

Affordable & usable broadband: Need to address international bottlenecks

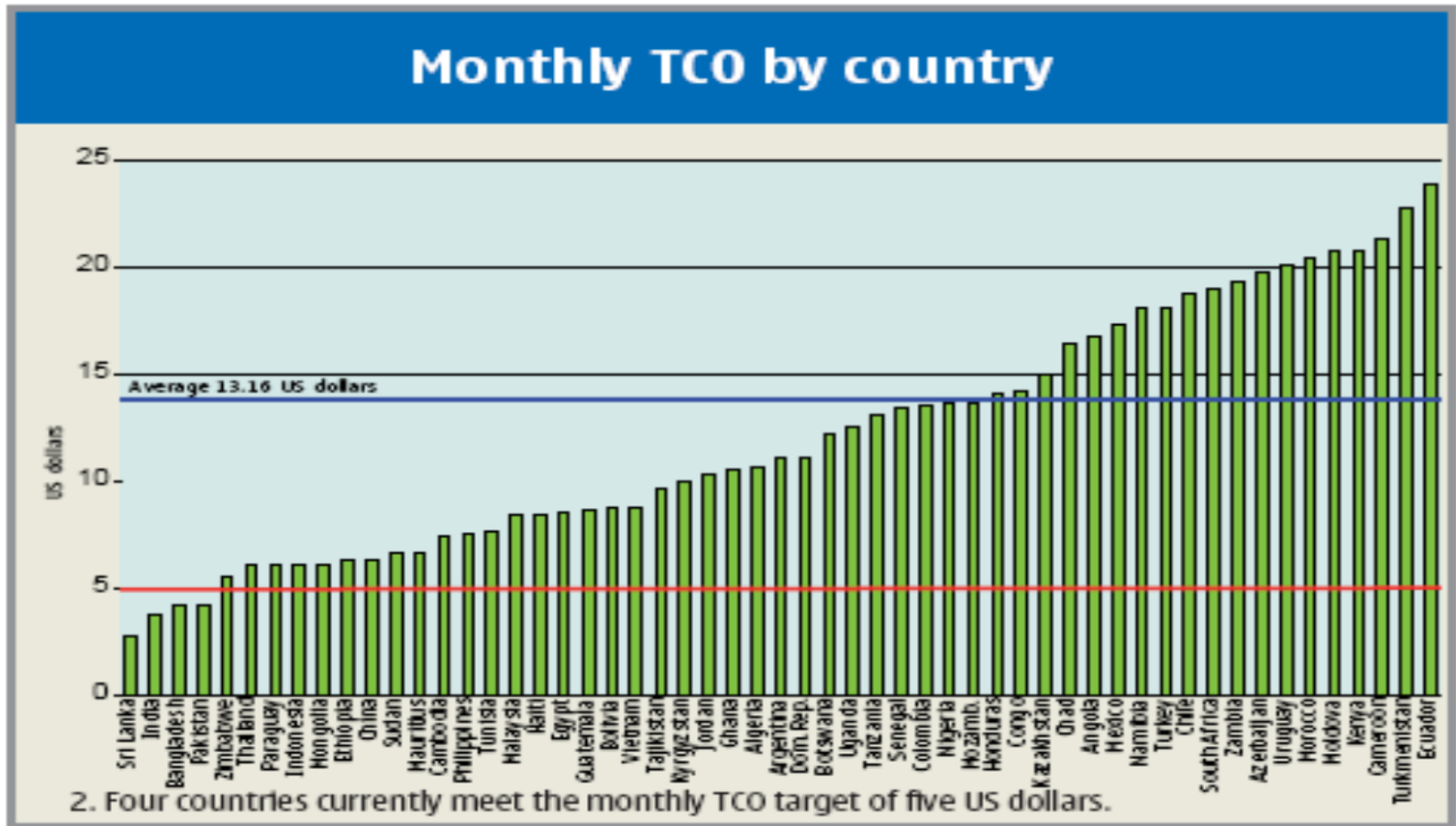
Rohan Samarajiva, Chair, LIRNEasia

Phil ICT Research Network, Manila, September 26, 2013



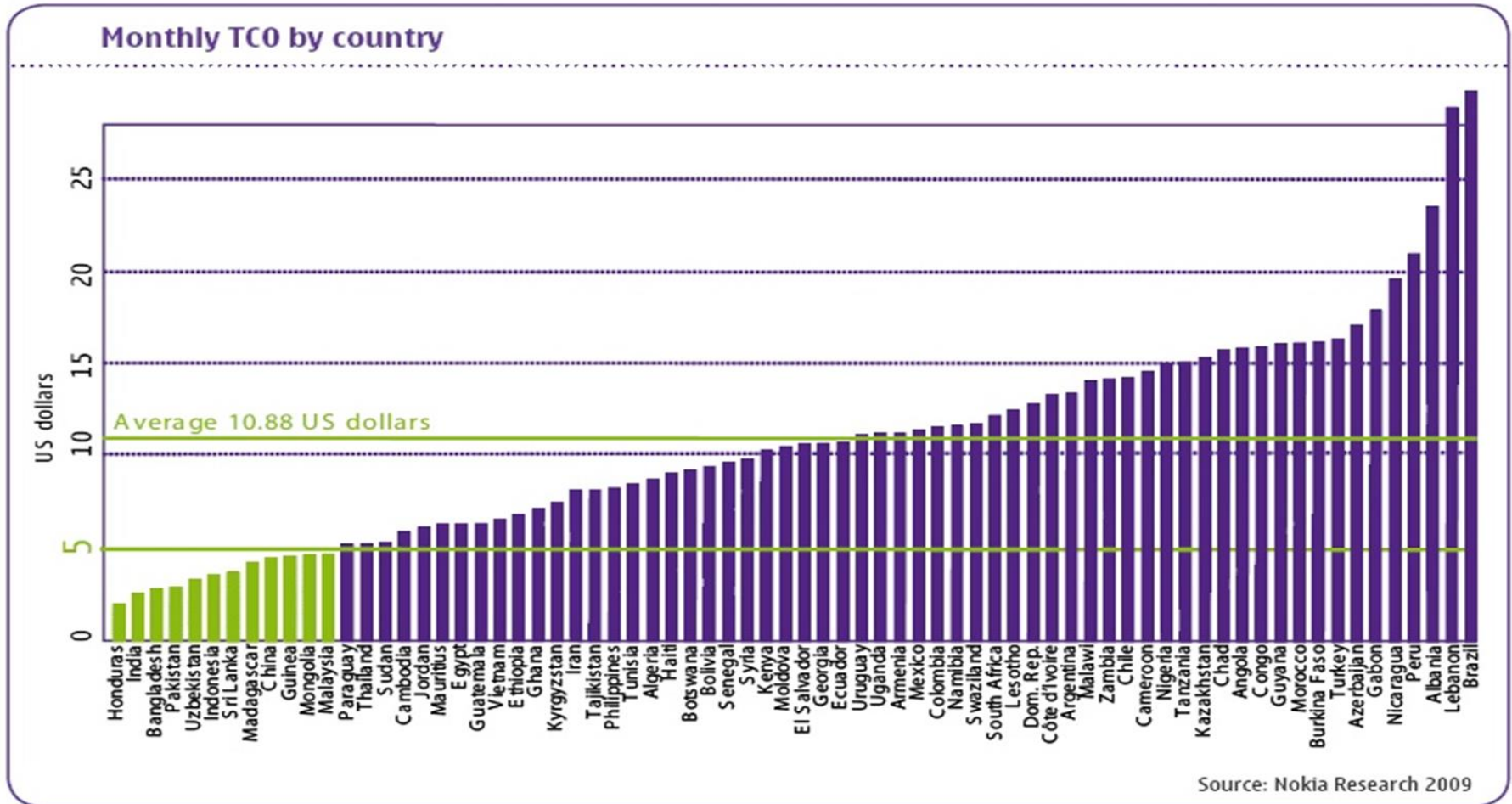
**CAN ASIAN SUCCESS IN NARROWBAND
BE REPLICATED WITH BROADBAND?**

In voice+SMS basket comparison, 4 countries < USD 5 in 2007: All Asian

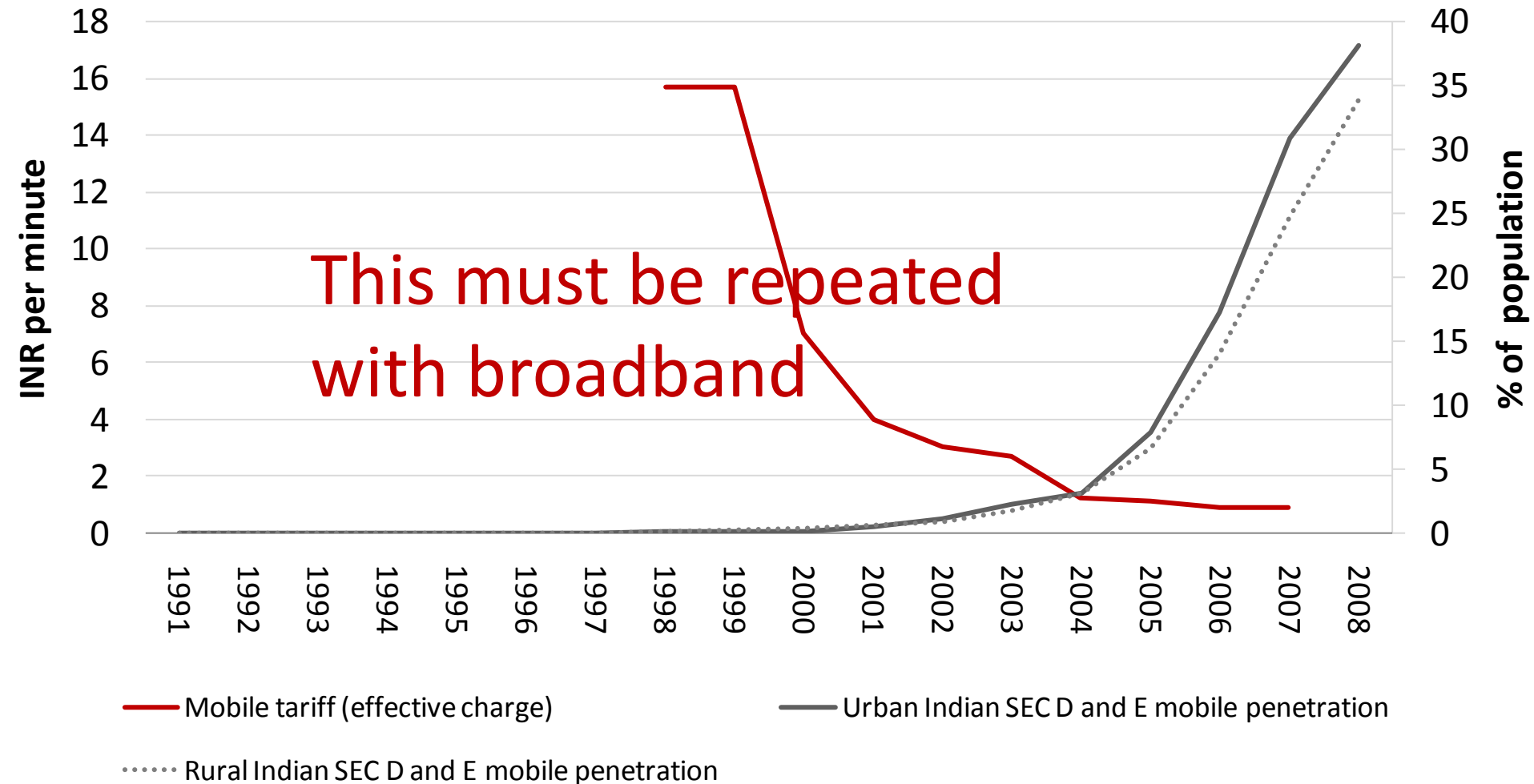


Source: Nokia, November 2007

In 2009, 12 countries < USD 5: 9 were Asian



Success in voice: Low prices → greater connectivity (India SEC D&E)



WHAT IS BROADBAND? IS BROADBAND DIFFERENT IN ASIA?

What is broadband?

- The Broadband Commission sought to focus on considering some of the core concepts of broadband as an ***always-on service (not needing to make a new connection to a server each time a user wants to go online)***, and ***high-capacity: able to carry lots of data per second, rather than the particular arrival speed of the data***. The practical result is that broadband enables the ***combined provision of voice, data and video at the same time***.

