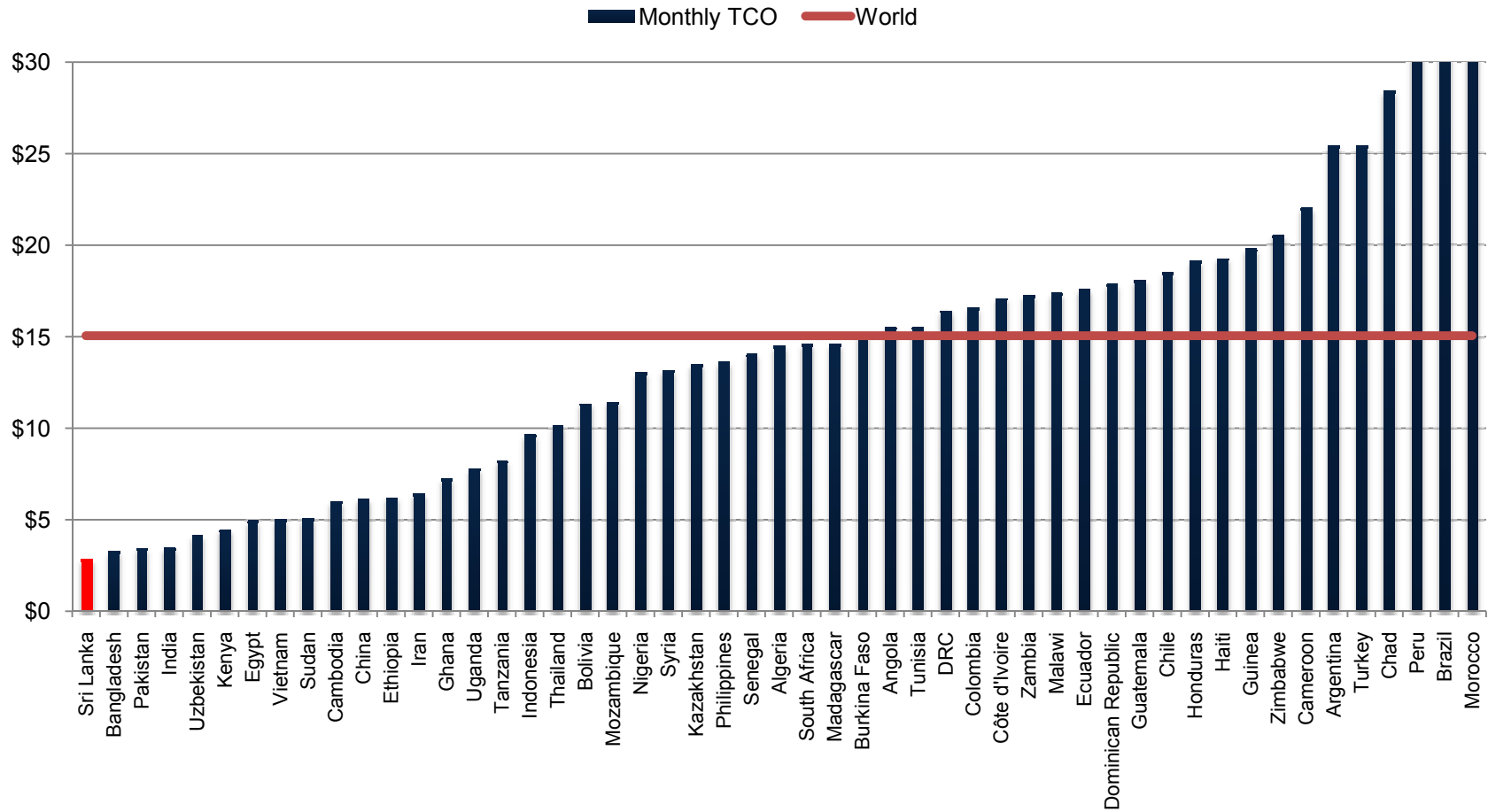


No regional telecom networks; commercial telecenters (will remain in long term)

What happened (separate from e-SL): emergence of Budget Telecom Network Model..

