Broadband policy and regulatory issues in emerging markets

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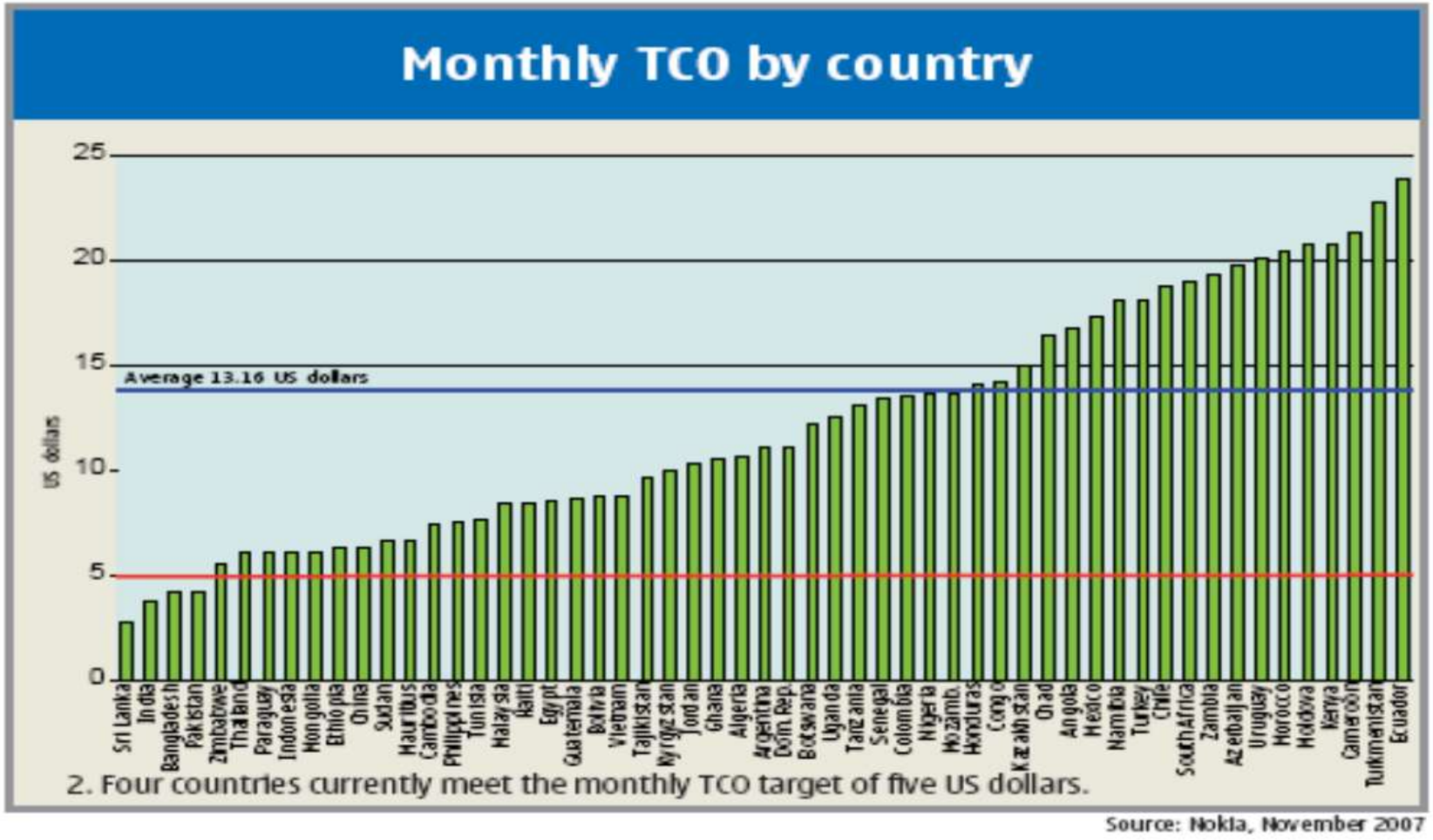
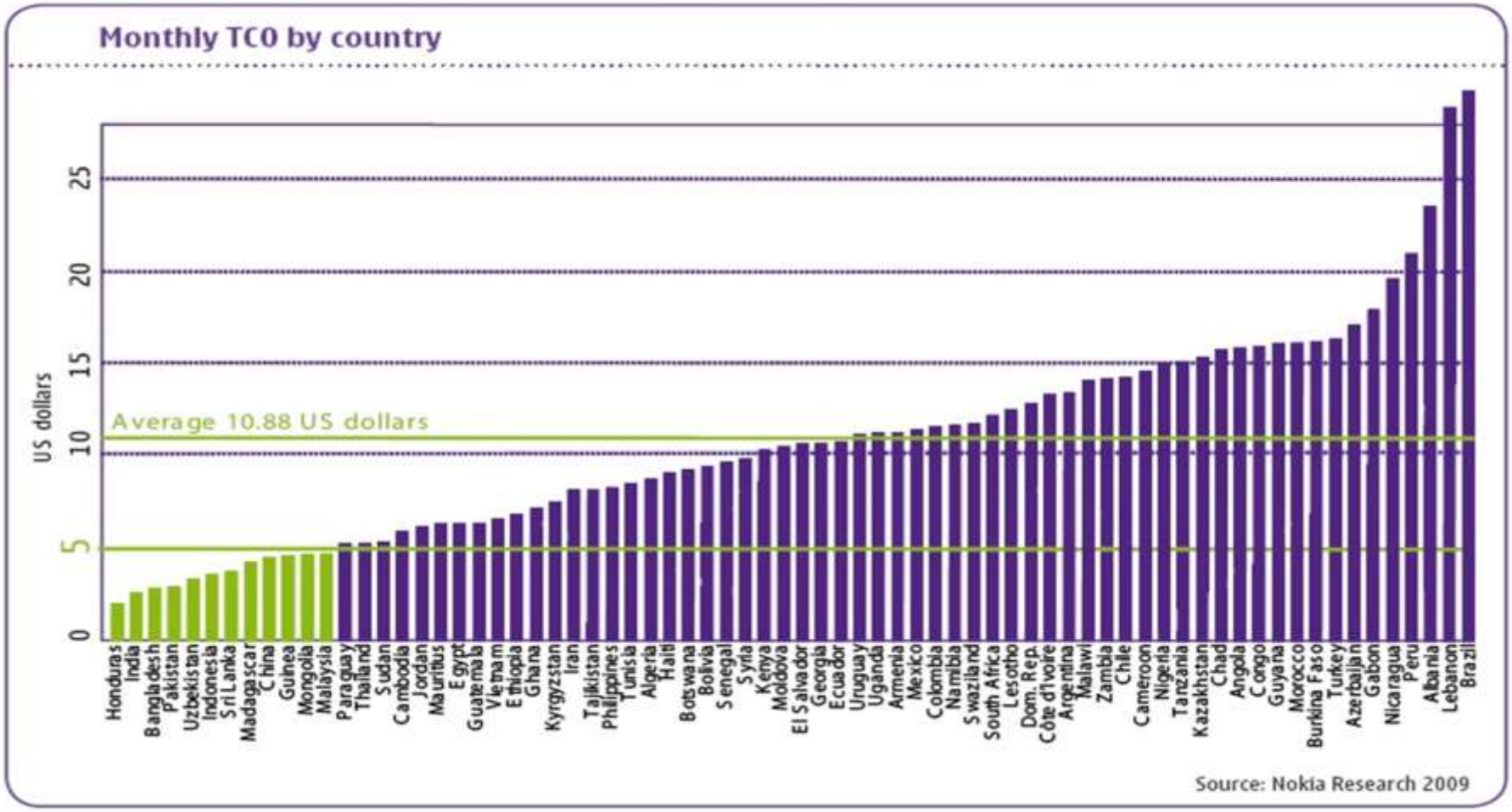
CAN ASIAN SUCCESS IN VOICE BE REPLICATED WITH BROADBAND?

