

# Measuring sector performance: Instruments and impact

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DIRSI: Telecommunications in Latin America

20 November 2010, Lima



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

# Measuring sector performance to gauge how successful sector reforms have been

- Good sector performance means
  - Connectivity (access)
  - Choice
  - Quality (of services)
  - Prices (affordability)

# Measuring sector outputs

Some of LIRNEasia's tools and impacts

# Connectivity: Usual suspects are flawed

- Connectivity (# of fixed/mobile/Internet subscriptions; # of subscriptions/100; etc)
  - Don't account for multiple SIM ownership
  - Don't account for non-owning phone and Internet users (device sharing)
  - Can't tell us who these users are (rich/poor; urban/rural; male/female...); etc
  - Can't tell us which are actually fixed and which are actually mobile (LK "fixed" wireless)

# Quality: Usual suspects are flawed and/or absent

- Only traditional measures: waiting lists; call success rates; call drops; upload/download speeds, etc.
- Few regulator publish internet quality data, and if they do, it's using invasive cumbersome methods that produce outdated data
- Trade-offs across differing approaches
  - LIRNEasia measures QoSE, from user's perspective

# Price: Flawed methods (previously used) are being corrected with the use of baskets

- Prices (cost of a 3 minute call; cost of 1MB data, etc)
  - Don't reflect different usage levels
  - Don't distinguish between pre/postpaid
  - Don't account for sunk costs (handset, connection, installation charges, etc), taxes and deals (buckets, etc)
  - Different definitions of broadband (256kbps; 1Mbps; etc)
  - Can't tell us about affordability

# **What LIRNEasia uses to measure SP**

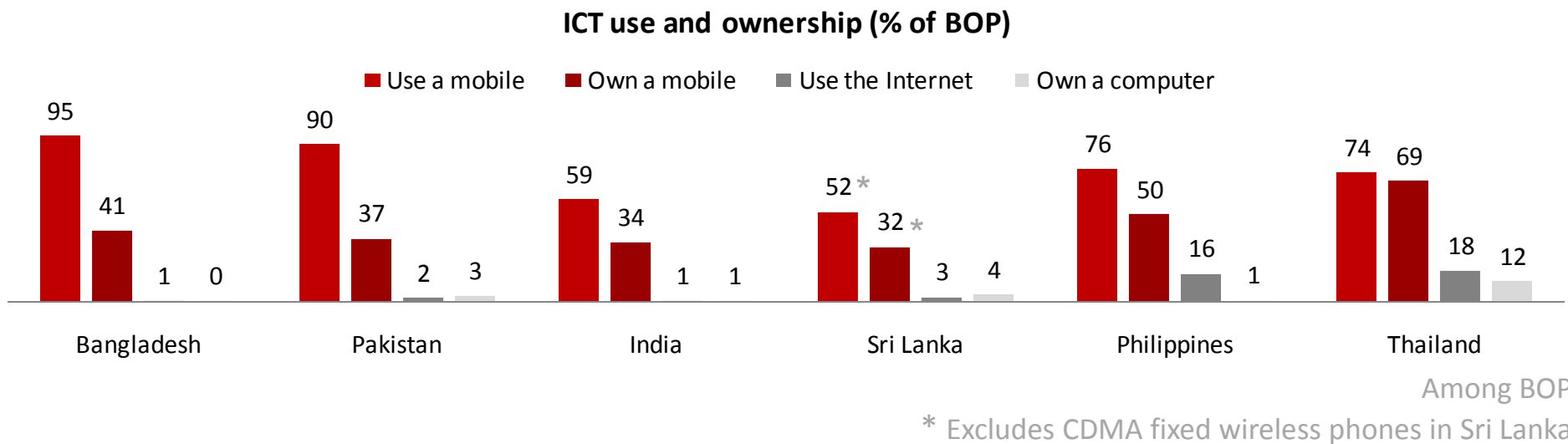
and how we make use of the results

# Connectivity



# Demand side surveys are very useful for overall numbers as well as nuances of use

- How many **own**? How many **use**?



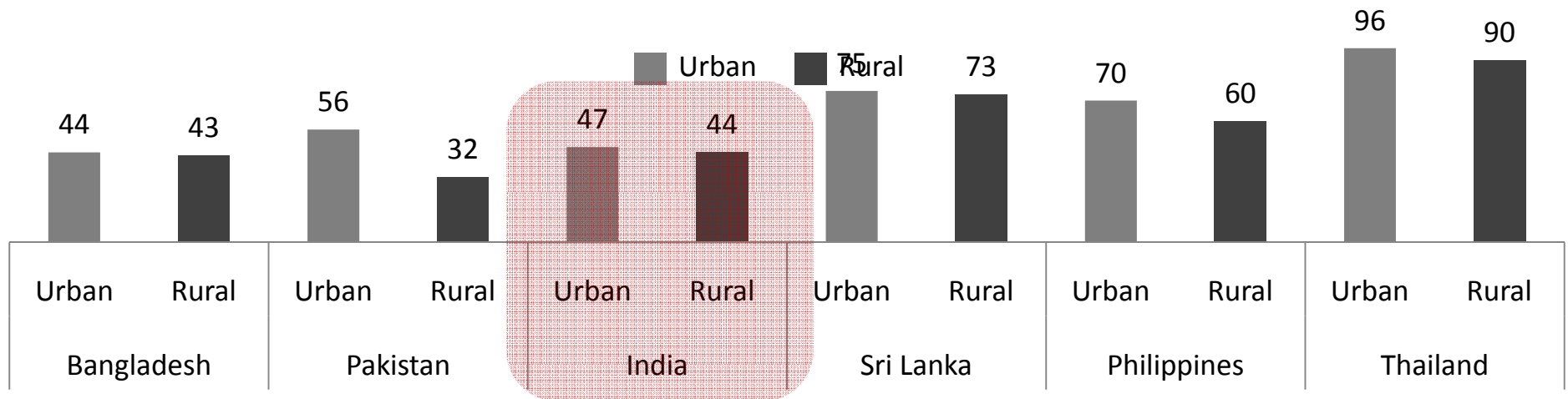
- Teleuse@BOP3 (2008) 10,000+ survey of BOP (SEC D & E; 15-60 yrs) telecom users in 6 countries
  - Representative of BOP (15-60)

- How many own more than one active SIMs?

