Interrogating research based on supply-side data

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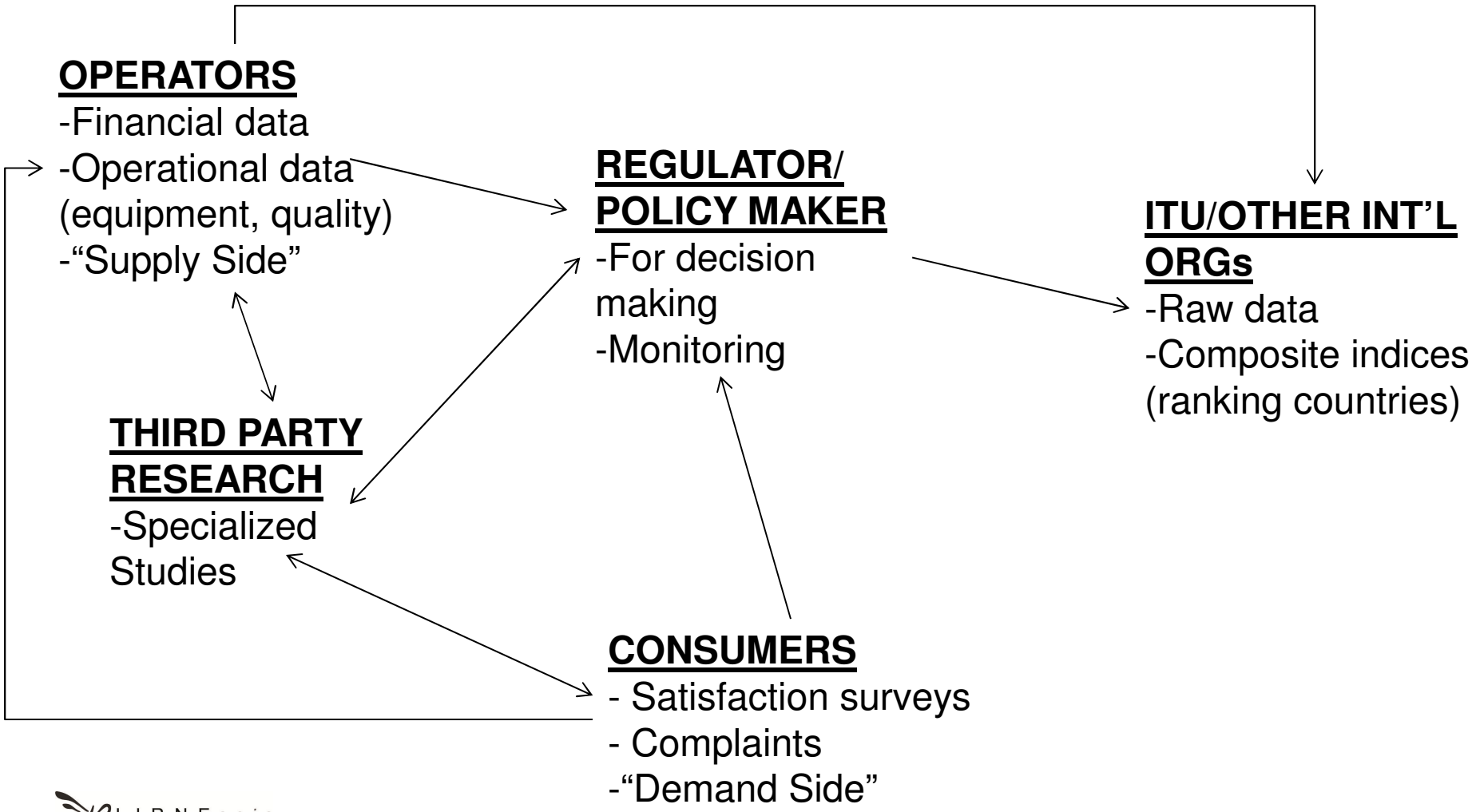
IDRC CRDI