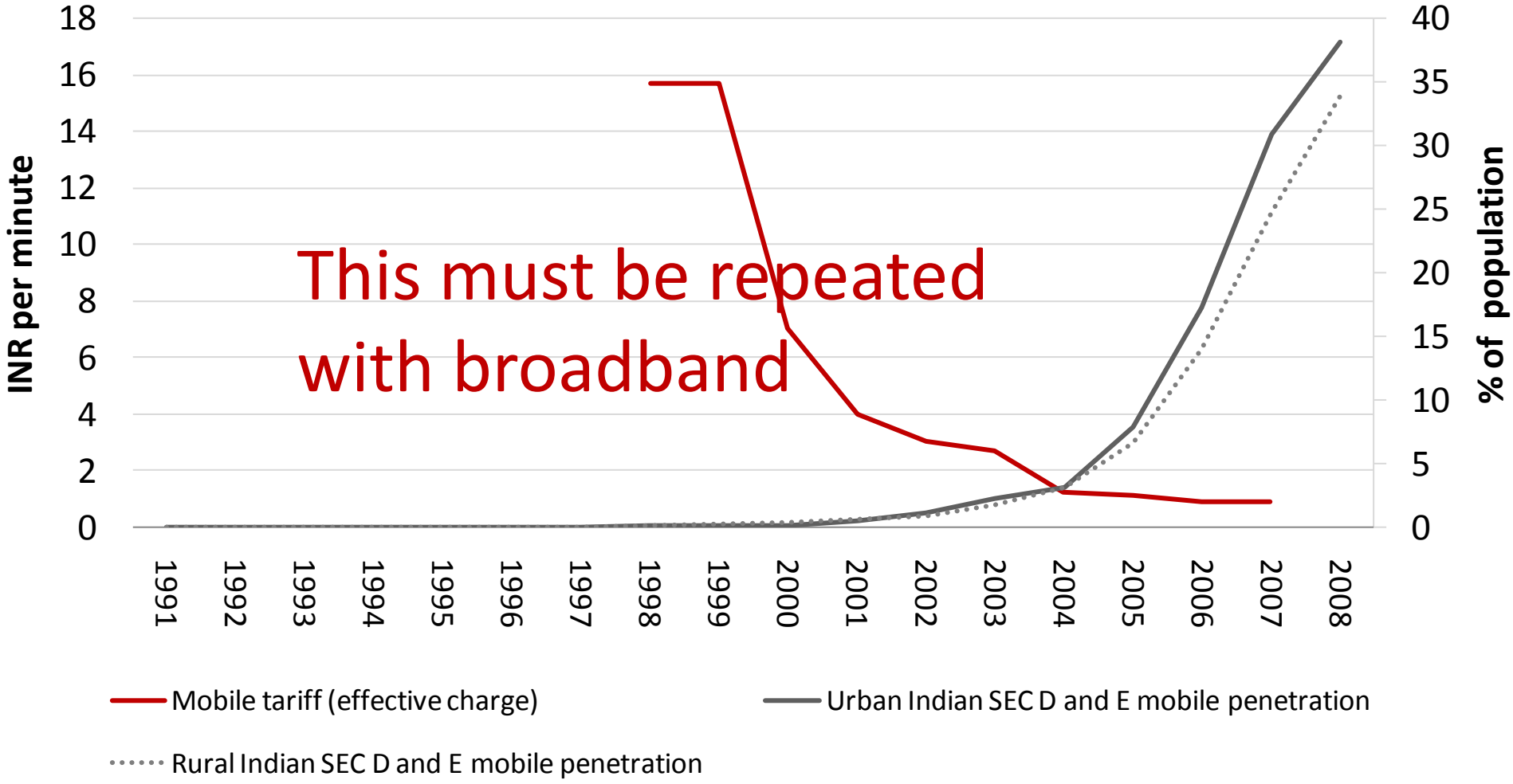
In voice+SMS basket comparison, 4 countries < USD 5 in 2007: All Asian



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, without measuring real performance?

Download speeds: Fixed Broadband

City, Country	IN, Bangalore	IN, Chennai	IN, Delhi	LK, Colombo	PK, Karachchi	MV, Male	NP, Kathmandu	IND, Jakarta
Time / Package	BSNL (1Mbps)	BSNL (4Mbps)	BSNL (4Mbps)	SLT (2Mbps)	PTCL (4Mbps)	Dhiraagu (512kbps)	NTC (512kbps)	Telkom Speedy Instant (512kbps)
8:00	867.0	2434.0	613.2	5496.3	1282.5	981.2	467.3	560.8
11:00	825.5	2320.8	750.6	5594.0	1479.0	942.2	337.3	482.4
15:00	590.3	2226.0	480.4	5612.5	2090.5	872.4	336.3	560.6
18:00	733.3	1594.8	533.8	5534.5	1002.5	1014.0	669.3	559.4
20:00	737.5	2629.0	572.2	5575.3	1048.0	1006.4	827.5	561.0
23:00	526.5	2461.8	518.0	5475.8	1089.8	810.4	-	561.0
AVERAGE	**713.3**	**2277.7**	**578.0**	**5548.0**	**1332.0**	**937.8**	**527.5**	**547.5**

Source: LIRNE*asia*, 2014

Download speeds: LTE (used as a Fixed broadband alternative)

City, Country	IN, Bangalore	LK, Colombo	IND, Jakarta
Time / Package	Airtel LTE (4Mbps)	Dialog LTE (4Mbps)	Internux LTE (72Mbps)
8:00	2167.3	5366.4	847.6
11:00	1236.5	5841.4	849.2
15:00	401.8	5831.0	952.8
18:00	1583.5	5887.0	1173.6
20:00	1622.0	5726.0	787.6
23:00	914.5	7048.3	838.6
AVERAGE	**1320.9**	**5950.0**	**908.2**