	Bangladesh		Pakistan		India		Sri Lanka		Philippines		Thailand	
	2008	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008	
More than 1 SIM	10%	12%	23%	5%	9%	9%	16%	9%	19%	1%	13%	

- Urban-rural divide?

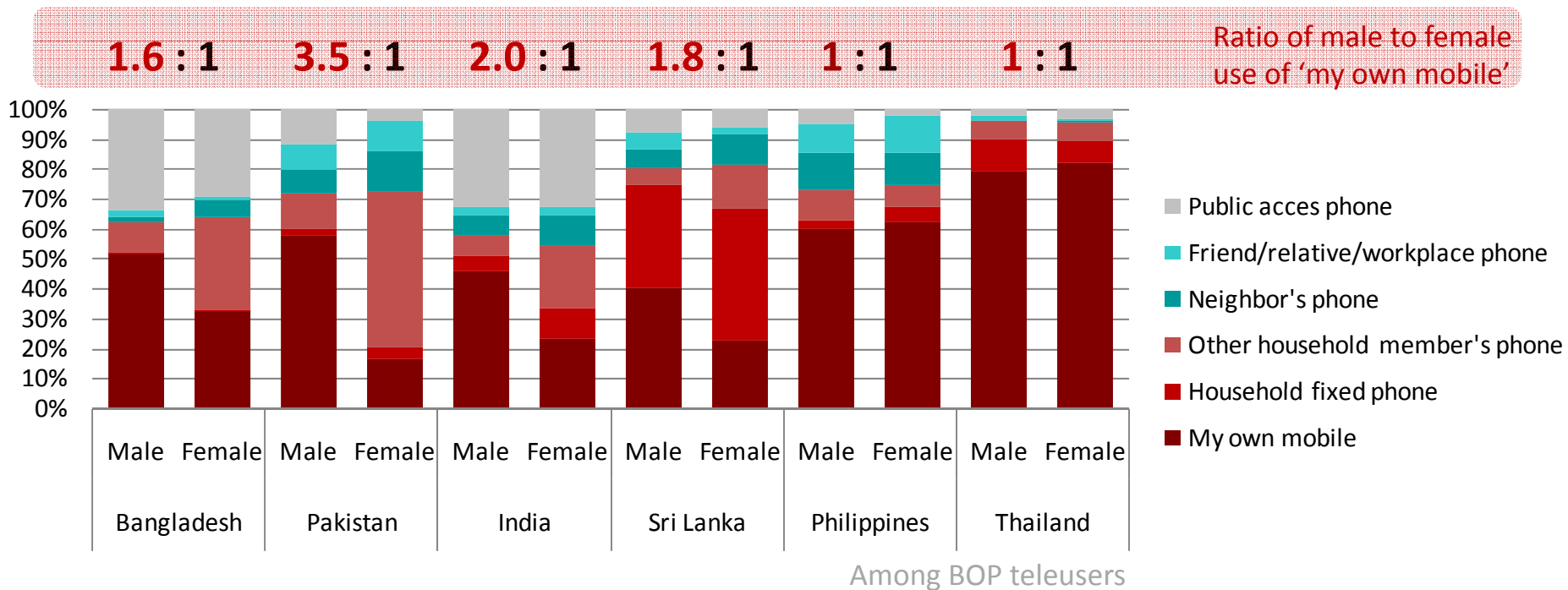
Phone (mobile and/or fixed) ownership (% of BOP teleusers)



BOP teleusers

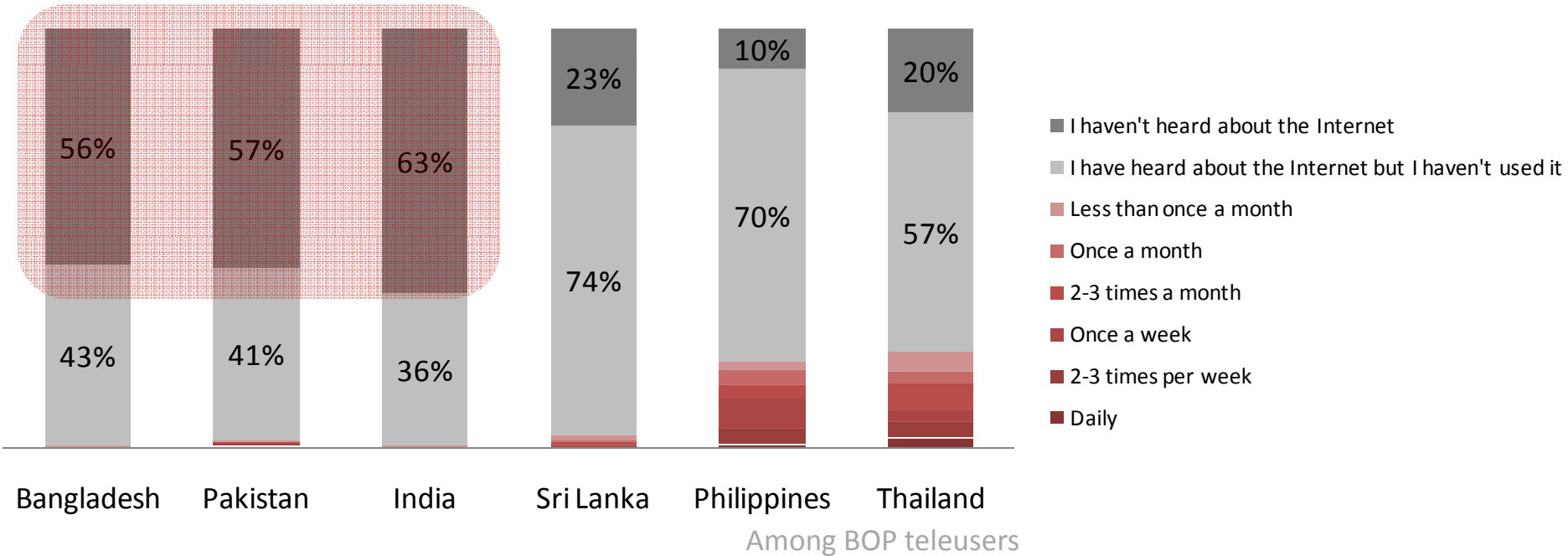
- Gender divide?