UKaid from the Department for International Development

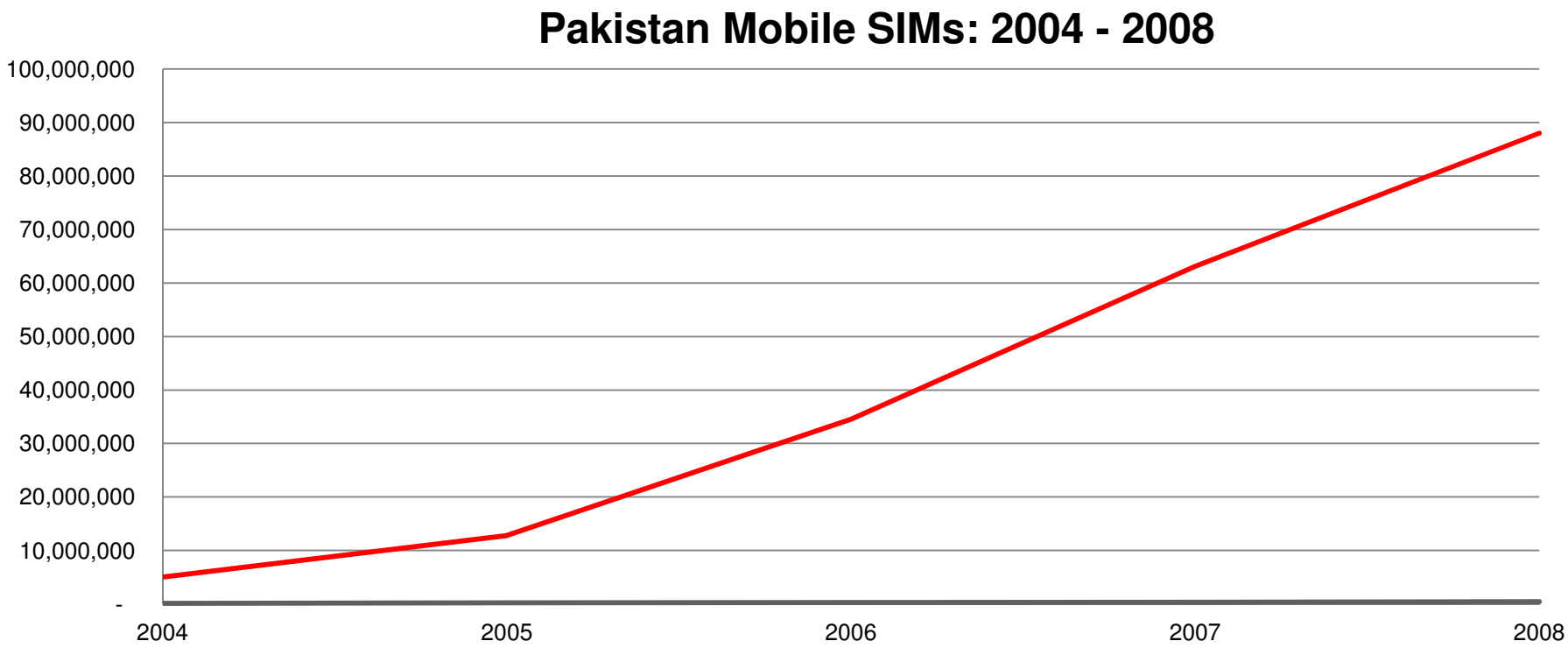
Canada

Data on the sector comes from multiple sources. Identify methods and definitions of each



CONNECTIVITY

Is connectivity increasing?