Source: LIRNE*asia*, 2014

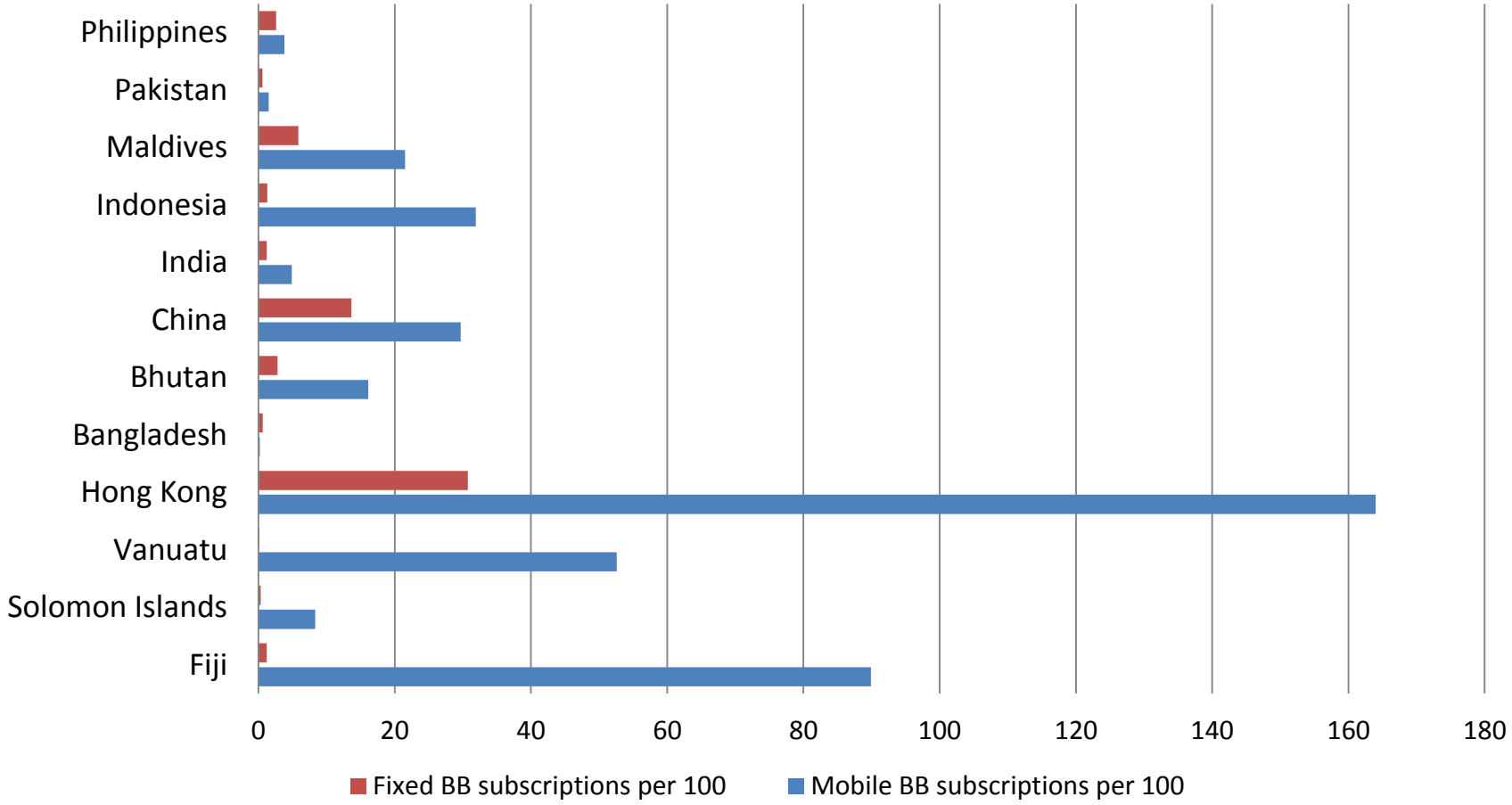
Download speeds: Mobile Broadband

Here we highlight Mbps offerings < 512 Kbps

City, Country	BD, Dhaka			IN, Bangalore	IN, Chennai	IN, Delhi	LK, Colombo			PK, Karachi	MV, Male		NP, Kathmandu	PH, Manila		IND, Jakarta
Time / Package	Banglalion (512kbps)	Qubee (mobile WiMax) (1Mbps)	Grameenphone (mobile WiMax) (512kbps)	Airtel 3G (4Mbps)	Tata (3.1Mbps)	Airtel (4Mbps)	Dialog (2.16Mbps)	Etisalat (7.2Mbps)	Mobitel (3.6Mbps)	PTCL Evo (9.3Mbps)	Ooredoo Data 99 (7Mbps)	Dhiraagu Data 200 (1Mbps)	Ncell (7.2Mbps)	SMART Bro Starter Plug-it (7.2 Mbps)	Globe Tattoo Stick (3.6 Mbps)	Telkomsel Flash Ultima(3.6Mbps
8:00	491	954	555	1723	715	396	2113	830	2652	3278	375	1120	1419	340	375	848
11:00	494	957	547	991	515	394	2098	1294	3427	1961	1227	1355	1620	188	75	849
15:00	494	893	528	208	600	644	2046	1655	3278	2498	1681	1347	1678	273	108	953
18:00	473	933	545	988	671	300	2097	1354	3263	1313	1242	866	1624	216	221	1174
20:00	448	959	481	1094	509	286	1811	889	2837	744	1121	1441	963	252	98	788
23:00	453	755	119	236	632	382	1711	746	2787	667	1195	1017	1781	124	131	839
AVG	**475**	**909**	**462**	**873**	**607**	**400**	**1979**	**1128**	**3041**	**1743**	**1140**	**1191**	**1514**	**232**	**168**	**908**

Source: LIRNE*asia*, 2014

Fixed & mobile broadband subscriptions/100 in selected Asia-Pacific economies



Source: ITU and NRAs, 2012; 2013

Facebook users > Internet users in selected SE Asian countries; Not so in sel. S Asian countries

	Population ('000s)	Internet users, ITU est. ('000s)	Internet users/100 pop	Facebook users	Facebook users/100 pop	Internet user-Fb user ('000)
Philippines	92,338	34,165	37.0	38,000	41	-3,835
Thailand	65,479	18,950	28.9	30,000	46	-11,050
Sri Lanka	20,271	4,439	21.9	2,400	12	2,039
Indonesia	237,641	37,595	15.8	70,000	29	-32,405
India	1,210,855	182,839	15.1	110,000	9	72,839
Pakistan	197,361	21,512	10.9	16,200	8	5,312
Bangladesh	156,887	10,198	6.5	9,600	6	598
Myanmar	51,419	617	1.2	2,000	4	-1,383

Sources: Most recent population data from NSOs; 2013 Internet user/100 data from ITU; Facebook user data from advertising portal

Broadband in Asia appears different

- More Facebook than Internet users in SE Asia
- Mostly wireless, not fixed
- Low prices, but also problems with quality in developing Asia

Broadband is not like 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 still mostly local
- With broadband (especially in small countries)
  - Most traffic is international
  - Even local websites hosted abroad
  - Even email intended for local persons require international traffic