What is not broadband?

- Partnership for measuring the ICTs for Development suggests that always-on connections that are not 256kbps up and down are not broadband
- India, in its National Telecom Policy 2012, proposed gradually raising the threshold to 2Mbps down
- But what is the point of applying definitions to advertising, when real performance suggests that many operators in Asia do not offer true broadband (at least 256 kbps, 80% of the time)

BD offerings are not broadband? BSNL, Bangalore & Airtel, Chennai?

City, Country	Dhaka, BD		Thimphu, BT	Bangalore, IN		Chennai, IN	
Package	Qubee 256 kbps	Citycell 300 kbps	Druknet 1 Mbps	Airtel 512 kbps	BSNL 512 kbps	Airtel 512 kbps	BSNL 256 kbps
8:00 AM	252.5	271.5	1157.6	1297.8	2366.7	142.8	1072.3
11:00 AM	251.2	267.3	1173.4	1302.1	1591.6	162.9	1052.8
3:00 PM	230.8	177.4	1278.9	1179.4	269.4	163.8	553.4
6:00 PM	251.1	243.6	1061.0	237.8	221.4	268.2	320.6
8:00 PM	256.4	220.6		357.0	147.1	169.1	611.7
11:00 PM	257.8	191.7		1310.4	90.1	175.3	919.5
Average	250.0	228.7	1167.7	947.4	781.0	180.4	755.1