- Regulator: enable market entry
 - Multiple operators → high competition
- ToP market quickly penetrated
- Need to penetrate BoP to keep growing
 - Need to lower prices (therefore lower costs)
- Lowering of operating costs
 - Over 90% pre-paid (not post-paid): no credit risk, no bill, variable income customers attracted
 - Very low value re-charge; low income customers
 - Outsourced/managed networks, utilization based payments, regional negotiations for equipment: lowering network costs
- Result: Ability to offer extremely low-priced voice and SMS [budget telecom network model = BTNM]

...giving low mobile voice & SMS prices



Source: Nokia

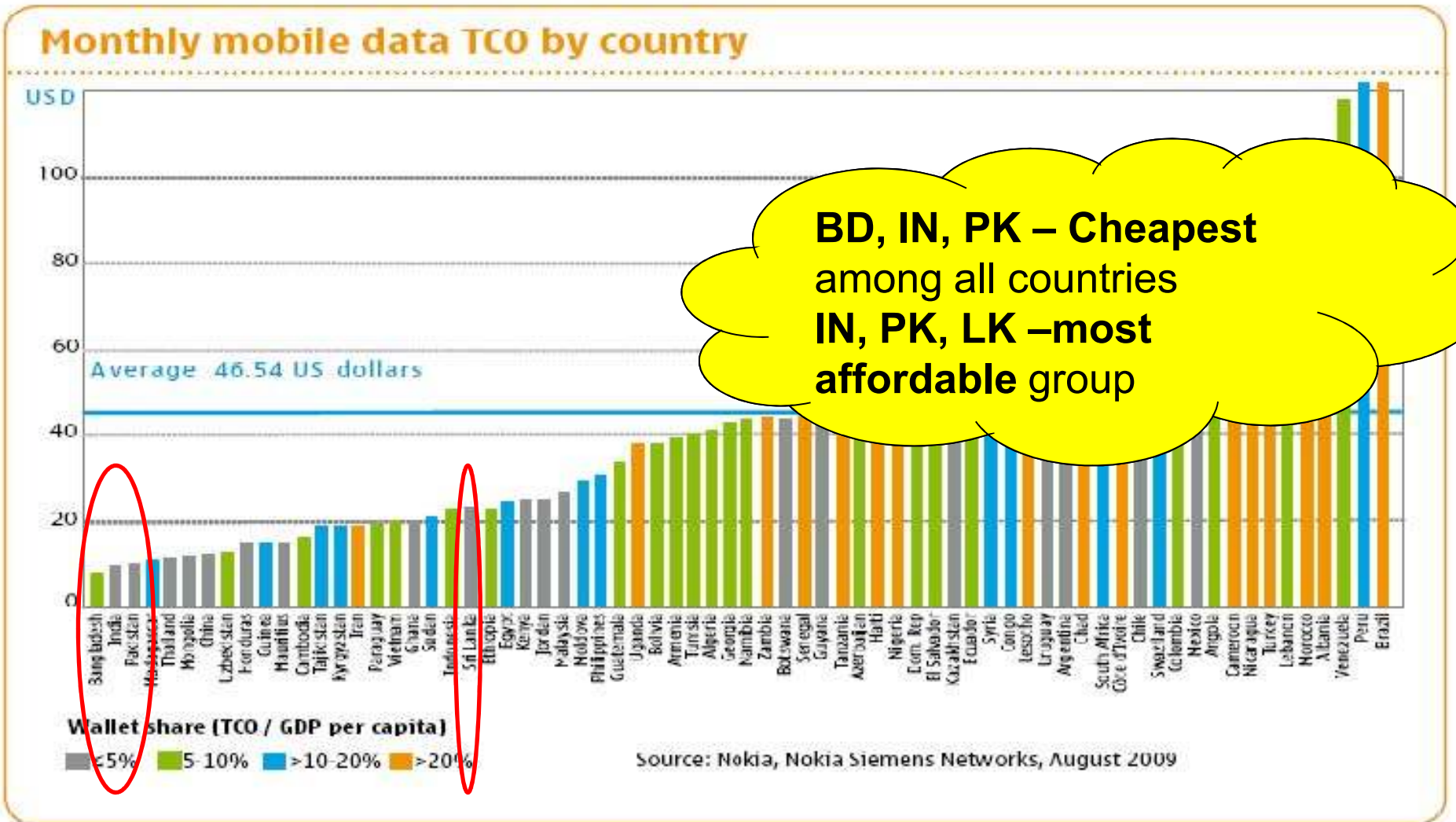


Consequences and natural evolution of BTNM



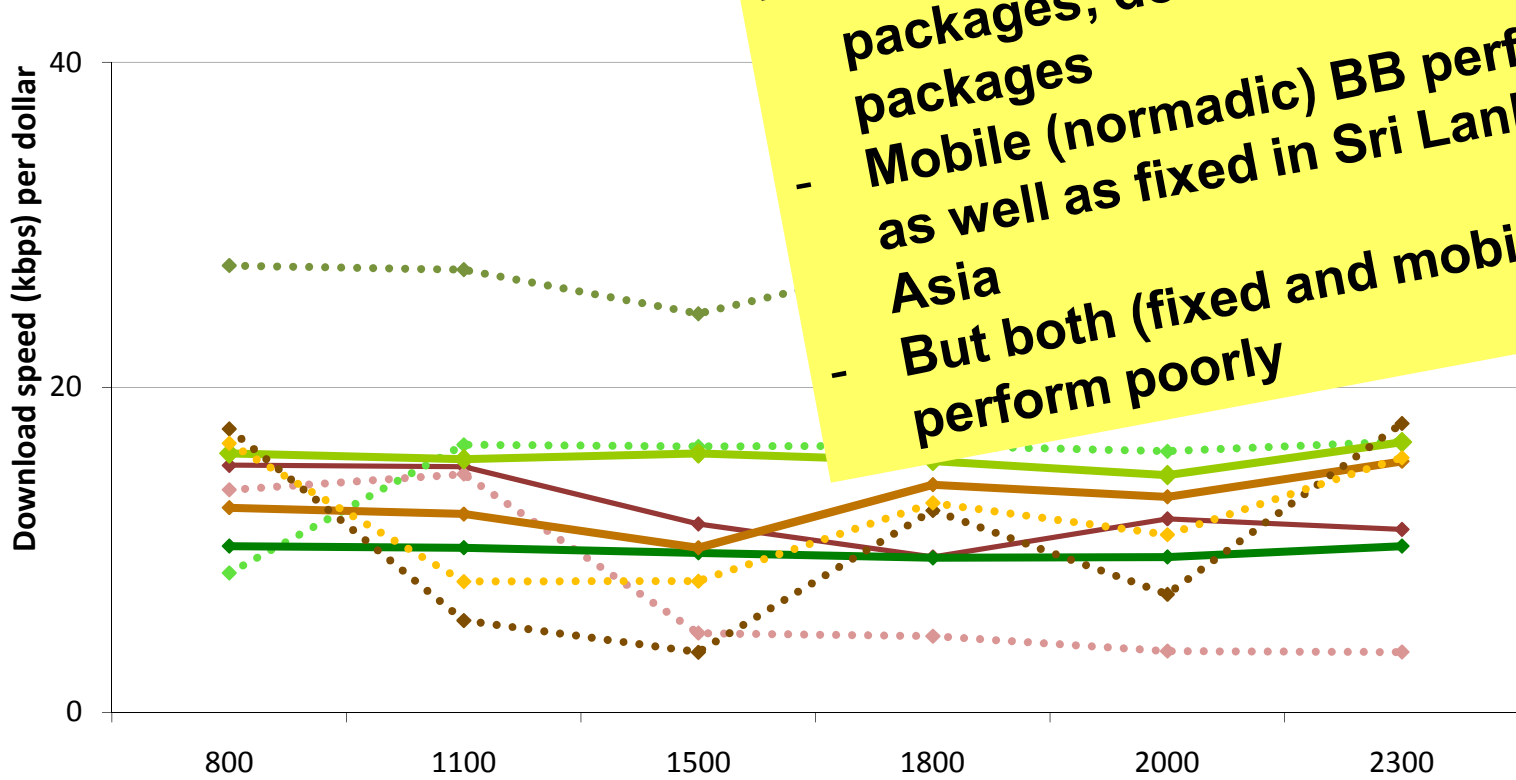
- Low prices + innovative payment modes → high usage
 - MOUs and network load: much higher than EU
- Saturating market even reaching BoP
 - New products to grow revenue → Data
- Regulator: made 3G spectrum available v. early
- Same BTNM business model applied to data
- Result: cheap/affordable data service on mobile networks
 - High adoption : data SIMs = fastest growth service
 - Mobile internet subscriptions = 4x fixed internet subscriptions
- |Asia's first 3G network"; LTE this year; "mobile BB success story"

..leading to cheap mobile data access



...with quality that's NOT relatively inferior to fixed BB products

Download speeds (kbps) per dollar from



- Solid lines = mobile BB packages; dotted lines = fixed BB packages

- Mobile (normadic) BB performs as well as fixed in Sri Lanka & S. Asia

- But both (fixed and mobile BB) perform poorly

- Sirius (256 kbps) Dhaka, BD
- SKYbd (256 kbps) Dhaka, BD
- BSNL (256 kbps) Bangalore, IN
- BSNL (1 Mbps) Bangalore, IN
- Airtel (256 kbps) Delhi, IN
- Airtel (1 Mbps) Delhi, IN
- Dialog (2 Mbps) Colombo, LK
- SLT (2 Mbps) Colombo, LK
- SLT (512 kbps) Colombo, LK

Source: www.lirneasia.net;

Note: sample results shown. Time series data for bi-annual BB quality of service testing available at www.lirneasia.net.