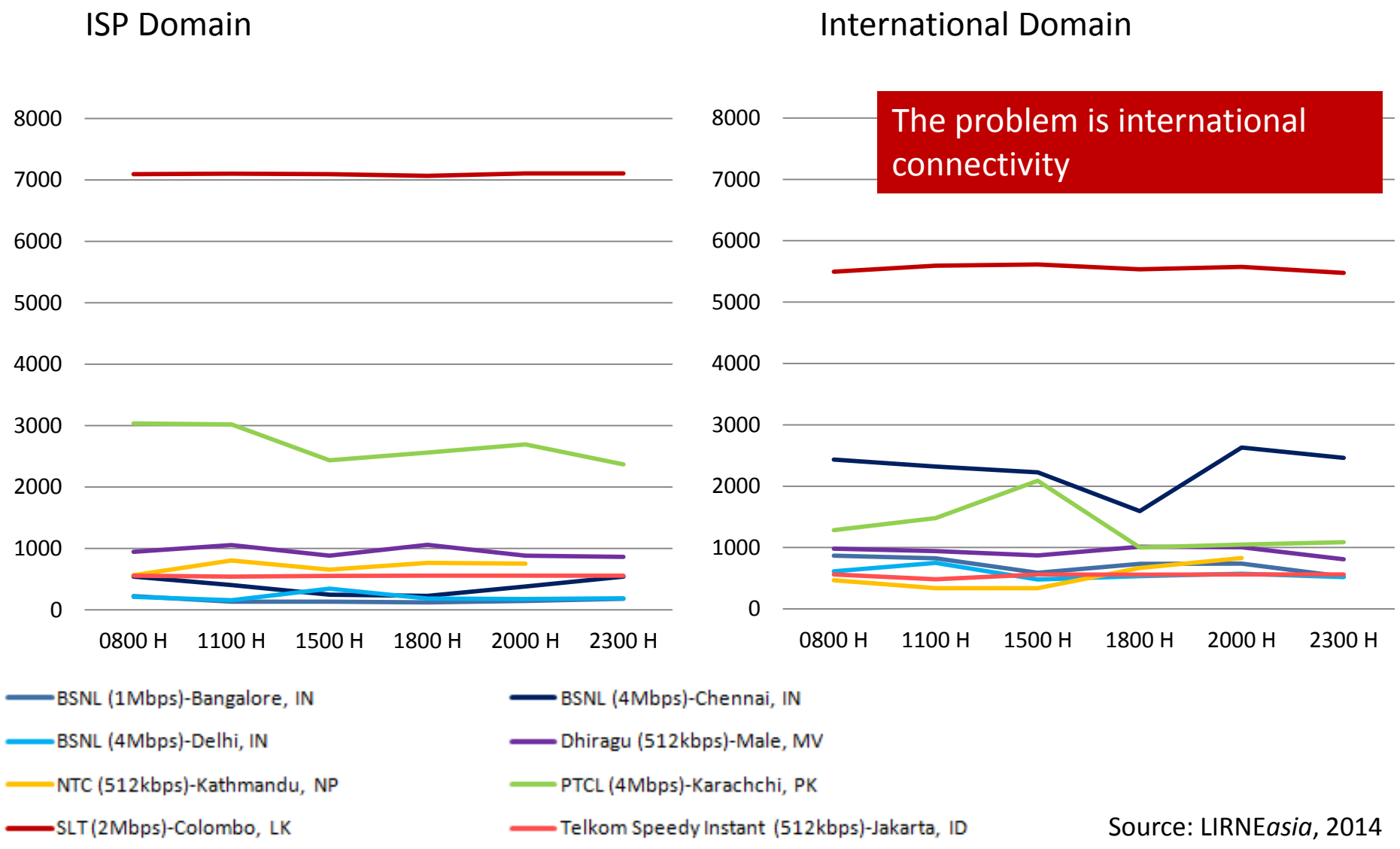
A chain is as strong as its weakest link

Broadband performance is defined by performance over the weakest link

One cannot focus on local access alone . . .

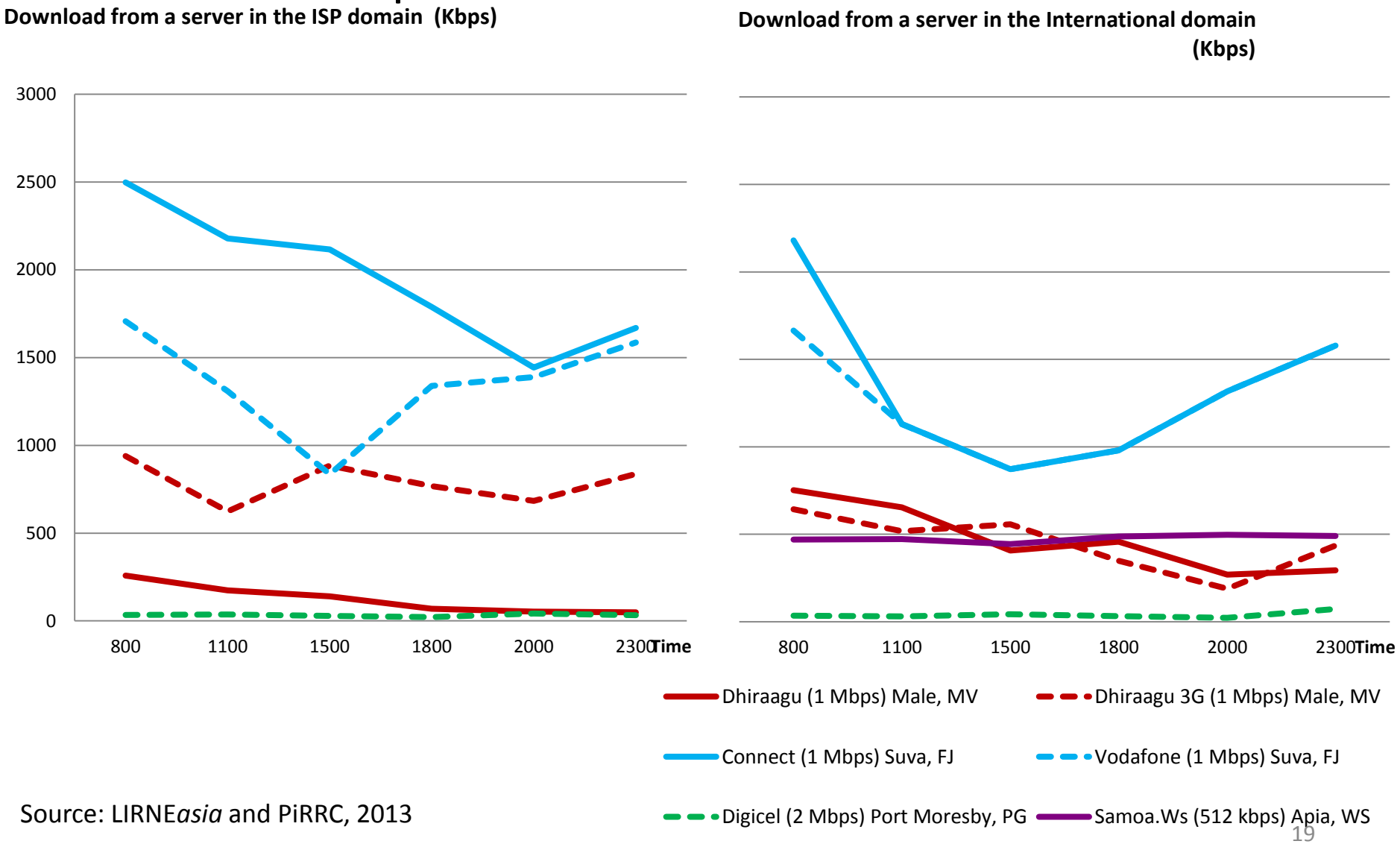
IS THE INTERNATIONAL SEGMENT THE WEAKEST LINK?