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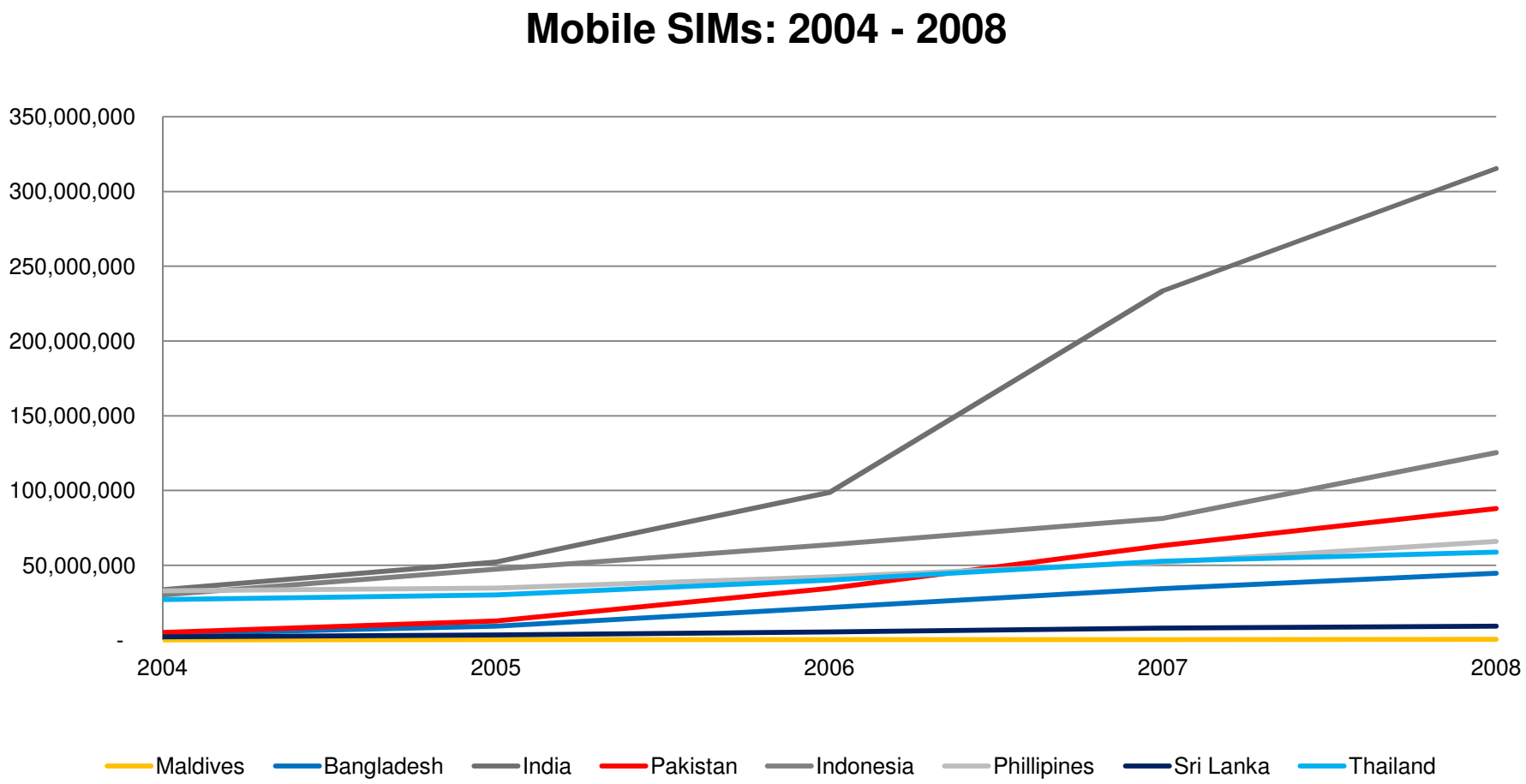
Looks impressive