Red = performance < 256 kbps threshold

Average is above 256 kbps
But below threshold 3/6

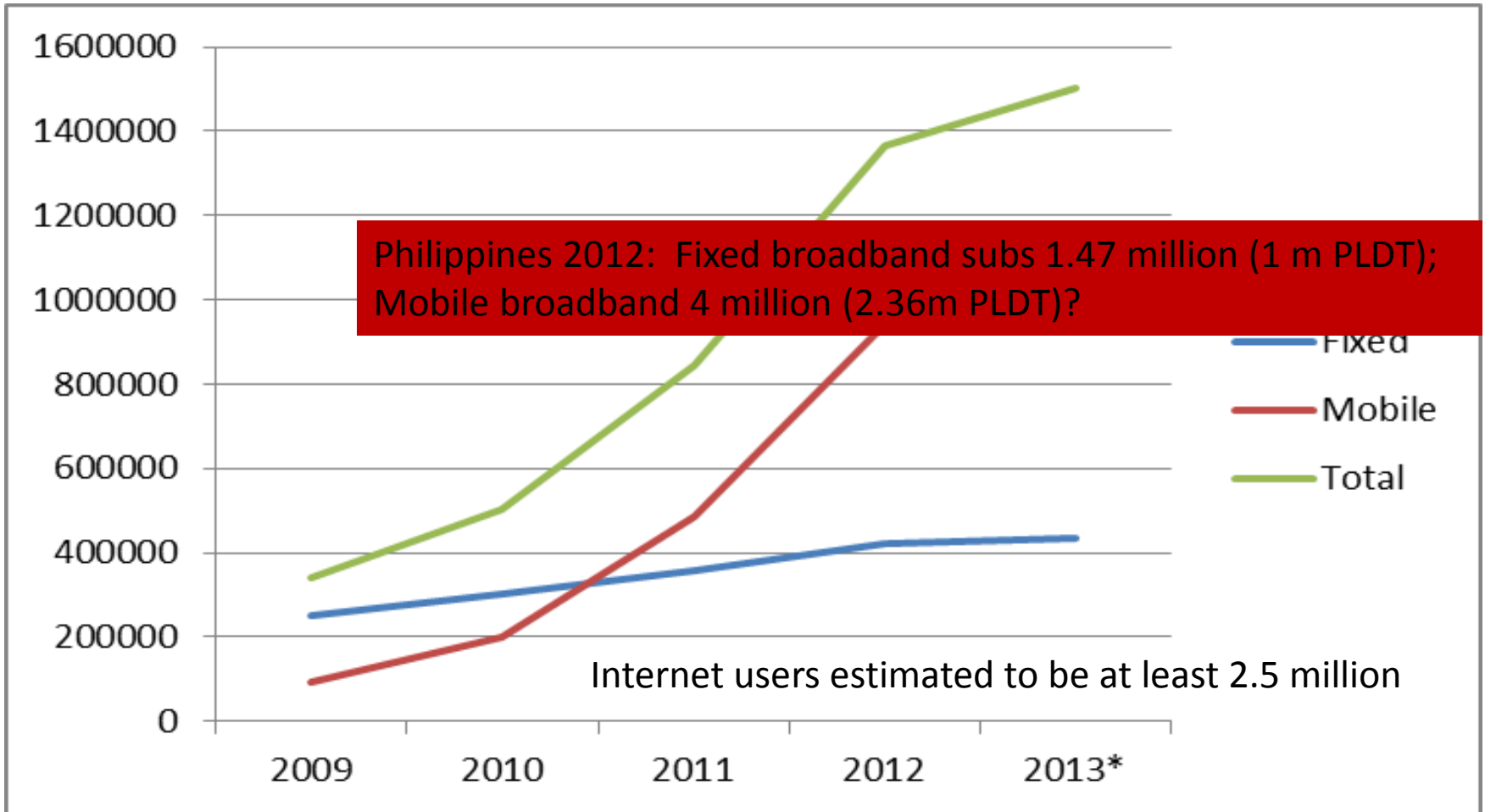
SLT, Colombo also failed the cut, despite a 2Mbps offering/average of 571 kbps delivery

City, Country	Mumbai, IN		New Delhi, IN		Colombo, LK		
Package	Airtel 2 Mbps	MTNL 512 kbps	Airtel 512 kbps	MTNL 2 Mbps	SLT 2 Mbps	Dialog 1 Mbps	Mobitel 1 Mbps
8:00 AM	293.4	375.3	337.6	416.7	1685.8	1082.7	714.9
11:00 AM	316.1	381.3	182.8	425.8	257.2	1054.0	340.5
3:00 PM	304.3	387.8	336.2	343.7	167.4	1054.0	340.5
6:00 PM	275.0	401.6	331.6	437.3	271.1	1401.3	855.0
8:00 PM	322.6	337.2	337.1	429.7	210.1	1355.7	579.9
11:00 PM	308.0	377.1	394.5	429.3	835.1	1398.5	832.4
Average	303.2	376.7	319.9	413.7	571.1	1224.4	610.5

Red = performance < 256 kbps threshold

 Access via USB modem (dongle)

Sri Lanka's broadband growth, 2009-March 2013



Broadband in developing Asia appears different

- Mostly wireless, not fixed
- Low prices, but also problems with quality

But broadband is unlike voice

- In old style PSTN, most calls are local, few national, fewer international
 - Local switching possible
- In mobile networks, need to interrogate databases
 - More signaling traffic going longer distances, but actual calls and SMS still mostly local
- With broadband (especially in small countries)
 - Most traffic is international
 - Even local websites are hosted abroad
 - Even email intended for local persons requires international traffic



A chain is as strong as its weakest link

Broadband performance is defined by performance over the weakest link

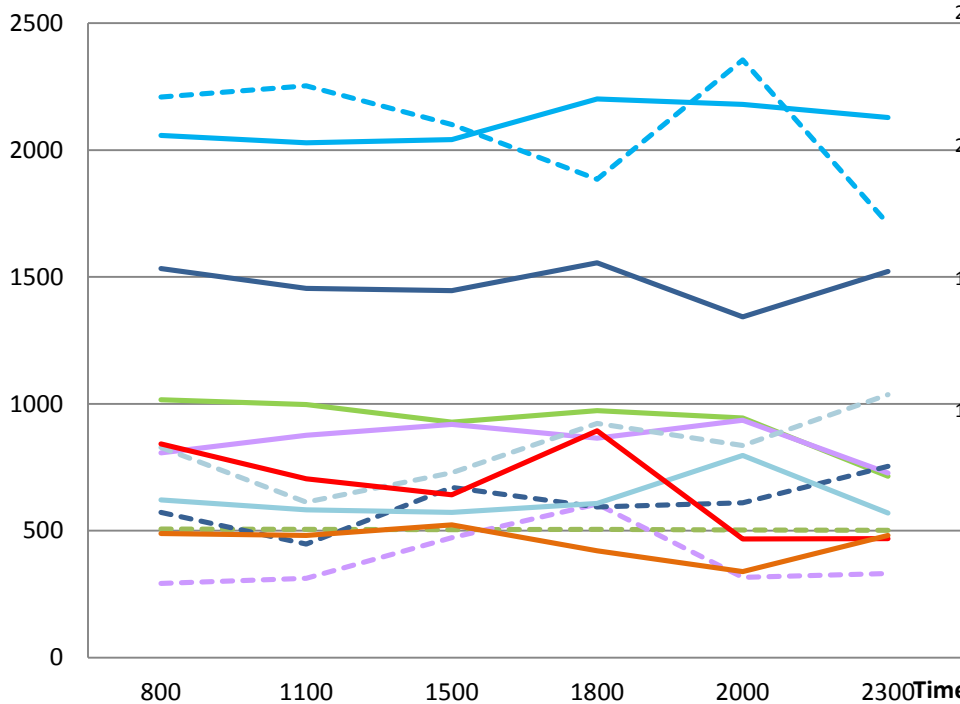
One cannot focus on local access alone . . .