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



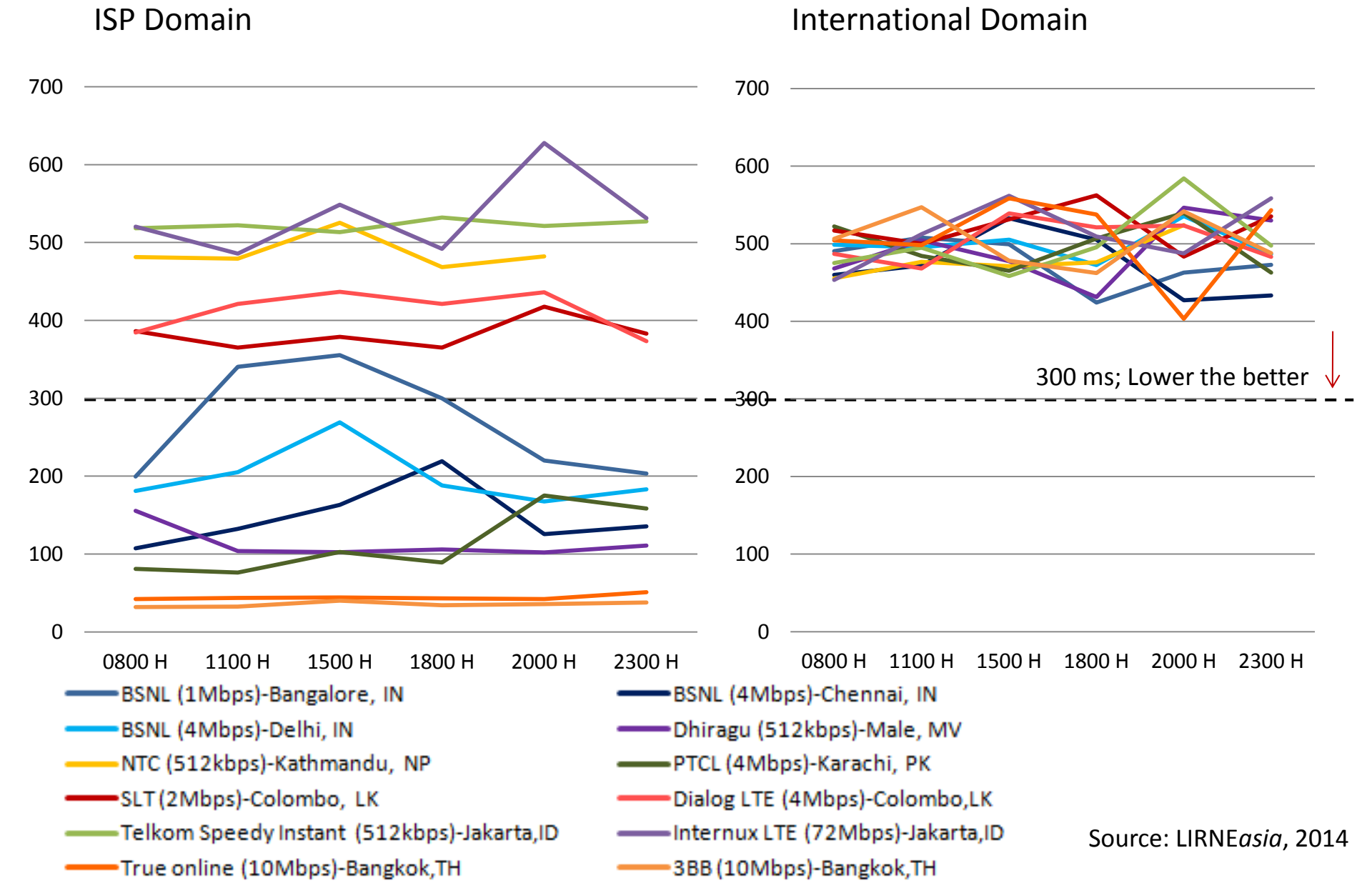
Source: LIRNE*asia*, 2014

Selected Asia Pacific small island states: Download speeds: ISP vs. International