But bottlenecks/limits being reached



- Access network for BB
 - Problem solved (more or less)
- Mobile BB gives similar speeds to fixed BB
- But both (fixed and mobile) perform poorly
 - Low value for money
 - Lower than promised speeds
- Because bottlenecks exist (in fixed and mobile BB)
 - In local peering
 - International connectivity
- Due to high cost of backhaul
 - Local
 - International

Local backbone: problematic



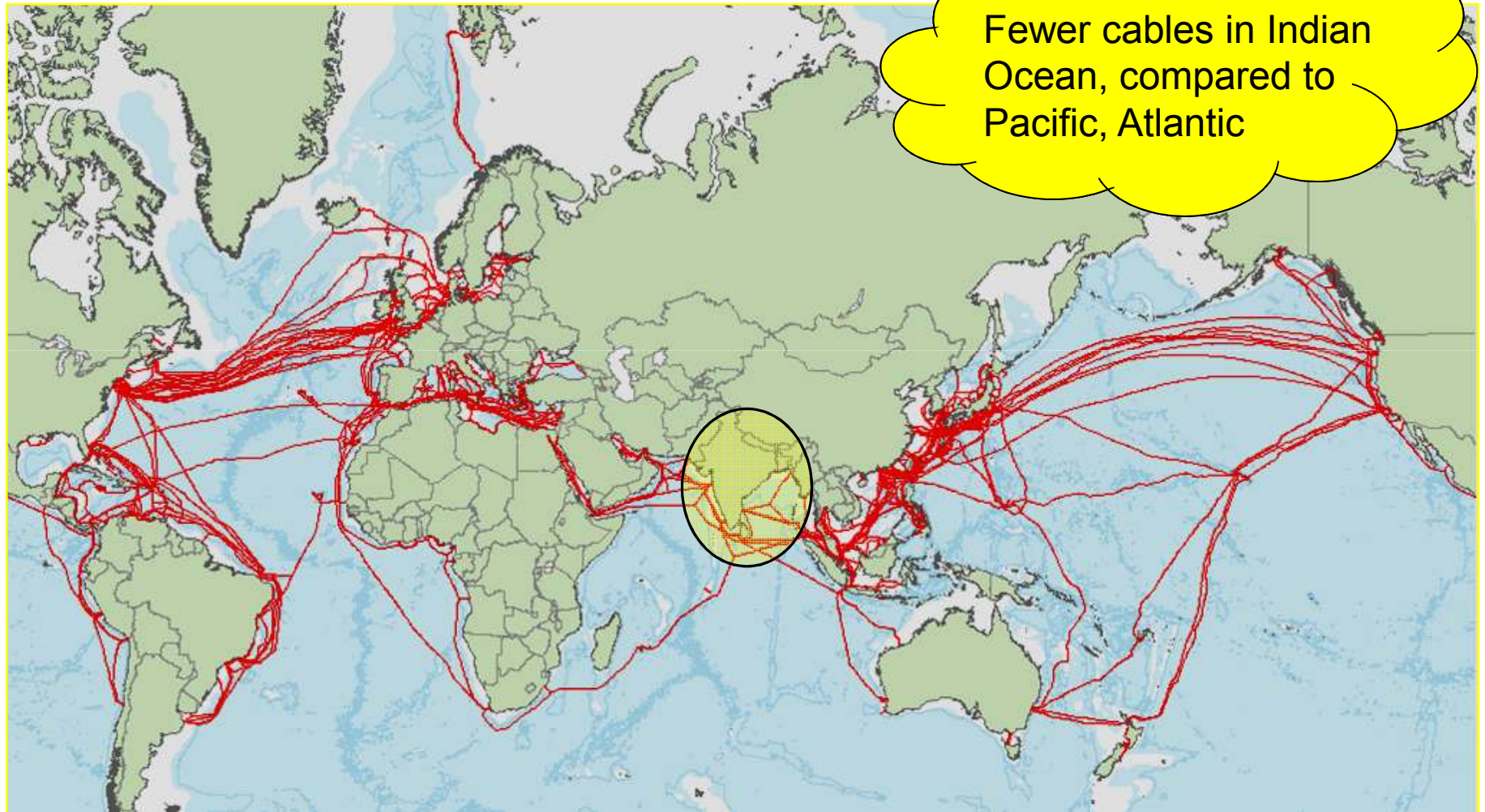
- Partially govt.-owned incumbent has widest fiber coverage
 - Unregulated sharing
 - Not cost based
- Largest mobile operator has limited fiber
- Resulting high use of microwave. Still
- Plans for NBN halted
 - World Bank funds initially allocated → no longer available for this purpose
 - Currently: plans to “ask” incumbent to implement