**IS THE INTERNATIONAL SEGMENT
THE WEAKEST LINK?**

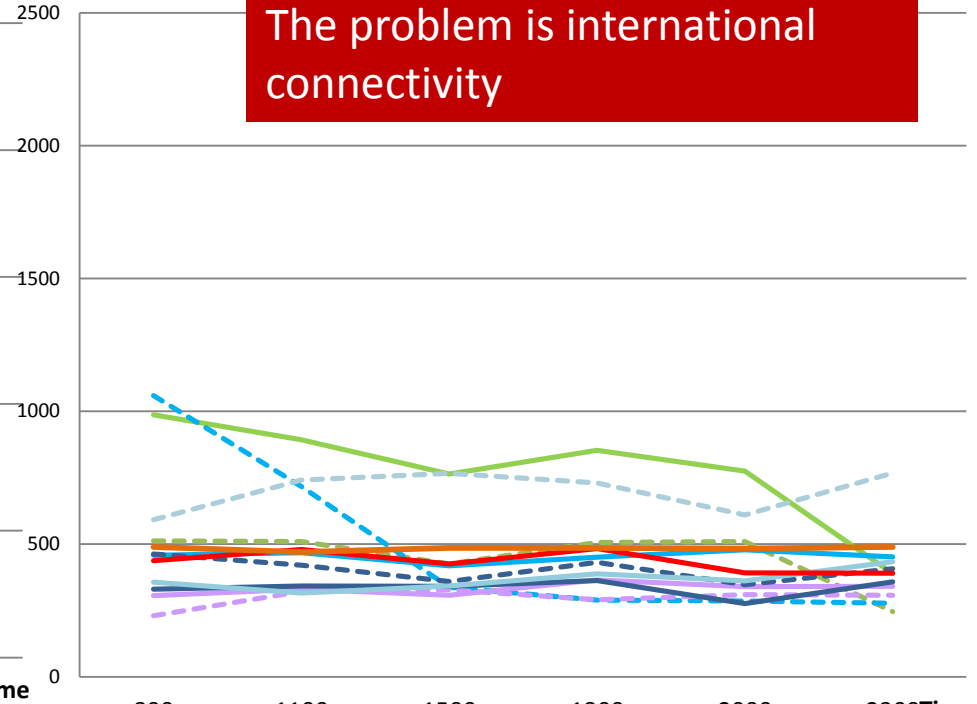
Selected Asian cities: Identifying the weak link (Fixed download)

Download from ISP Server (kbps)

Download from International Server (kbps)



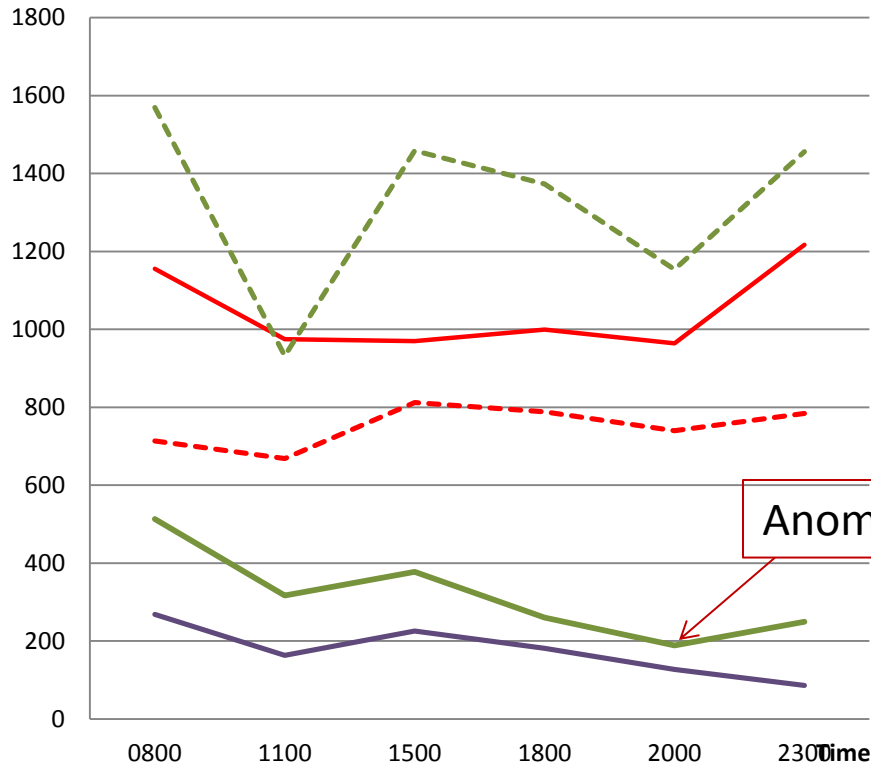
- Qubee (1 Mbps) Dhaka, BD
- Banglalion (512 kbps) Dhaka, BD
- Airtel (256 kbps) Bangalore, IN
- BSNL (256 kbps) Bangalore, IN
- Airtel (2 Mbps) Chennai, IN
- BSNL (256 kbps) Chennai, IN
- Airtel (2 Mbps) Mumbai, IN



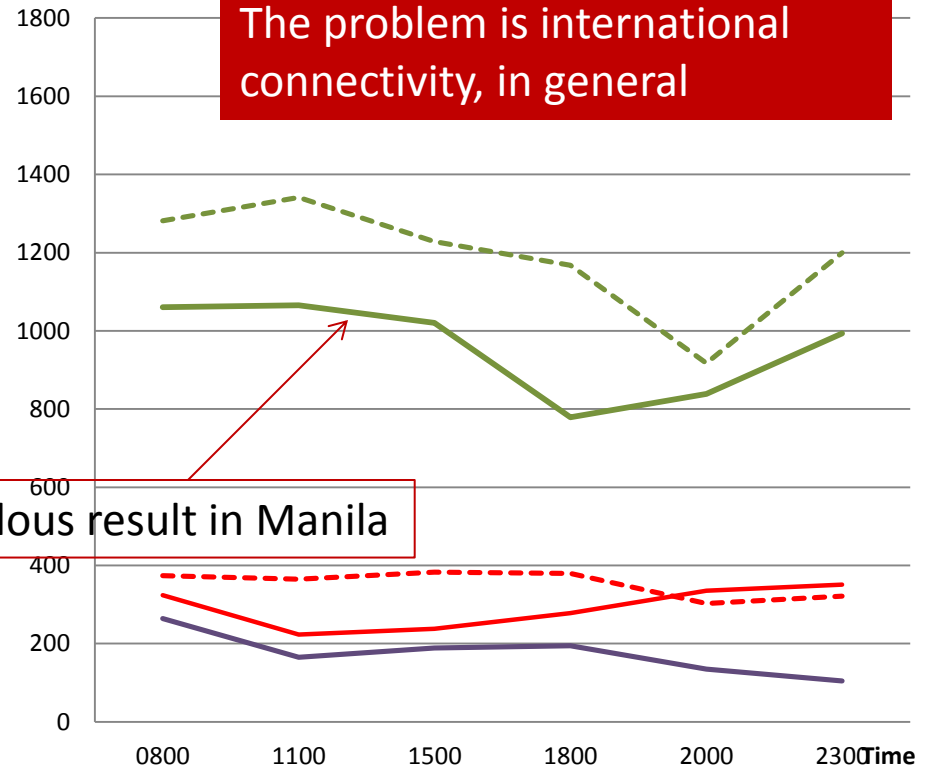
- Qubee (1 Mbps) Dhaka, BD
- Airtel (256 kbps) Bangalore, IN
- Airtel (2 Mbps) Chennai, IN
- Airtel (2 Mbps) Mumbai, IN
- Airtel (2 Mbps) New Delhi, IN
- SLT (2 Mbps) Colombo, LK
- Banglalion (512 kbps) Dhaka, BD
- BSNL (256 kbps) Bangalore, IN
- BSNL (256 kbps) Chennai, IN
- MTNL (320 kbps) Mumbai, IN
- MTNL (512 kbps) New Delhi, IN
- Telkom Speed (512 kbps) Jakarta, ID