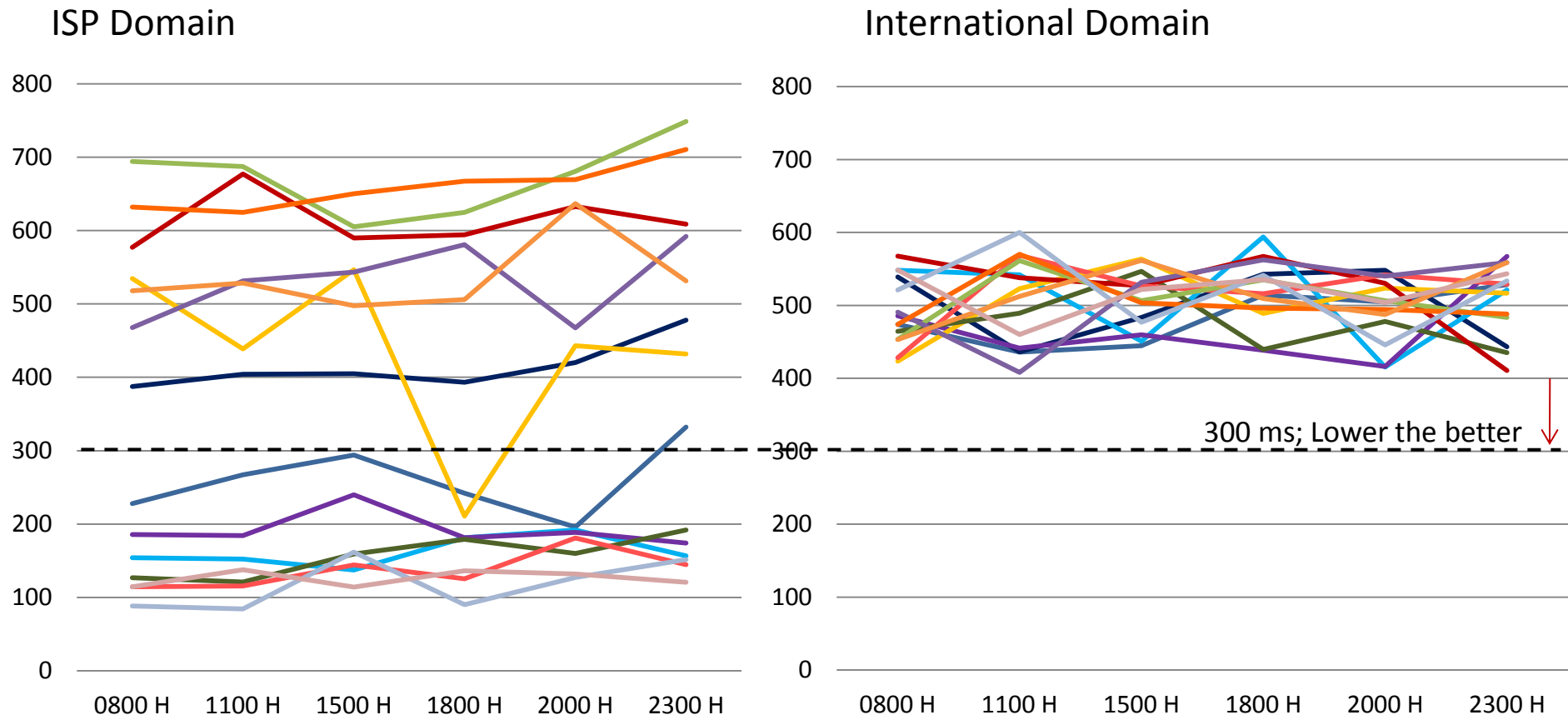
Source: LIRNE*asia* and PiRRC, 2013

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



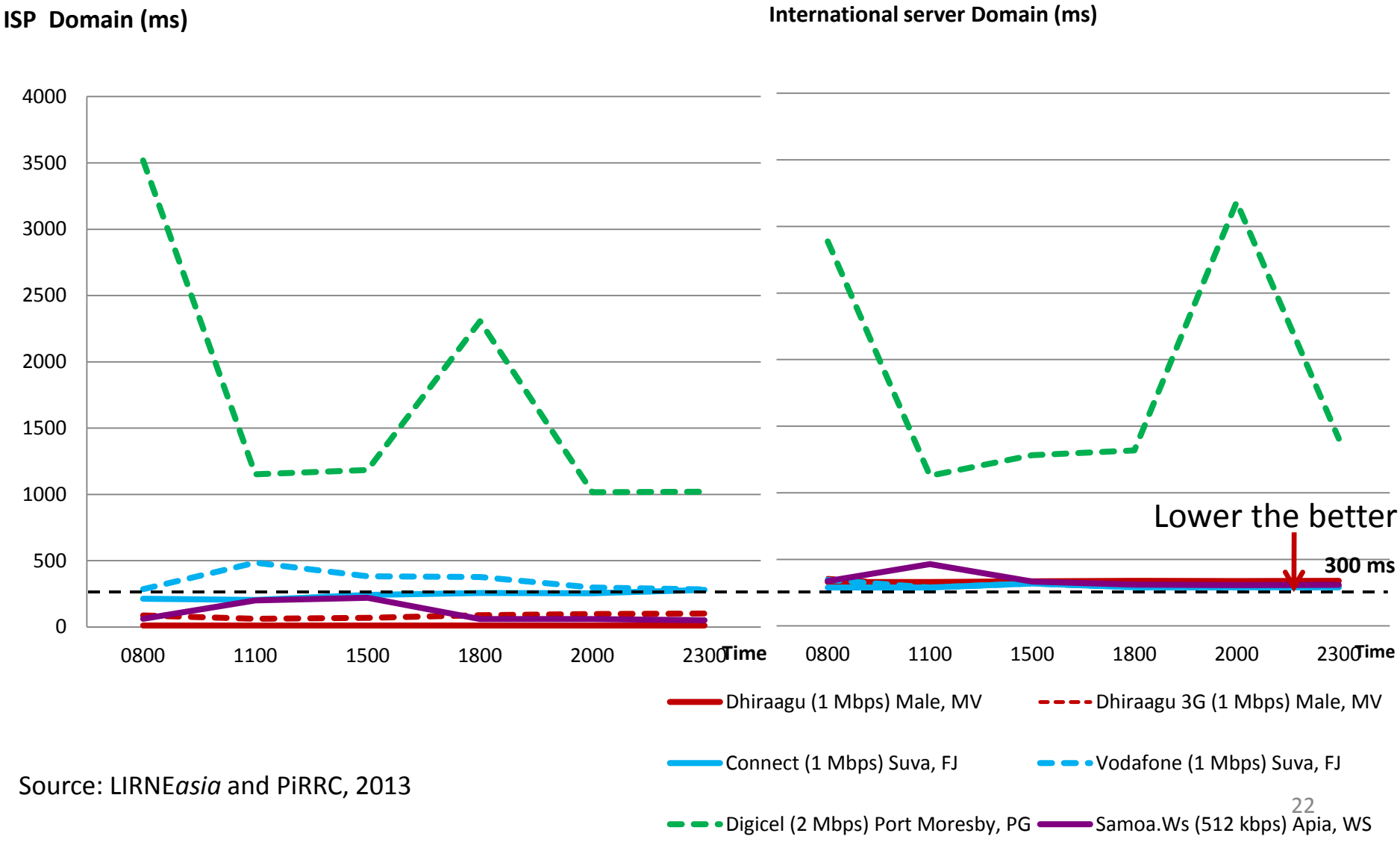
Source: LIRNE*asia*, 2014

Selected Asian cities: Latency (RTT) – USB Dongle, Mostly unsatisfactory



Source: LIRNE*asia*, 2014

Selected Asia-Pacific small island states: Latency (RTT), ISP Domain vs. International