But PK is in middle of pack when compared



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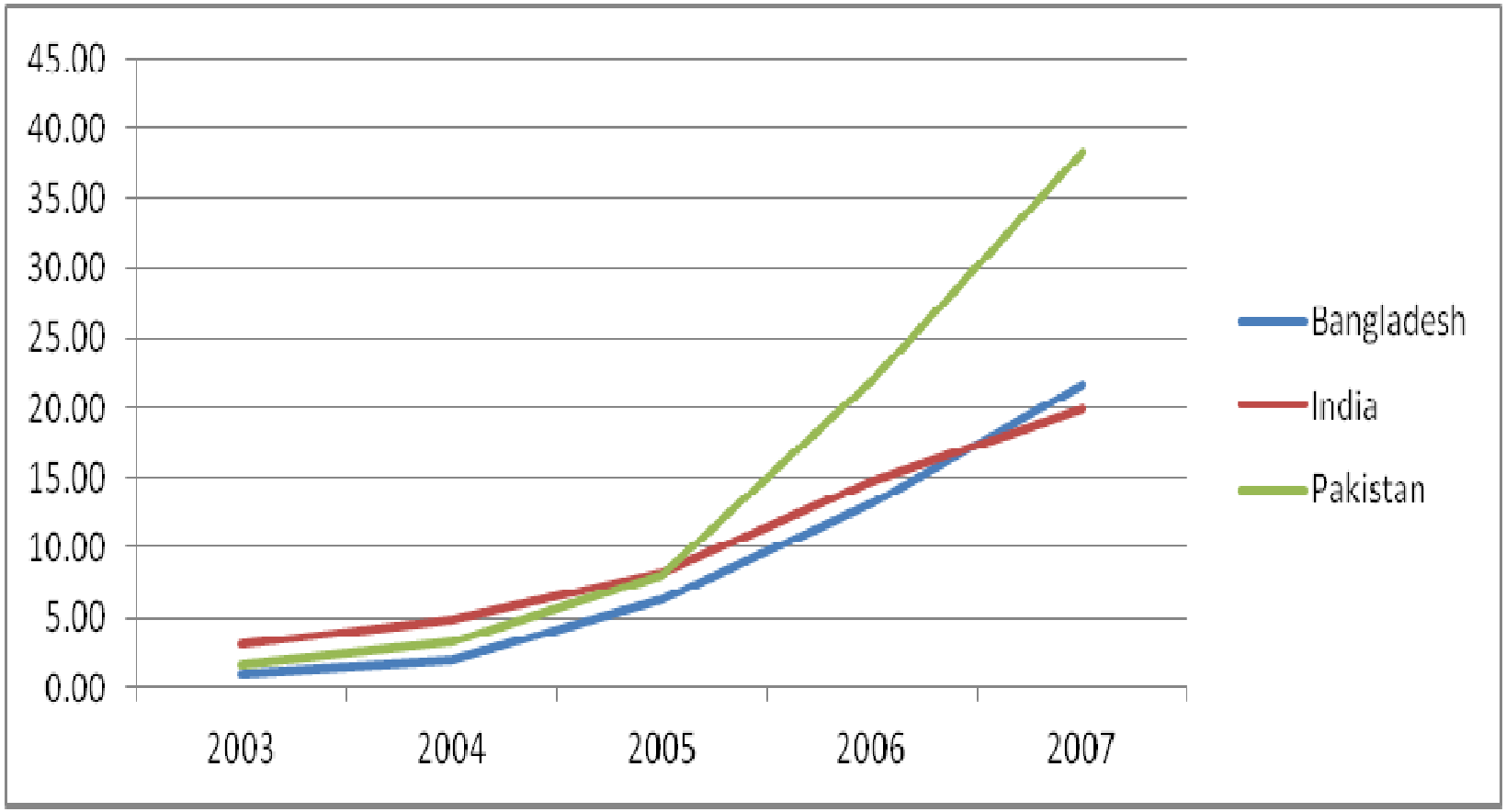