Most frequently used phone (% of BOP teleusers)



- Do people even know about these ICTs?

Internet use (% of BOP teleusers)



# • What do the poor do with their mobiles?

Among BOP mobile owners

	B'desh	Pakistan	India	S' Lanka	Ph'pines	T'land
	% of BOP mobile owners					
Taking phone calls	100%	100%	99%	100%	89%	100%
Receiving phone calls	100%	100%	98%	100%	99%	100%
Sending/receiving 'missed calls'	94%	84%	84%	73%	86%	39%
Sending/receiving SMS (text messages)	32%	47%	33%	52%	100%	53%
Sending/receiving MMS (picture messages)	1%	4%	4%	6%	13%	4%
Sending/receiving emails	0%	0%	1%	0%	0%	1%
Browsing the Internet	0%	1%	1%	2%	0%	2%
Taking photos /video clips	4%	2%	1%	8%	4%	18%
To play games (individual)	13%	18%	7%	21%	14%	17%
To play games (interactive)	1%	1%	1%	1%	3%	1%
To listen to the radio	0%	7%	3%	12%	5%	22%
To listen to music (files which you have downloaded or been sent by others, not radio)	4%	5%	3%	7%	3%	22%
To share content that you have created (E.g. ringtones, wallpapers, pictures, games and video clips)	1%	2%	2%	6%	5%	3%
To send or receive or download or upload other content (E.g., ringtones, wallpapers, pictures, games and video clips)	0%	2%	3%	8%	10%	9%
As an organizer (keep appointments, reminders, alarm and clock)	1%	7%	8%	4%	9%	14%
To check my bill / credit balance	11%	40%	25%	50%	3%	39%

# Data successfully used to combat of regressive element of proposed mobile tax in Sri Lanka (2007)

- Proposed tax
  - 7.5% mobile subscriber levy (increase from 2.5%) + **LKR50 flat rate**
- Data used to show poor are dependent on mobiles, with low monthly expenditure

- Regressive effect illustrated to policymakers, media, etc

Monthly mobile expenditure (LKR)	+General tax (LKR)	Existing (LKR)	Proposed (LKR)		Revised (LKR)	
	+17.5% VAT & SRL	+2.5% MSL	+7.5% MSL & 50	Tax as % of value	+10% MSL	Difference (proposed vs revised)
200	235	241	303	51.3	259	-44
400	470	482	555	38.8	517	-62
600	705	723	808	34.6	776	-68
800	940	964	1061	32.6	1034	-27
1000	1175	1204	1313	31.3	1293	-80
1200	1410	1445	1566	30.5	1551	-85
1400	1645	1686	1818	29.9	1810	-8
1600	1880	1927	2071	29.4	2068	-3
1800	2115	2168	2324	29.1	2327	3
2000	2350	2409	2576	28.8	2585	9

Range of Prepaid ARPU's

Relative winners  
Losers

Result: Flat rate eliminated; MSL increased to 10%

# From the Hansard, September 6, 2007

මේ වාගේ බඳු පනත් කෙටුම්පත් හෙතෙන්න අද උත්සාහ කරනවා. LIRNEasia කියන පර්යේෂණ ආයතනයේ මහාචාර්ය රොහන් සමරජිව මහතා සහ දොස්තර හර්ෂ ද සිල්වා මහතා රුපියල් 50 ප්‍රතිපායන බද්දට විරුද්ධව ඊතේ. පෙරේරා නවා කළා. එක්සත් ජාතික පක්ෂයත් මෙම තර්කය දිගට ම ගෙන ගියා. අද හවස් වන විට ගරු ඇමතිතුමා රුපියල් 50 ඉවත් කරනවා නම් අප සතුටු වනවා. සියයට 10ක වැඩි කිරීමත්, ඒ තරම් ප්‍රමාණයක් දක්වා වැඩි නොකර අඩු කරන්නක් කියා අප ඉල්ලා සිටිනවා. මොකද. ඒකෙන් වදින්නේ සාමාන්‍ය මිනිසාටයි.

*Translation: We will be pleased if Hon. Minister removes the regressive tax of LKR 50 as pointed out by Prof. Rohan Samarajiva, Dr. Harsha de Silva of LIRNEasia and UNP Members. We also request not to increase the mobile subscriber levy to 10%. This tax will have an adverse effect on the common man.*