Source: LIRNE*asia* and PiRRC, 2013

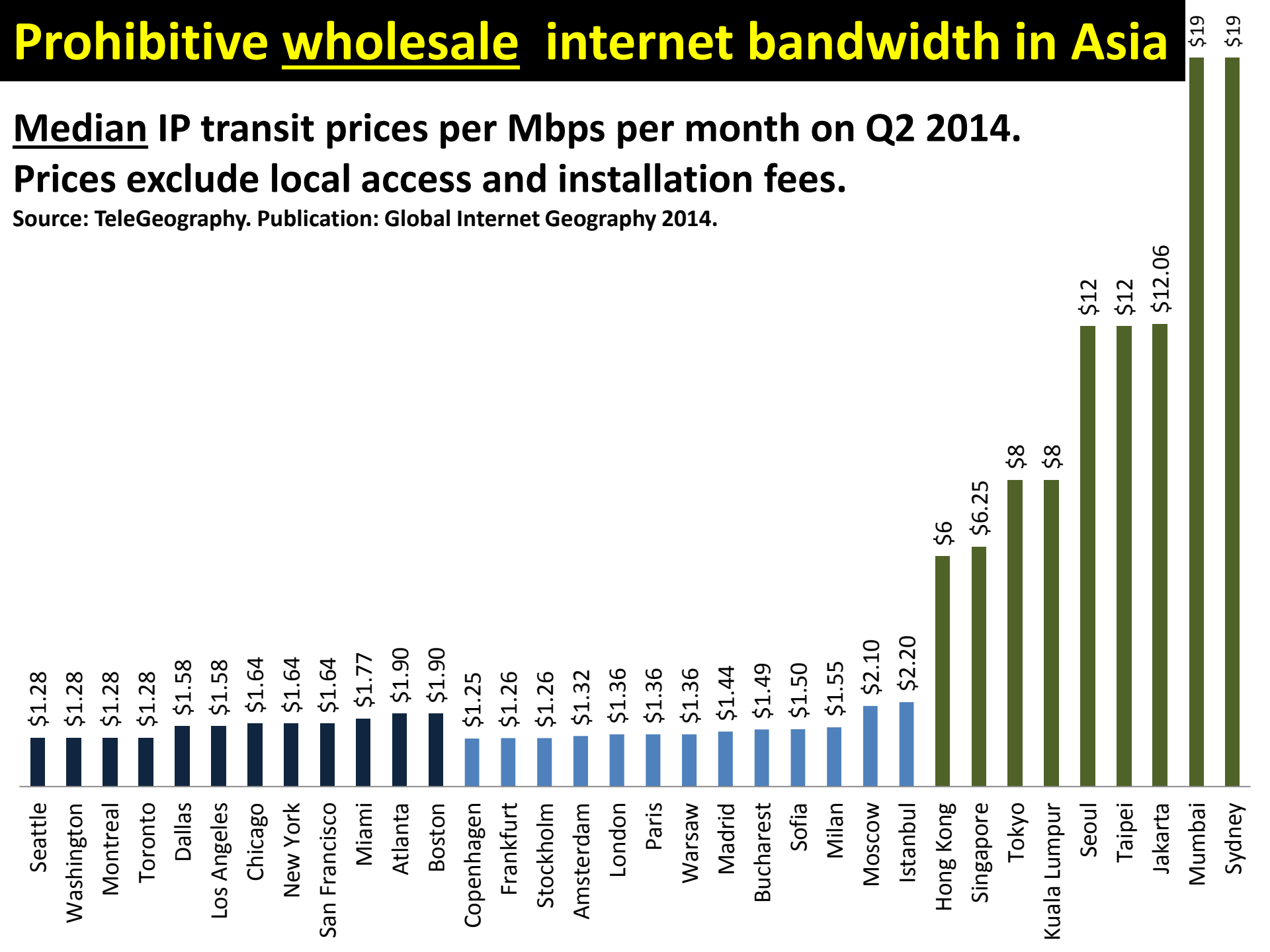
Why?

- 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

Prohibitive wholesale internet bandwidth in Asia

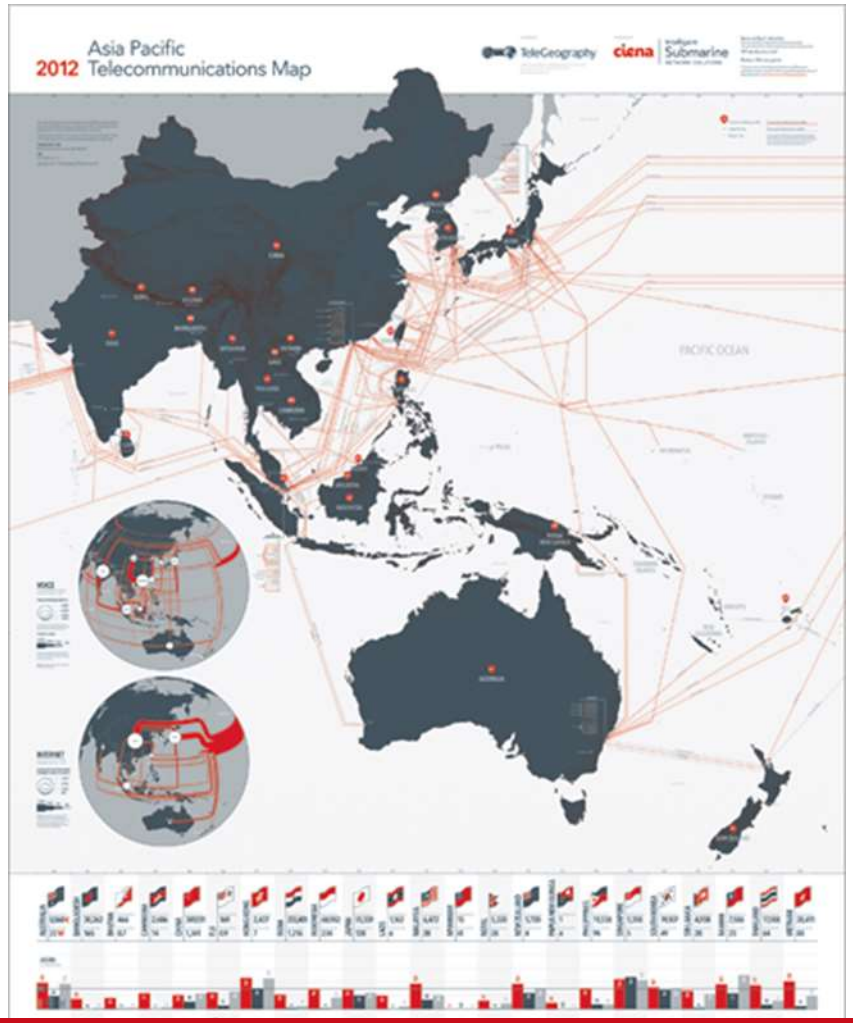
Median IP transit prices per Mbps per month on Q2 2014.
Prices exclude local access and installation fees.

Source: TeleGeography. Publication: Global Internet Geography 2014.



Need to develop submarine-terrestrial mesh for Indian Ocean-Asia

- Now with Africa also building terrestrial cable, Asia may be the region with least terrestrial cables
- Terabit shows that existing bilateral terrestrial cables are used to bring traffic to Singapore and Hong Kong and then out on submarine cables
- Indian Ocean has three chokepoints: Suez/Red Sea; Malacca Strait and Taiwan Strait
- Fragmented efforts to work around by private actors; but as Terabit shows, there is a need for seamless terrestrial connectivity