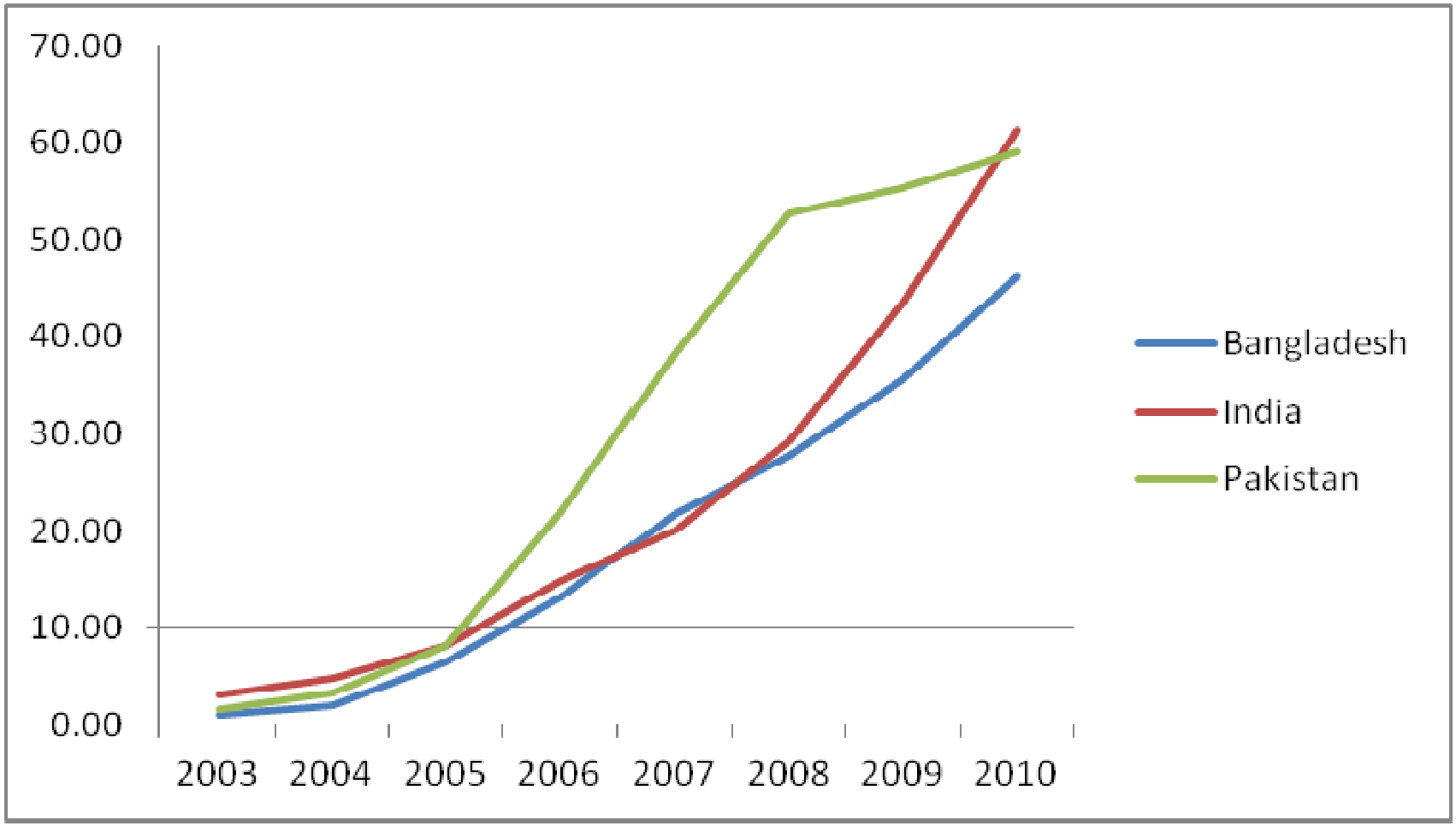
Telecom data change: Most recent SIM/100 data matter . . .