Selected Asian cities: USB Dongle download (3G networks)

Download from ISP Server (kbps)



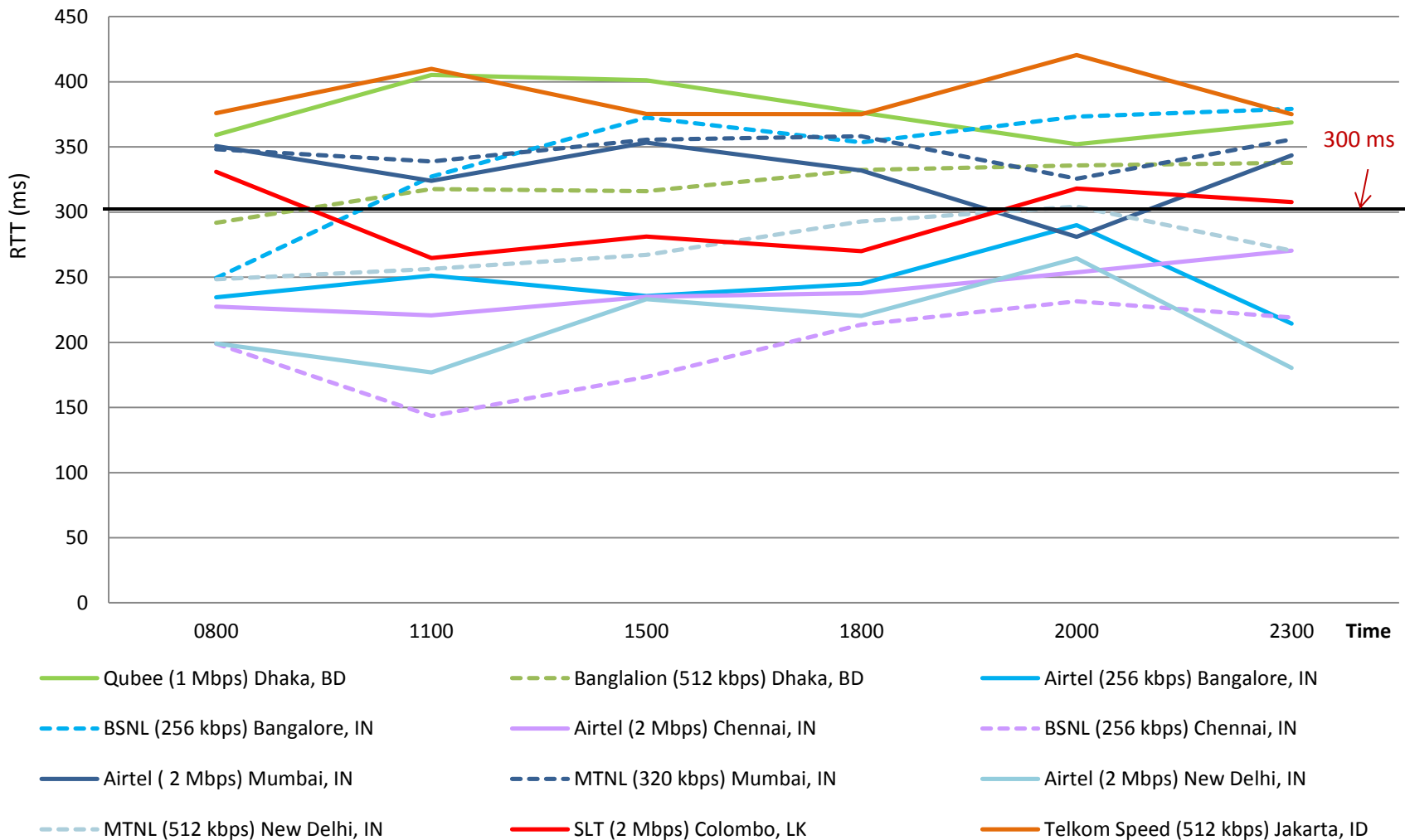
Download from International Server (kbps)



- Dialog (upto 3.6 Mbps) Colombo, LK
- - - Mobitel (upto 1 Mbps) Colombo, LK
- Three (upto 3 Mbps) Jakarta, ID
- Globe Tattoo (upto 3.6 Mbps) Manila, PH

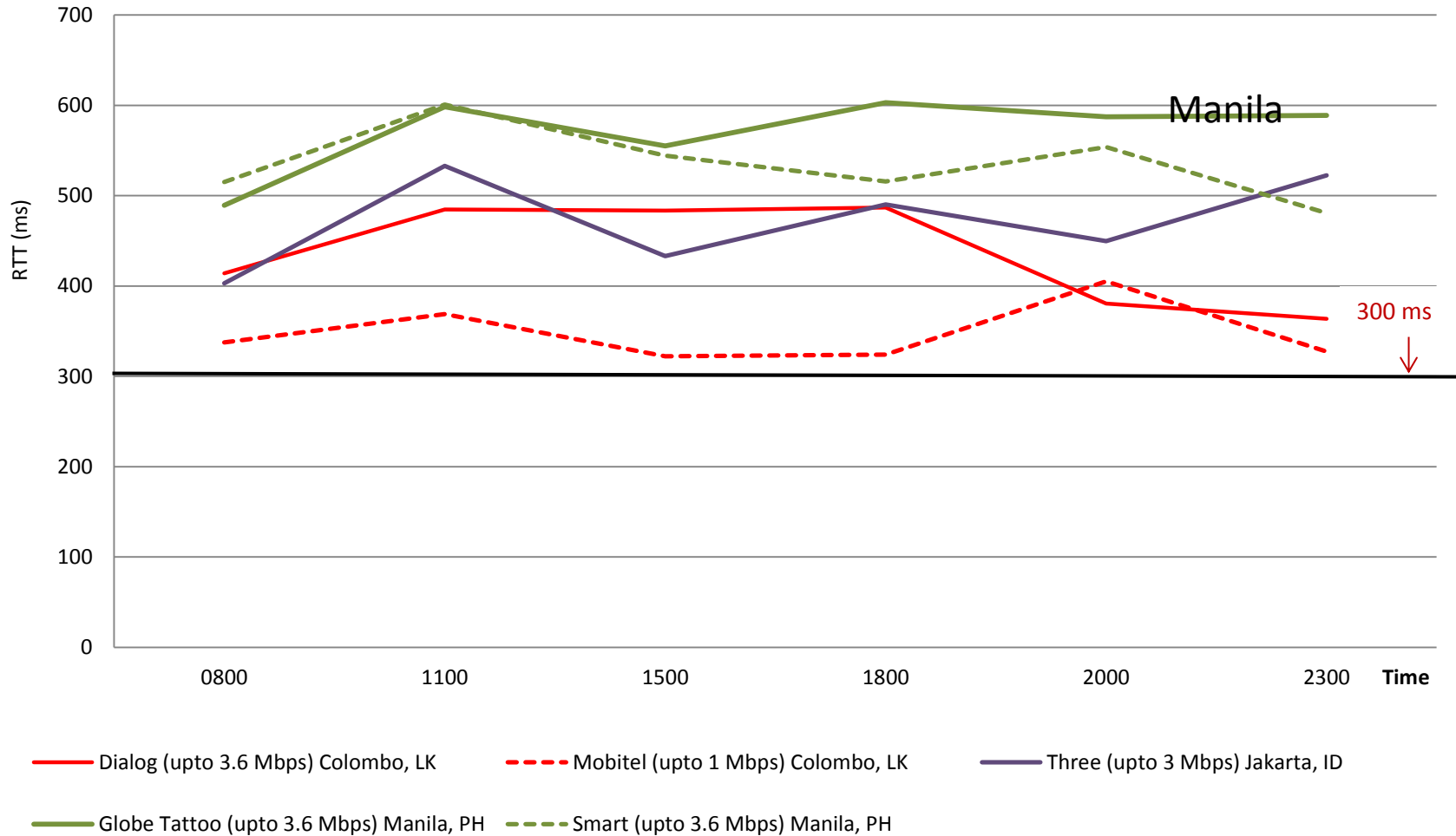
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Selected Asian cities: Latency (RTT) – Fixed: Mostly unsatisfactory