International connectivity: problematic



- Expensive access to landing stations
 - Controlled by incumbent
 - Operators must use incumbent's (expensive) fiber to connect to station
 - Non-tariff barriers: “delays” when capacity increases needed
- General under-supply of international cable in the region
 - Only better than Africa

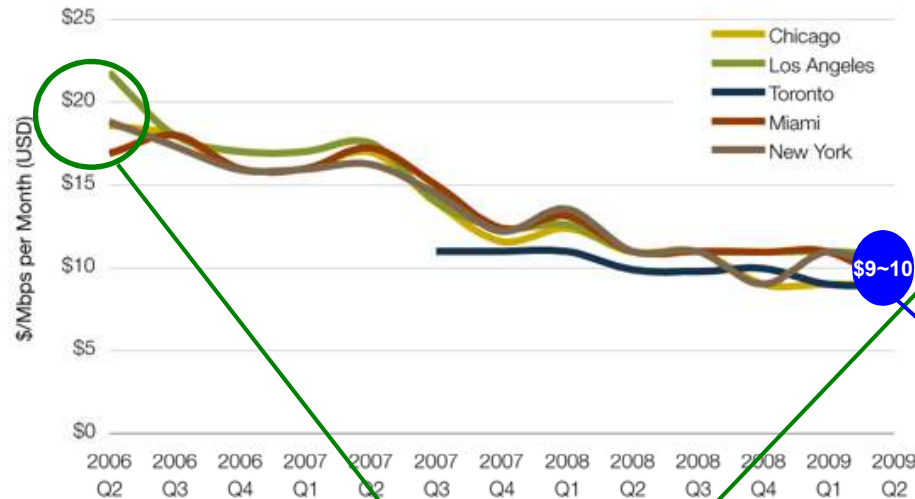
Low supply of int'l cables



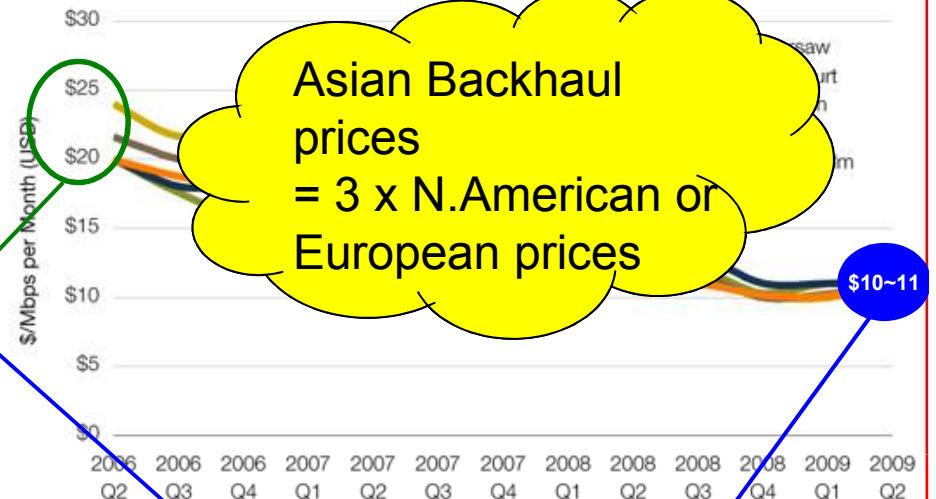
Source: Global Marine Systems Ltd.