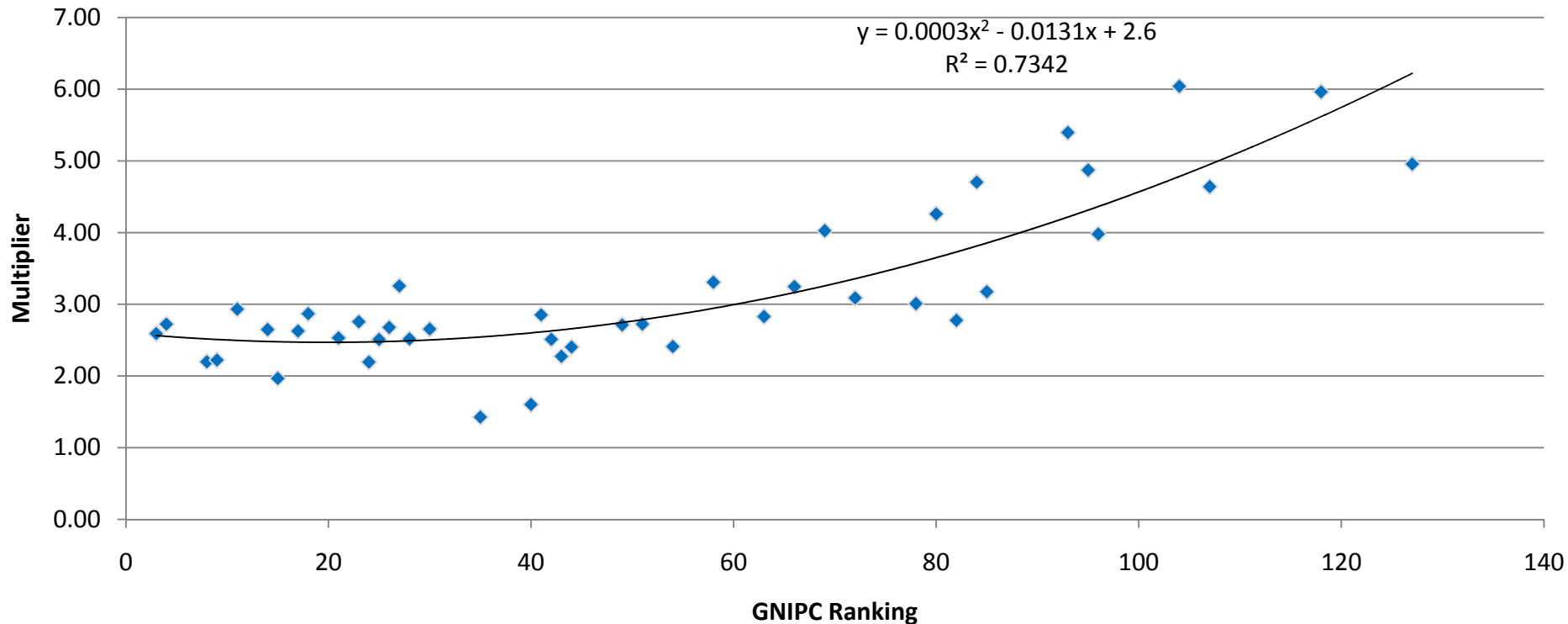


# More recent application of demand-side data to accurately estimate Internet "users"

- ITU-reported numbers
  - Estimated Internet users = Total Internet subscriptions \* X
  - What is X? How is it determined?
    - Afghanistan: 500
    - Burundi: 13
- New methodology
  - Use existing demand-side data to calculate X for subset of countries; , according to GNI

# Result: individual country multipliers (X) determined objectively

- Maybe not perfect, but better than arbitrary Xs

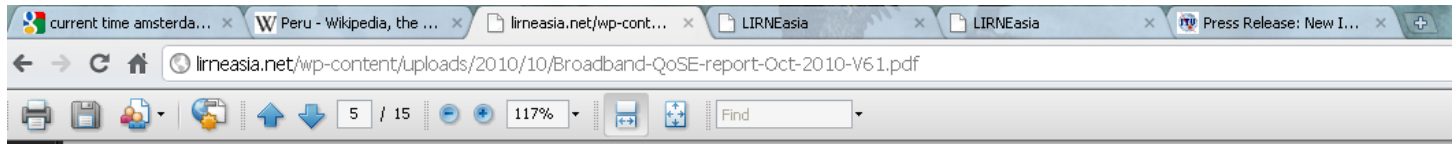


**Quality**

# LIRNEasia uses broadband quality of service experience (QoSE) benchmarks

- Measures 5 parameters (Upload, download, RTT, Jitter, packet loss)
  - In relation to 3 servers (ISP, national, International)
- Tests conducted
  - For mobile and fixed broadband (wireless coming soon)
  - At different times of the day (0800, 1100, 1500, 1800, 2000, 2300)
  - On weekdays and weekends
  - From multiple locations (even in buses)
  - **By users (software downloadable; background app; data automatically uploaded to publicly accessible website)**
- Tests for long intervals to minimize effects of short term variations (e.g. 100 pings, 100 sec download)
- Variations studied and outliers removed

# Value for money compared (kbps/USD)



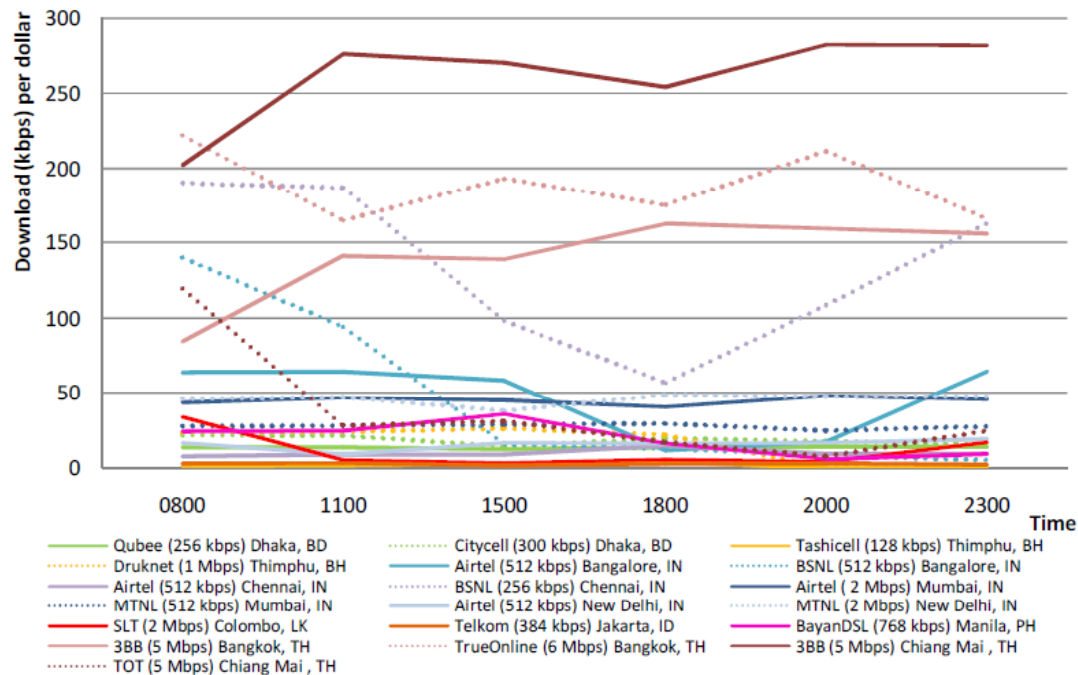
## BROADBAND ENCHMARKS

Q3 2010

Quality of Service Experience (QoSE)