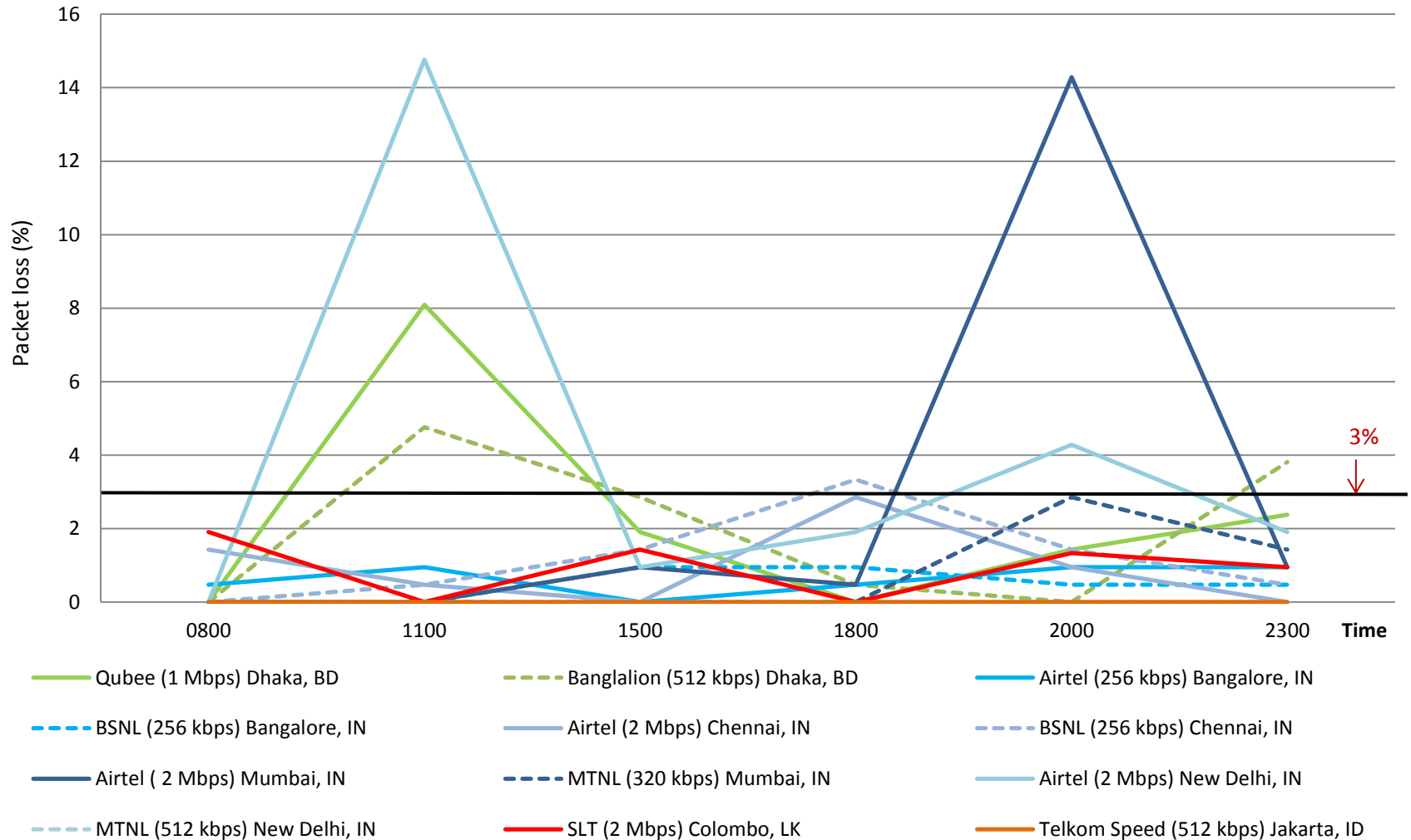


Source: LIRNEasia, 2011

Selected Asian cities: Latency (RTT) – USB Dongle: All above 300 ms

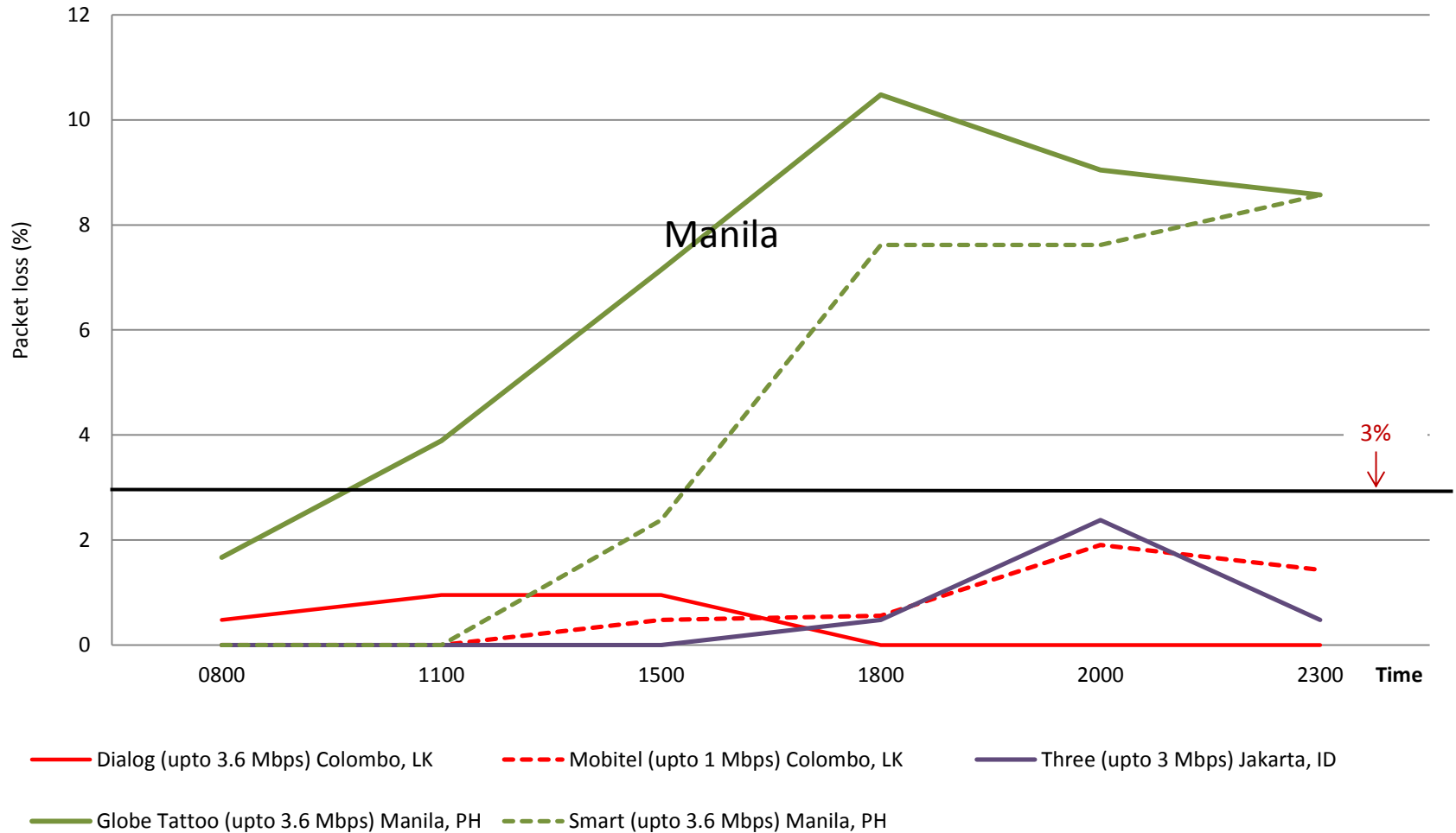


Selected Asian cities: Packet Loss – Fixed (unsatisfactory some of the time)