Resulting higher prices

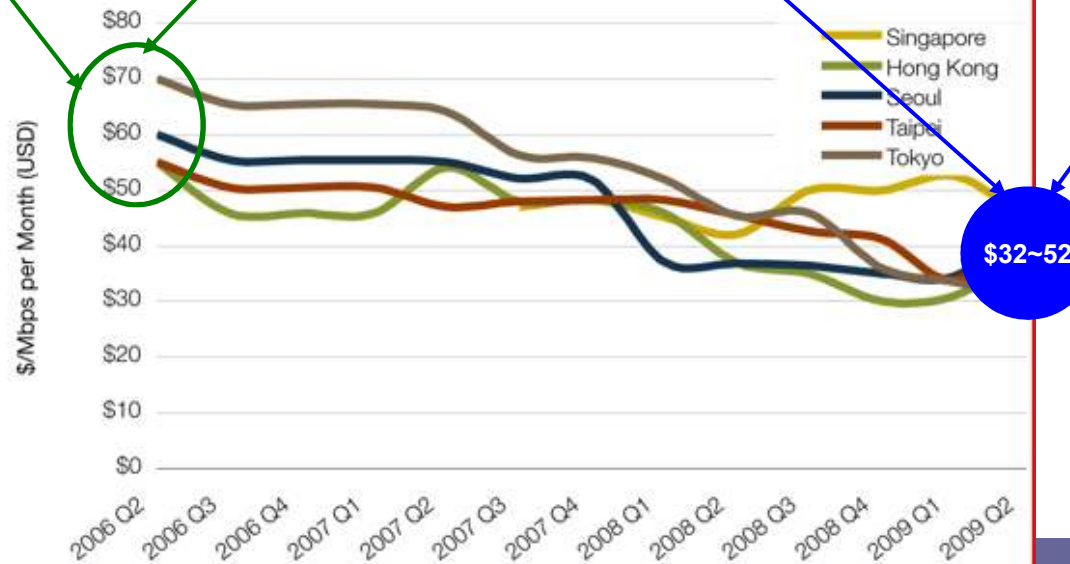
Median GigE IP Transit Prices in North America, Q2 2006-Q2 2009



Median GigE IP Transit Prices in Europe, Q2 2006-Q2 2009



Median GigE IP Transit Prices in Asia, Q2 2006-Q2 2009



Sri Lanka: room for improvement

- Programmatic approach of policy maker
 - Work in progress/room for improvement
- Regulator: facilitated entry; allocates spectrum
- Mobile voice business model applied to mobile BB
 - Successful, so far
- But stymied by structural bottlenecks
 - Backbone (local and international)
- Market forces (when facilitated) will get you to a certain point (e.g. developing the access network)
- But regulators need to monitor constantly and act
 - Backbone access (or areas with high coordination cost or externalities)



CHOICES



Key decisions to make



- Subsidy-driven vs. market-driven
 - both allow role for government
- Organic vs. programmatic
 - Urge to go programmatic?



Most relevant choice: Subsidy-driven vs. market-driven

- South Korea and Australia are exemplars of subsidy-driven approach
- Hong Kong is best example of market-driven approach
- Clarifying role of government in each

Organic-programmatic continuum



- India is organic, moving toward programmatic by consolidating multiple initiatives
 - Many dispersed initiatives (by organization, by city, by state)
 - Consolidated under several initiatives
 - NEGP and other
 - Unique Identification Authority under Nandan Nilekani
- Sri Lanka started on the programmatic end (e Sri Lanka initiative in 2003), but is actually organic, in the face of weaknesses of execution



CONCLUSION



Nature of the state is key



- Choices that need to be fully examined
 - Programmatic vs. organic
 - Subsidy-led vs. market-led
 - Korea vs. Hong Kong?
- Markets can lead, but not in the absence of ineffective regulation
- Market-led does not mean govt. has no role
 - Different role
 - Facilitating/enabling/incentivizing vs. funding/investing vs. implementing vs. operating



- The appropriate solution depends on nature of the state
 - Back to Levy & Spiller (1994): institutions and context
 - What will work in a country with an efficient bureaucracy will not necessarily work in one that does not

Our mission



To improve the lives of the people of the emerging Asia-Pacific by facilitating their use of ICTs and related infrastructures; by catalyzing the reform of laws, policies and regulations to enable those uses through the conduct of policy-relevant research, training and advocacy with emphasis on building in-situ expertise





Thank you



*Diálogo Regional sobre
Sociedad de la Información*

Horacio Urteaga 694
Jesús María, Lima - PERU
Teléfonos: (51-1) 3326194 / 4244856
Fax: (01) 3326173

info@dirsi.net
www.dirsi.net