### 3.1 Fixed Broadband – Throughput (kbps)<sup>vii</sup>

Figure 1 - Download from an International server - kbps per dollar

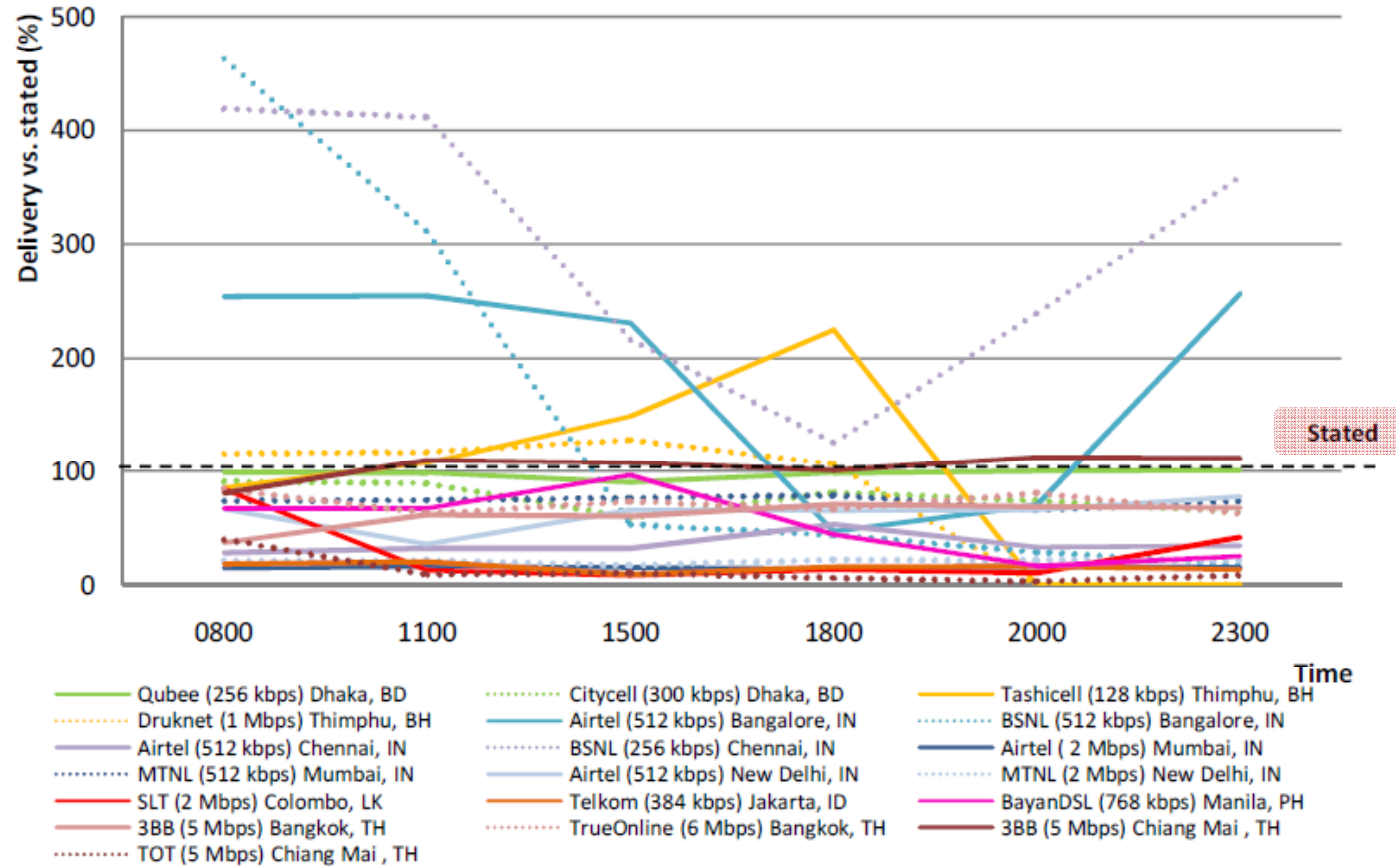


www.lirneasia.net

# Delivered vs stated speeds

NB: See annex for data

Figure 2 - Download from an International server –Delivered vs. Stated



www.broadbandasia.info

# Pressure for ethical advertising

## Pressure for ethical advertising

**Unlimited Broadband**  
Take it anywhere with you

HSPA+  
World's Broadband Today  
3.5G Technology

As much as you can byte  
for as little as Rs 20/-

Dialog offers unlimited downloads and uploads on Pre-paid Mobile Broadband. Available in 30 minute, 2 hour and 24 hour slots.

Internet Browsing Time	Price* (Rs.)	Validity Period (days)
20 minutes	20/-	1
2 hours	50/-	3
24 hours**	400/-	7

\* Approximate based on the earlier  
\*\* The 24 hour option is subject to Dialog's Fair Usage Policy. For details visit www.dialog.com  
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www.dialog.in

**Dialog**  
Broadband

TheFuture.Today.

- Dialog Broadband changed advertised speeds from 7.2 Mbps → 1 Mbps
- Mobitel, stopped advertising speeds of 14.4 Mbps → 3.6 Mbps

## HOW BROAD IS YOUR BROADBAND?

### FOUR facts you should know

- Value for Money**  
Sri Lankan broadband users receive less value for their money than North American users.  
(LIRNEasia's 2009 3rd Quarter test results)
- Checking Advertised Speeds**  
When connecting to most international websites, the average Sri Lankan broadband user typically gets only 40-50% of the advertised broadband speed.
- Bandwidth Bottlenecks**  
Although international bandwidth prices continue to fall, international bandwidth limitations continue to be a major bottleneck.
- Contention Ratios**  
The Sri Lanka Telecommunication Regulatory Commission has still not specified contention ratios, which limit the number of simultaneous users on a shared link, thereby boosting overall bandwidth.