Who is actually ahead?



Aided by multiple millions of SIMs deregistered in PK & SIM tax of USD 12+ in BD

Are the data comparable? E.g., How do you reconcile different financial years?

- Many countries Jan – Dec (calendar year)
  - E.g., Sri Lanka
- But many others differ
  - India: Apr – Mar
  - Pakistan : Jul – June
- So “total fixed access paths in 2008” reported by IN not comparable with PK
- Having quarterly data eliminates problem to a great extent
- Especially important if benchmarks are used for mainstream regulatory work such as interconnection or retail tariff regulation

Prerequisites for comparison

- Internationally accepted definitions and procedures
- Make sure that the definitions are adhered to
  - ITU has mobile broadband definition; use is inconsistent
    - *"Mobile broadband subscribers* refer to subscribers to mobile cellular networks with access to data communications (e.g. the Internet) at broadband speeds (here defined as greater than or equal to 256 kbit/s in one or both directions) such as WCDMA, HSDPA, CDMA2000 1xEV-DO, CDMA 2000 1xEV-DV etc, irrespective of the device used to access the Internet (handheld computer, laptop or mobile cellular telephone etc). These services are typically referred to as 3G or 3.5G and include: Wideband CDMA (W-CDMA), an IMT-2000 3G mobile network technology, based on CDMA"

Sources of internationally accepted definitions

- ITU (2010) *Definitions of World Telecommunication/ICT Indicators*, Geneva: ITU

- Partnership on Measuring ICT for Development (2010), *Core ICT Indicators 2010*, Geneva: ITU

Useful Indicators to measure connectivity

FIXED

- Number of fixed lines
- Number of fixed wireline phones
- Number of fixed wireless phones
- Total fixed line subscribers per 100 inhabitants

MOBILE

- Number of mobile SIM cards
- Number of mobile SIM cards – prepaid
- Number of mobile SIM cards – postpaid
- Total mobile SIMs per 100 inhabitants

BROADBAND

- Number of broadband connections per 100 inhabitants

ICT

- Number of mobile users
- Number of Internet users

IN-COUNTRY ACCESS GROWTH

- Backbone map for a country
- Mobile coverage map per operator
- Base station map per operator

WSIS target 10: bringing ICTs within reach of a majority of the world's population

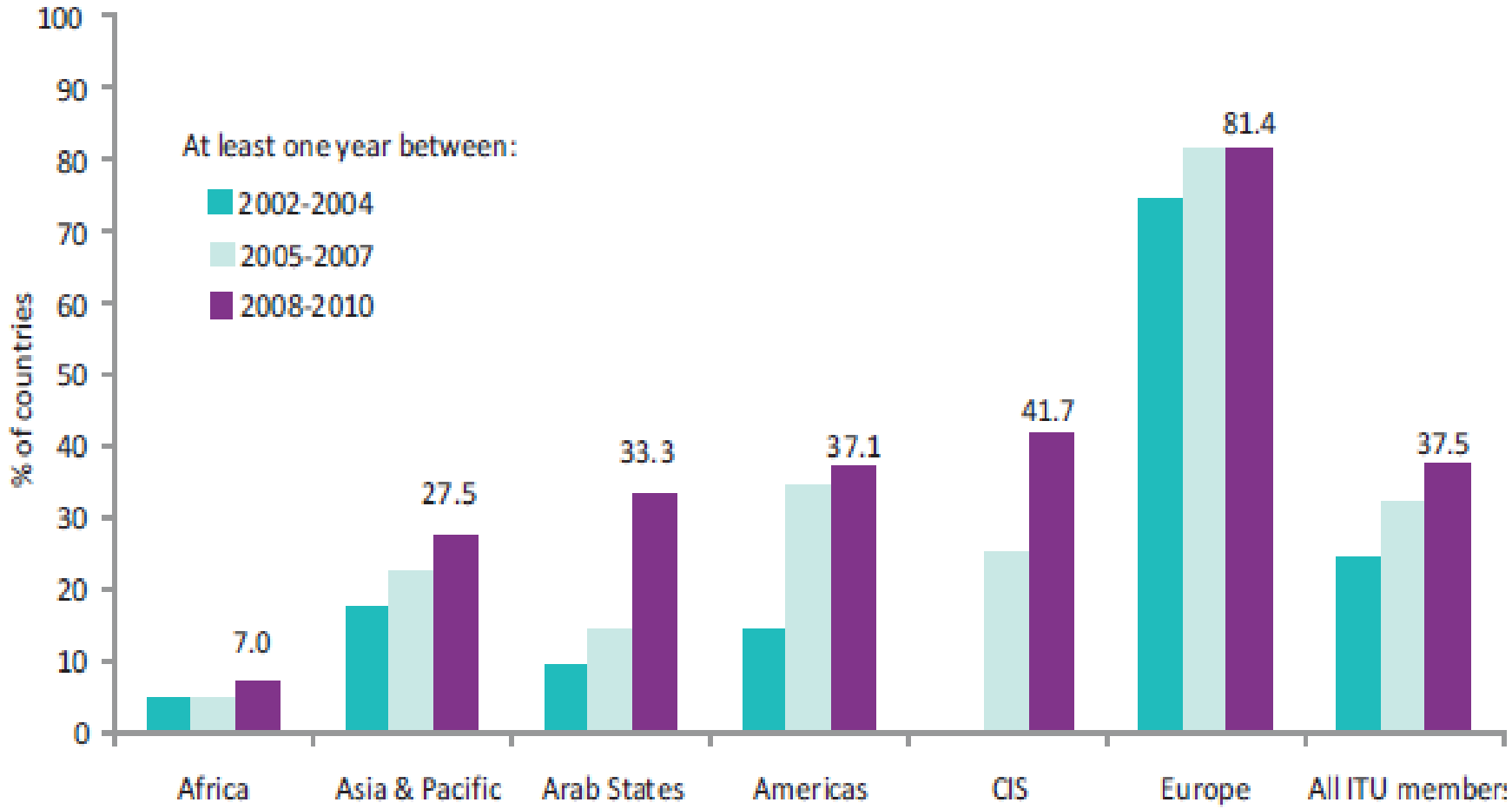
- Four indicators:
  - Mobile subscriptions
  - Mobile use
  - Internet use by household
  - Internet use by individuals
  - [Note: 3 more business indicators added later (since WDTR 2010)]
- Data collected and reported for all
- Our Focus: Indicator 4 (Internet Use by Individuals)
  - Can the method for estimating be improved?