Source: LIRNEasia, 2011

Selected Asian cities: Packet Loss – USB Dongle (two unsatisfactory)

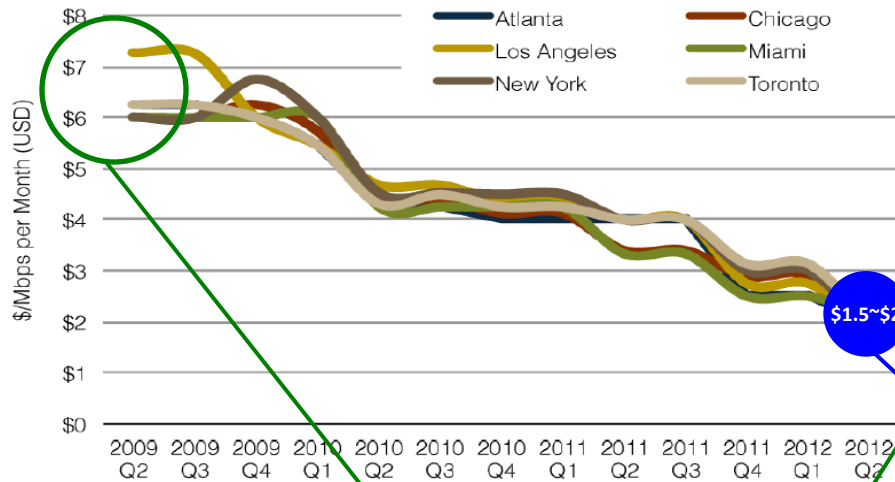


Why?

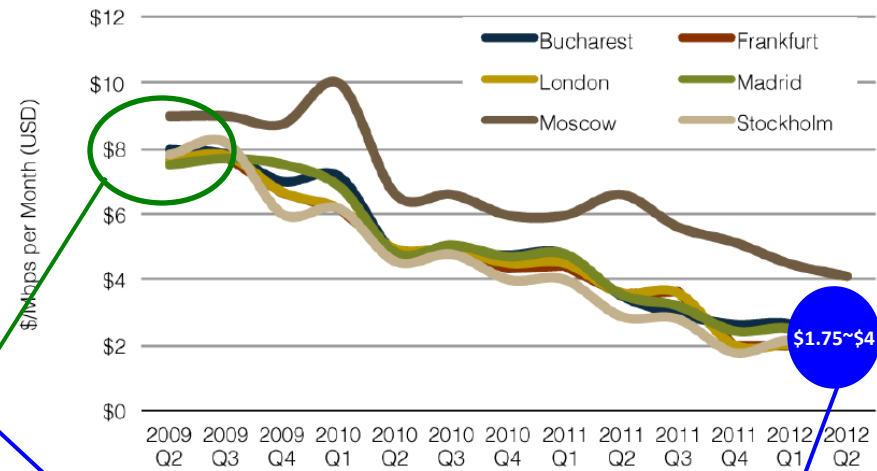
- Connectivity to the Internet Cloud is a costly input
- Understandably, operators economize on international segment → lower performance
 - Because overall performance is determined by performance of the weakest link

Asian bandwidth is 6x costlier

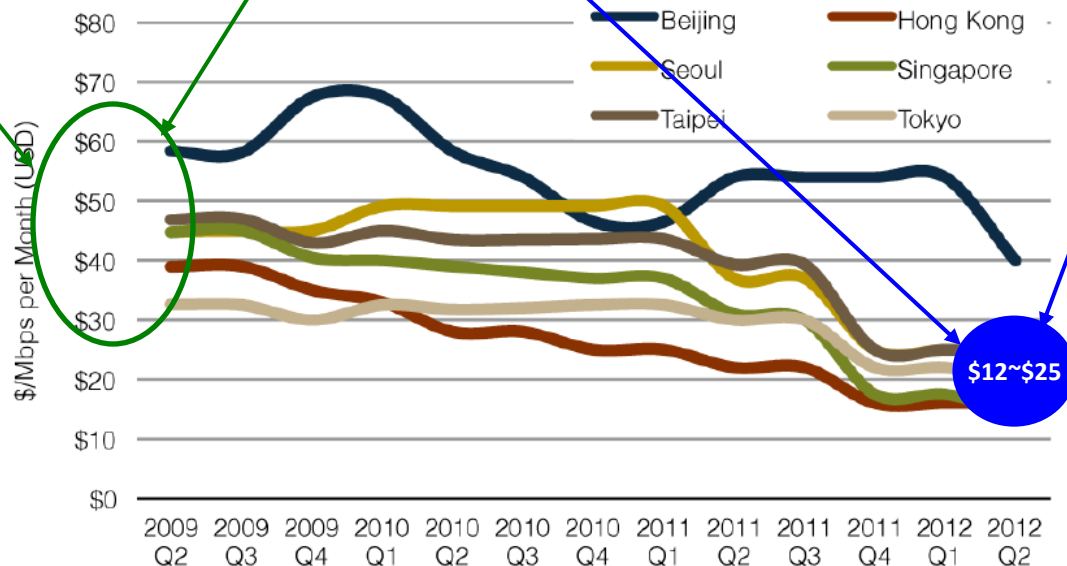
Median 10 GigE IP Transit Prices in North America, Q2 2009-Q2 2012



Median 10 GigE IP Transit Prices in Europe, Q2 2009-Q2 2012



Median GigE IP Transit Prices in Asia, Q2 2009-Q2 2012



Source: TeleGeography

- Data exclude installation & local access fees.
- GigE = 1,000 Mbps.

What policymakers can do: Asian Highway → “Asian Information Superhighway”

- Inadequacy of supply is what causes higher prices
 - Sole reliance on undersea cables is inappropriate for the world’s largest continent
 - Problems exacerbated by frequency of cable cuts, approvals needed for cable-repair ships to work within territorial waters, high insurance premia driven by piracy in Indian Ocean, etc.
- Take the lead at UNESCAP to promote the laying of cables along the Asian Highway/Trans-Asian Railway to link all of Asia to Europe and the Pacific Rim
 - Must be an OPEN ACCESS mesh network, ideally owned by entity other than incumbent telecom operator in each country learning from problems experienced in ADB-funded SASEC, for example
- Necessary solution for land-locked countries
- Terrestrial cables will COMPLEMENT submarine cable & bring down prices for all, including those countries that do not use terrestrial cables
- Encourage more PPPs in undersea cables, especially in underserved areas such as the Pacific and Bay of Bengal

What policymakers can do: Asian Highway → “Asian Information Highway”

- Increased supply of backhaul will bring down wholesale prices for all, island nations as well as landlocked countries
- But these reductions will be reflected in retail prices only if domestic policy allows it
 - A terrestrial network along highway traces will provide both international and terrestrial backhaul
 - Publish domestic leased-line prices using standard definitions such as 2MB/2km; 2MB/100km
 - Few standard measures exist for international leased lines, but more transparency is needed here as well
 - Give “build or buy” option to all users
 - If there are economic advantages to a single supplier, there is no reason to have legal barriers to others doing “foolish” things
 - Ensure competition exists in supply of broadband, wireline & wireless

What of satellites?