In January 2009, following LIRNEasia's recommendations to adopt contention ratio of 1:30 (Business) and 1:50 (Residential), the Telecommunications Regulatory Authority of India (TRAI) specified contention ratios of 1:30 (Business) and 1:50 (Residential).

### Models to emulate

PARAMETER	SINGAPORE	INDIA
Network Availability	> 99%	> 98%
Latency (Local)	< 35ms	< 120 ms
Latency (International)	< 300ms	< 350 ms (terrestrial) < 500 ms (satellite)
Bandwidth Utilization	90% during peak time	< 80% during peak time
Download Speed	Not Specified	> 80% of advertised from user to ISP
Service Activation	Not Specified	100% in 1.5 working days
Customer Support	Not Specified	60% calls in 60 seconds 80% calls in 90 seconds

### Value for money Fixed Broadband Download from yahoo.com (kpbs per dollar)

Legend:

- Dialup Office Net (2 Mbps) Colombo, LR
- ST Office (2 Mbps) Colombo, LR
- ST Home (12 Mbps) Colombo, LR
- Comcast (8 Mbps) Ottawa, CA
- Rogers (20 Mbps) Ottawa, CA
- Verizon (2 Mbps) Buffalo, US
- Comcast (5 Mbps) Denver, US

Download the free software from [www.broadbandasia.info](http://www.broadbandasia.info) to test the quality of your broadband link.

LIRNEasia  
[www.lirneasia.net](http://www.lirneasia.net)




LIRNEasia is a regional ICT policy and regulation think tank active across the Asia Pacific.



# Similar approaches being adopted by regulators

- FCC promoting BB QoS monitoring via “crowd sourcing”
- TRAI (India) and BTRC (Bangladesh) both partially adopted LIRNEasia recommendations on monitoring and publication of QoSE information

## Bangladesh: Response to the paper on 'BROADBAND WIRELESS ACCESS SERVICES'

- Operators should guarantee QoSE not within ISP only, but till first entry point to US 
- Operators should publish contention ratios 
- Assurance at launch is inadequate; QoSE should be regularly monitored 
- “Broadband = 128 kbps +” definition should change

## India: Response to the paper on 'ISP BANDWIDTH REQUIREMENTS'

- Suggested contention ratios 1:20 (business) and 1: 50 (residential) – Adopted 1:30 and 1:50 ✓
- Information on contention ratios should be made public ✓
- Broadband QoSE is not just speed; need a holistic view
- Operator obligation should be till first entry point to US

**Prices**

# Broadband benchmarking: South Asia Broadband Conference, Sep '07. Research picked up by AFP



South Asia

August 2007

## Broadband Prices (USD<sup>5</sup>)

Country	2Mbps, 2km DPLC (p.a.) <sup>2</sup>	2Mbps, 100 km DPLC (p.a.) <sup>3</sup>	2 Mbps Broadband business connection (p.a.) <sup>4</sup>	Minimum 256Kbps Broadband business connection (p.a.)	Minimum 256Kbps Broadband Residential connection (p.a.)
Afghanistan	12,000 <sup>6</sup>	N/O <sup>7</sup>	N/O	N/O	N/O
Bangladesh	30,446 <sup>8</sup>	- <sup>9</sup>	N/O	1,240 <sup>10</sup>	2,066 <sup>10</sup>
Bhutan	180 <sup>11</sup>	1,715 <sup>11</sup>	N/O	N/O	N/O
India	412 <sup>12</sup>	4,098 <sup>13</sup>	717 <sup>14</sup>	107 <sup>15</sup>	223 <sup>14</sup>
Maldives	16,342 <sup>16</sup>	40,576 <sup>16</sup>	N/O	2,792 <sup>17</sup>	112 <sup>17</sup>
Pakistan	51 <sup>18</sup>	2,528 <sup>18</sup>	N/O	2,660 <sup>19</sup>	2,660 <sup>19</sup>
Sri Lanka	3,174 <sup>20</sup>	9,261 <sup>21</sup>	726 <sup>22</sup>	242 <sup>23</sup>	242 <sup>23</sup>
Benchmarks					
Indonesia	4,800	-	N/O	954 <sup>26</sup>	254 <sup>27</sup>
Philippines	392 <sup>24</sup>	-	785 <sup>25</sup>	N/O	261 <sup>25</sup>
EU average	358 <sup>28</sup>	-	164 <sup>29</sup>	119 <sup>30</sup>	119 <sup>30</sup>

September 17, 2007

Monday

Ramazan 04, 1428

“ PAKISTANIS PAY MOST IN SOUTH ASIA TO ACCESS IINTERNET”



**Pakistanis pay most in South Asia to access Internet**

COLOMBO, Sept 16: Home to some 1.5 billion people, South Asia is paying a high price to access the Internet as service providers have been slow to deliver cheaper broadband connections, analysts say.

The region has embraced telephones, mobile phones and computers and India has a flourishing noted industry watchers at the first South Asia Broadband Congress said here earlier this month.

But South Asia has lagged behind in hopping onto the broadband bandwagon, observed Sanjay Communication Technology.

“There is not enough local language content and affordable connections.

Currently, broadband penetration is very low -- estimated to be less than three per cent in the region -- and it boils down to cost,” Gupta said.

Home users in Pakistan pay the most in the region, with annual broadband prices of 2,660 dollars, followed by Bangladesh at 2,066 dollars, according to Colombo-based LIRNEasia, a regional telecom think-tank.

The same service costs 242 dollars in Sri Lanka, 223 dollars in India and 112 dollars in Maldives, said researchers at LIRNEasia, who are studying reasons for poor broadband penetration in South Asia.