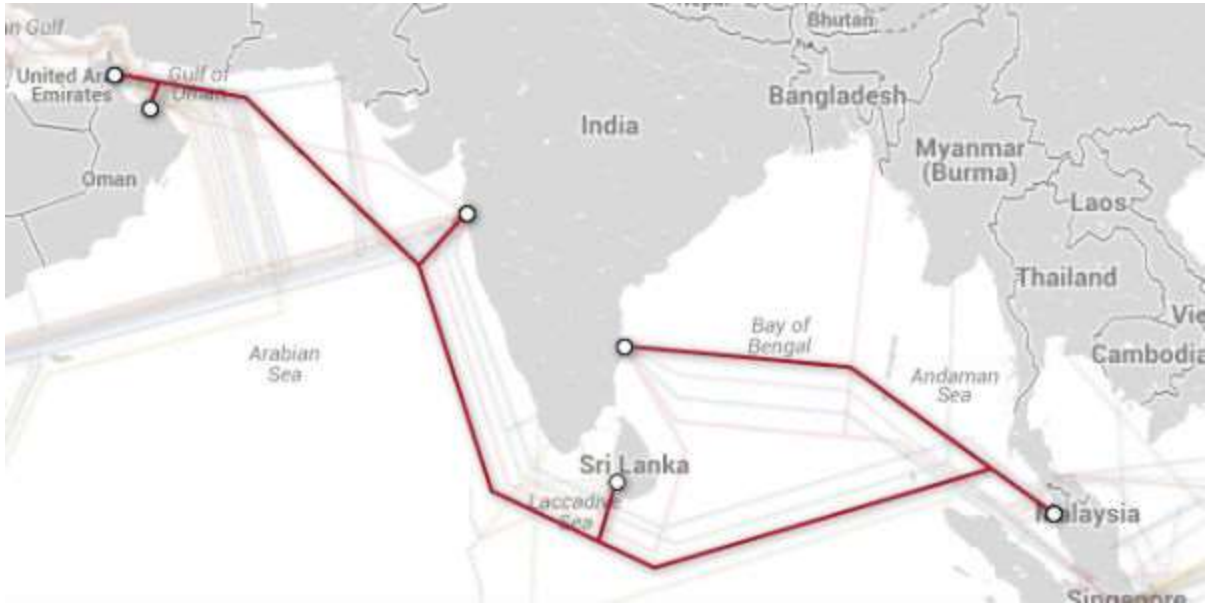
LIRNEasia working with UN ESCAP since 2010 to make this a policy priority for the Asia Pacific

Source: TeleGeography

What policymakers can do: Asian Highway ➔ "Asian Information Highway"

- Inadequacy of supply is what causes higher prices
  - Sole reliance on undersea cables is inappropriate for the word'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
- Encourage more PPPs in undersea cables, esp in underserved areas such as the Pacific and Bay of Bengal

Bay of Bengal Gateway, with Dialog Axiata as local partner



Partners: Alcatel-Lucent, Vodafone Group, Omantel, Etisalat, Reliance Infocom, Dialog Axiata, Telecom Malaysia

Landing stations: Barka (Oman); Fujairah (UAE); Mumbai & Chennai (India); Ratmalana (Sri Lanka); Penang (Malaysia); Singapore

What policymakers can do: Asian Highway ➔ "Asian Information Highway"

- Increased supply of backhaul will bring down prices for all, island nations as well as landlocked countries
  - 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

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 (e.g., India's NOFN)
- 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

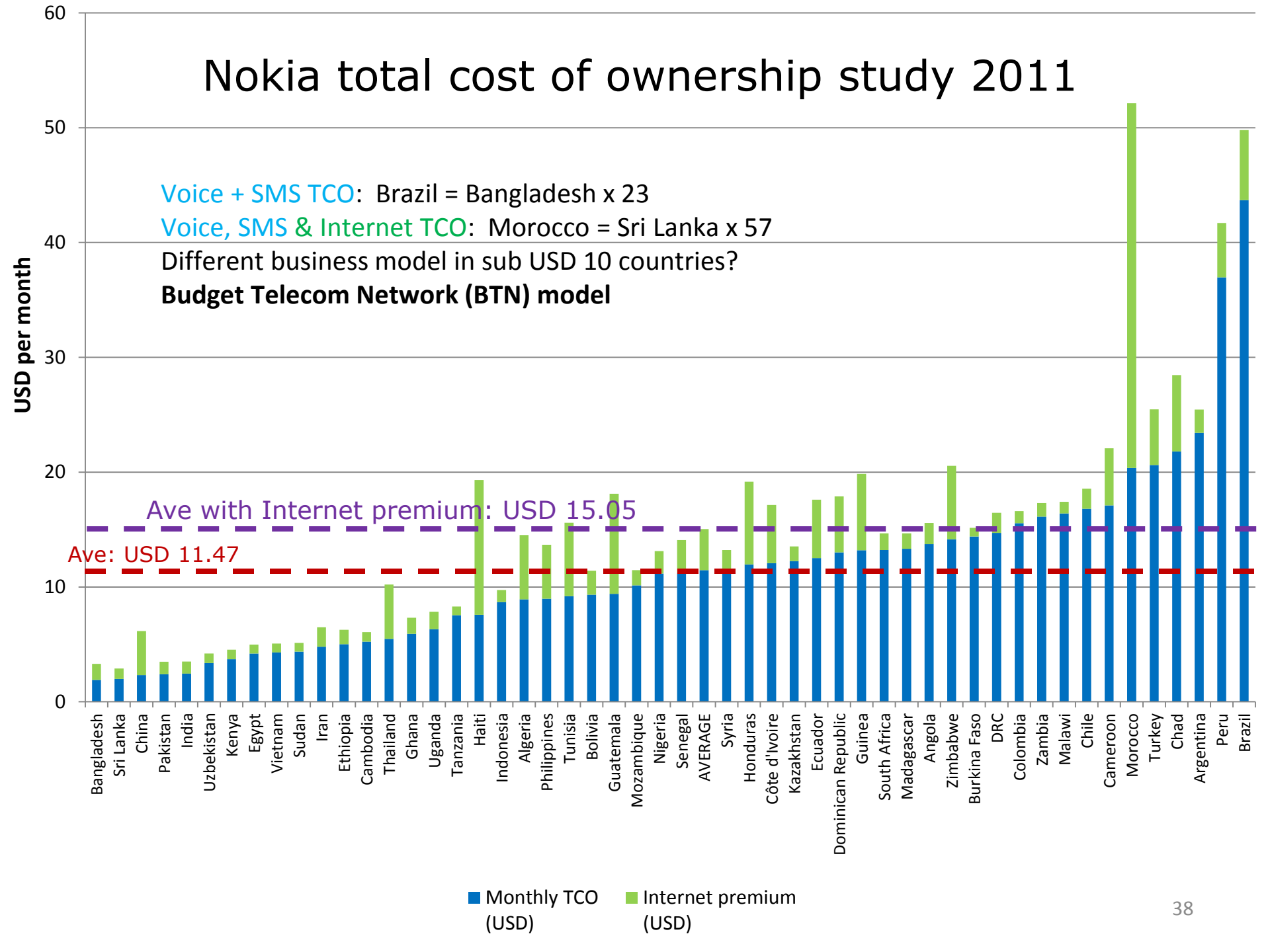
The economics of renewable energy look much better in relation to expensive and erratic conventional energy

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
USD per month
60
50
40
30
20
10
0
Ave with Internet premium: USD 15.05
Ave: USD 11.47
Bangladesh
Sri Lanka
China
Pakistan
India
Uzbekistan
Kenya
Egypt
Vietnam
Sudan
Iran
Ethiopia
Cambodia
Thailand
Ghana
Uganda
Tanzania
Haiti
Indonesia
Algeria
Philippines
Tunisia
Bolivia
Guatemala
Mozambique
Nigeria
Senegal
AVERAGE
Syria
Honduras
Côte d'Ivoire
Kazakhstan
Ecuador
Dominican Republic
Guinea
South Africa
Madagascar
Angola
Zimbabwe
Burkina Faso
DRC
Colombia
Zambia
Malawi
Chile
Cameroon
Morocco
Turkey
Chad
Argentina
Peru
Brazil
Monthly TCO (USD)
Internet premium (USD)

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 . . .