- Latency of 300 ms required for most applications
 - Singapore IDA standard, now adopted by others
- Not favored by BPO industry
- Generally useful as backup/redundancy

National and regional Internet exchanges

- More traffic is bypassing North America, but given availability of capacity and prices, different regions within Asia will have to decide who to exchange with

The next link of the chain . . .

ACCESS NETWORK (THE LAST MILE)

Fiber or wireless?

- Some are passionate about Fiber-to-the-Home (FTTH), arguing that anything less is second-class
- Others see no alternative to wireless access, given
 - Purchasing power of consumers in most countries
 - Cost of laying wire (copper or fiber) to homes (in much of Asia there are no wireguides that can be upgraded)

Middle ground

- Everyone, rich and poor, will access the Internet wirelessly
 - Those in developed market economies and those with wealth living in densely populated cities of developing countries, over a few meters
 - The rest of us, over a few kilometers
- Fiber should be pushed out as far as possible (India's current thinking on utilizing the Universal Service Fund is an example)
- Access should be open
- As many operators as possible should be permitted to link to the fiber, using multiple technologies, wire and wireless
 - If wire is superior in meeting people's needs, it will triumph over time
- Government intervention should be
 - Technology neutral
 - Focused on ensuring that all settlements have fiber within a reasonable distance
 - Access is open to all operators

New Zealand as a possible model to emulate

- Vertical disintegration of incumbent telco is the optimal solution to ensure open access
- Second and third best solutions need to be worked out if NZ solution is not feasible
- Removal of barriers to entry at the access level, subject to
 - Release of frequencies
 - Reasonable access to rights of way

Broadband without electricity?

- Can have broadband in areas without electricity
 - But it's costly
- Much of the technical innovation needed to get broadband to people is in energy

Pakistan has made renewables a condition of universal service subsidies



The economics of renewable energy look much better in relation to expensive and erratic conventional energy

Energy for terminal devices

- Less of a challenge than energy for network equipment
 - People develop workarounds
 - Can provide recharging opportunities from base stations that are powered by renewable energy

The critical links of the chain: what matters to the consumer

PRICE AND ATTRACTIVE APPLICATIONS

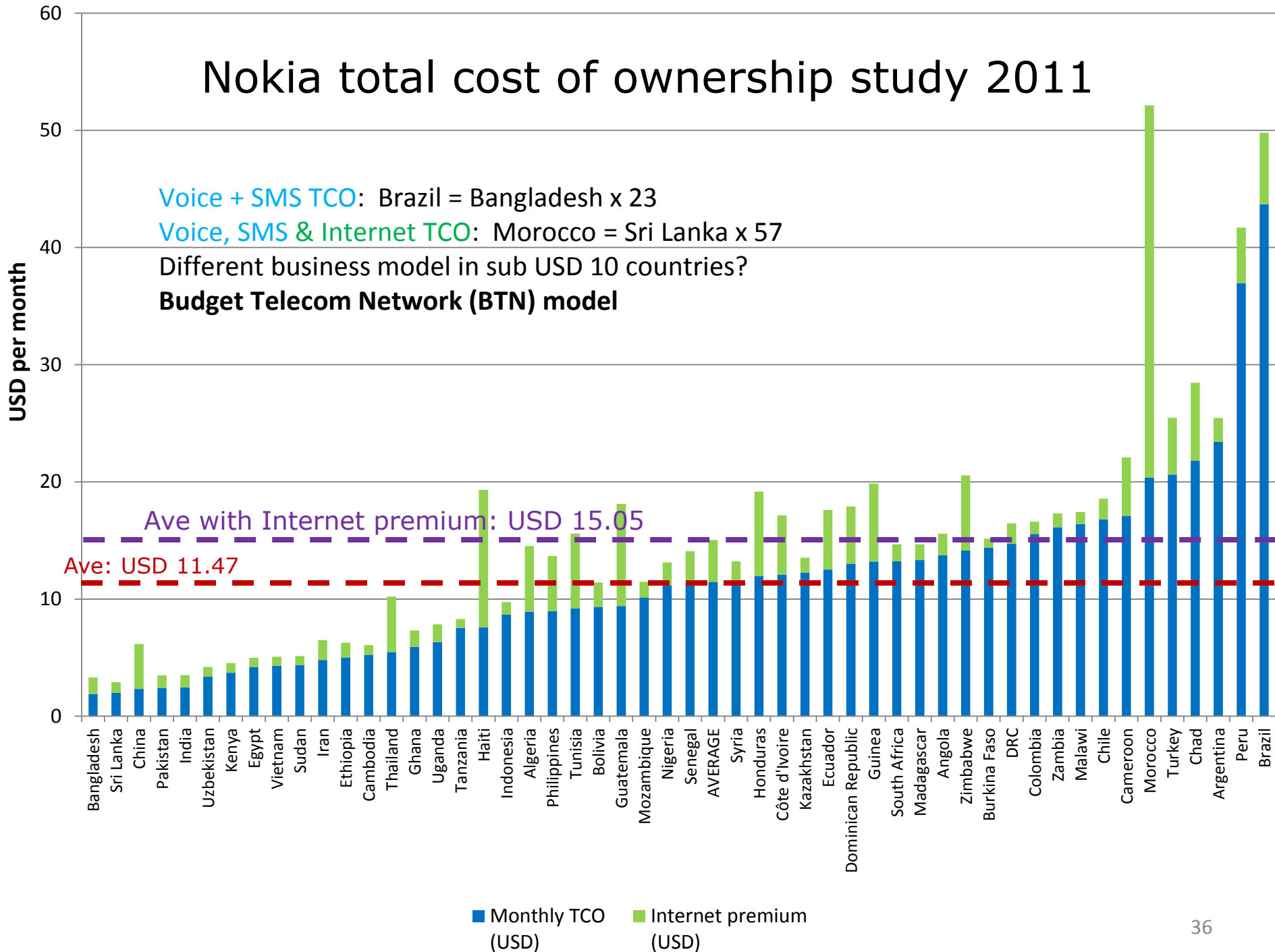
Nokia total cost of ownership study 2011

Voice + SMS TCO: Brazil = Bangladesh x 23

Voice, SMS & Internet TCO: Morocco = Sri Lanka x 57

Different business model in sub USD 10 countries?

Budget Telecom Network (BTN) model



Attractive content: What governments can do

- Asian prices as measured by Nokia are reasonable (only Philippines is above average, but even here cause may be voice prices in the basket)
- Ensure conditions for supply of attractive applications are maintained
 - Do not follow the siren call of “access charges” or sending-party-network-pays principle still being promoted by certain parties
 - Incubators, meet ups, other ways to promote innovation in the mobile apps space
 - Open up government data so mobile app developers have raw material to work with

Chain is a useful metaphor. But we're really dealing with networks. A resilient mesh made up of multiple chains . . .