“...according to Colombo-based LIRNEasia, a regional telecom think-tank”  
AFP → Dawn



From: Rohan Samarajiva [rsamarajiva@yafoo.com]  
 To: Helani Galpaya  
 Cc:  
 Subject: Fw: Broadband Price Benchmarks - LIRNE Asia

Sent: Fri 2/1/2009 4:35 PM

Message | SABB Draft 1 4.doc (84 KB)

----- Forwarded by M Arif Sargana/Economic Affairs/PTA/PK on 09/22/2007 01:57 PM -----

**Aasif Inam/CA/PTA/PK**

09/21/2007 12:37 PM

To: M Arif Sargana/Economic Affairs/PTA/PK@PTA  
 cc:  
 Subject: Broadband Price Benchmarks - LIRNE Asia

**..and so on. Multiple emails/conversations back and forth about methodology, prices**

Dear Sargana Sb,

We have reviewed the slides of the presentation by Prof. Samarajiva and I believe that there has been an error in reporting the broadband tariffs for residential connection in Pakistan (*copy of the document sent by your office to Prof. Samarajiva is attached*). Moreover, the data table was silent on many aspects based on which the comparison may not have reflected the true picture and therefore, the the business connection data also needs to be changed as described below.

Based on our assessment, the Broadband Tariffs in Pakistan are fairly comparative and in some instances more competitive than the regional broadband benchmarks. Below you would find some of the clarifications pertaining to the the Pakistan related data mentioned in the presentation of Prof Samarajiva. I request you to kindly forward these comments to him so that appropriate amendments can be made in their research data.

**Broadband Price Benchmarks – Lirne Asia**

# 6 months later...



South Asia

Feb 2008

Table 1 - Broadband Prices<sup>1</sup>

Price Drop: 64%

Country <sup>2</sup>	2MB, 2km DPLC <sup>3</sup> (p.a <sup>4</sup> )	2MB, 100km DPLC <sup>5</sup> (p.a)	2MB Broadband business connection <sup>6</sup> (p.a)	Minimum 256kbps Broadband business connection <sup>6</sup> (p.a)	Minimum 256kbps Broadband residential connection <sup>6</sup> (p.a)
Afghanistan	12,000 <sup>7</sup>	N/O <sup>8</sup>	N/O	N/O	N/O
Nepal	55,393 <sup>9</sup>	2,760,290 <sup>9</sup>	57,385 <sup>10</sup>	8,608 <sup>10</sup>	6,695 <sup>10</sup>
Bangladesh	23,393 <sup>11</sup>	N/O	N/O	8,016 <sup>12</sup>	2,680 <sup>13</sup>
Pakistan	49 <sup>14</sup>	2,437 <sup>14</sup>	N/O	964 <sup>15</sup>	964 <sup>15</sup>
India	432 <sup>16</sup>	4,447 <sup>16</sup>	3,779 <sup>17</sup>	241 <sup>18</sup>	379 <sup>17</sup>
Bhutan	2,438 <sup>19</sup>	18,283 <sup>19</sup>	4,540 <sup>20</sup>	303 <sup>21</sup>	303 <sup>21</sup>
Sri Lanka	3,249 <sup>22</sup>	6,350 <sup>23</sup>	556 <sup>24</sup>	250 <sup>25</sup>	250 <sup>25</sup>
Maldives	18,803 <sup>26</sup>	40,576 <sup>27</sup>	16619 <sup>28</sup>	2,091 <sup>29</sup>	379 <sup>30</sup>
EU Average	358 <sup>31</sup>		164 <sup>31</sup>	119 <sup>31</sup>	119 <sup>31</sup>



# Benchmarking used to monitor price levels for voice and data

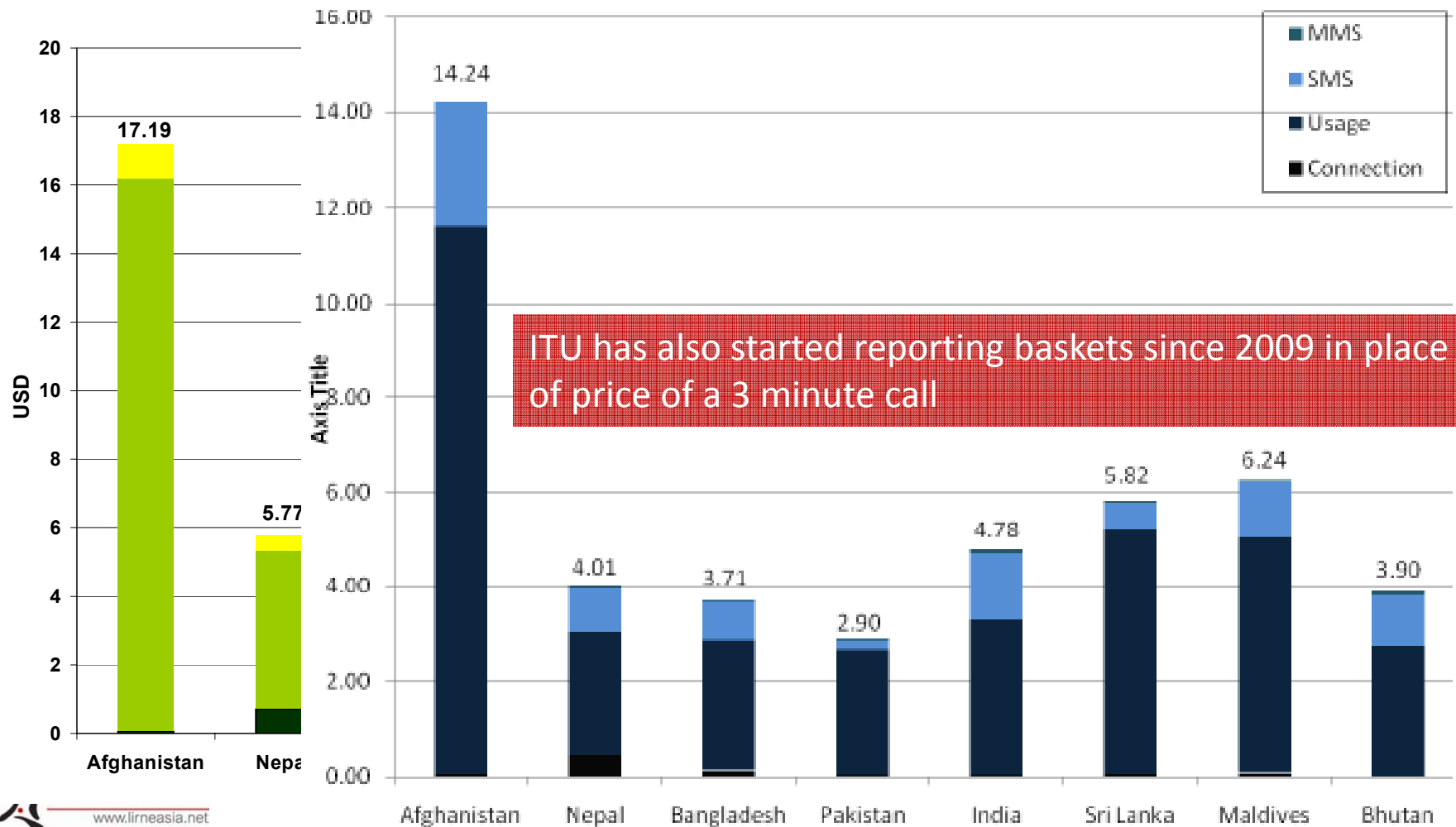
- Mobile baskets (based on adapted OECD methodology)
  - Least cost frontier
- Broadband (retail and wholesale [though less regularly due to resource intensiveness])
- Also collected: international voice; international roaming

# Adapted OECD mobile baskets used to gauge price/affordability levels

- Average voice minutes used per month (including voice mail, free minutes given)
- SMS & MMS per month
- Connection and rental charges
- All above separated by
  - On-net vs. off-net
  - Peak vs. off-peak
- Calculated for low, medium and high users
- Prepaid/postpaid
- USD (price) & PPP (affordability)
- LIRNEasia since 2006; ITU since 2009

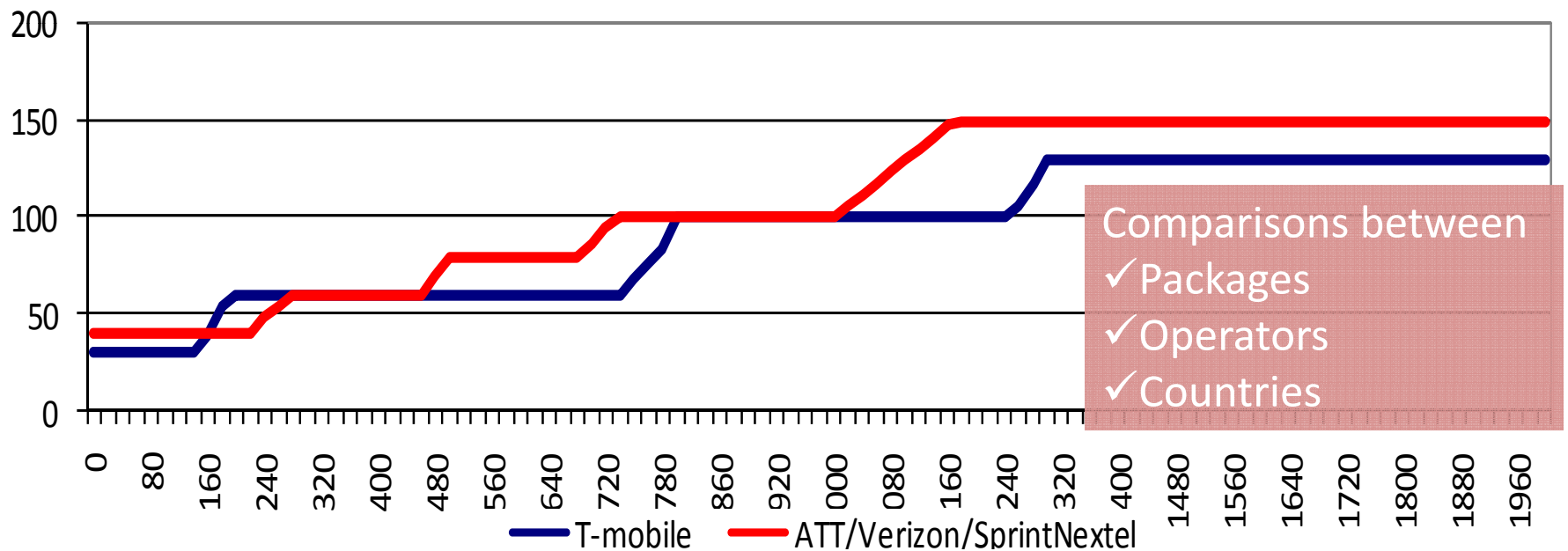
# Calculated for low, medium and high users; pre/postpaid seperately

SAARC countries medium user prepaid mobile price basket (USD)



# Another approach based on baskets: Lowest Cost Frontier (Bauer & Kim of Michigan State)

- Minimum level of expenditure (calculated using basket approach) at all usage levels



Assumes no switching costs and consumer has full information

# Web-accessible LCF tool developed by Mich State team for South Asian broadband packages (beta)

<http://lirneasia.herokuapp.com/>



**In sum**

# Telecom is closer to FMCG (Fast Moving Consumer Goods)

- High competition; increasing commoditization
- Newer methods of measuring performance are needed
  - E.g. retail surveys to measure toothpaste market share; focus groups, customer surveys for satisfaction, etc.
  - Yet telecom sector still relies on supplier provided data that is outdated by the time it's reported
  - Different approach is needed: demand side surveys
  - Only way to make nuanced policies; nuanced business decisions
  - But costly: so research organizations like us can't do it always. Regulators/NSOs need to get involved

**[www.lirneasia.net](http://www.lirneasia.net)**

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