Focus of this section

‘Proportion of individuals using the Internet’

- Base indicator in composite indices such as:
  - NRI (Network Readiness Index)
  - KEI (Knowledge Economy Index)
  - IDI (ICT Development Index)
- Best measurement method recommended by ITU:
  - demand-side survey on proportion of individuals using the Internet (from any location) in the last 12 months (HH7)

62.5% of countries have not conducted a demand-side survey on ICT use



Source: Measuring the Information Society 2011, ITU

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*Note: * Data in this chart refer to countries that have collected data on the number of households with Internet access at home through official national surveys*

Various methods can be used to estimate the number of Internet users

- **Internet Users = multiplier x Internet Subs (supply side)**

  Where

  – The multiplier = a number used to reflect that each subscription is used by more than one individual (e.g. at kiosks)

  – Internet subscriptions = Internet subscription of all types (speeds, technologies etc.)

    - Wired, wireless etc.

  – Above is then cross checked with other evidence (e.g. if HH access data available, Users > HH access number must be true, etc.)

Building on foundations of sand…

- Multipliers chosen at discretion of Country administrations
  - Perverse incentive to use higher multiplier to show high Internet penetration in country
- Difficulties in counting Internet subscriptions include…
  - Over-counting (counting all “Internet-capable” SIMs, irrespective of use)
  - Under-counting (being able to only count SIMs that have subscribed to a data package; SIMs with only voice packages may use Internet, but operators cannot count; impossible for pre-paid)
  - General difficulty with multiple ownership (one user with fixed and many SIM connections) leading to questionable multipliers

Difficult to find rationale for multipliers

Country	Fixed Internet Subscriptions (000s), 2009	Internet Users (000s), 2009, ITU method	ITU multiplier
Russia	88,068	59,700	0.68
Mauritius	224	290	…
Liberia	15	…	…
Liechtenstein	…	…	…
…	…	…	…
…	18	968	53.78
…	44	4,200	95.24
Iraq	3	325	104.84
Uganda	30	3,200	106.67
Afghanistan	2	1,000	500

- **Huge variance in Multipliers: 0.68 (Russia) to 500 (Afghanistan) in 2009**
- **"Similar" countries with very different multipliers**
  - Afghanistan - 2,000 fixed subscriptions; Multiplier=500
  - Burundi - 5,000 fixed subscriptions; Multiplier=13

PROPOSED MODEST IMPROVEMENT

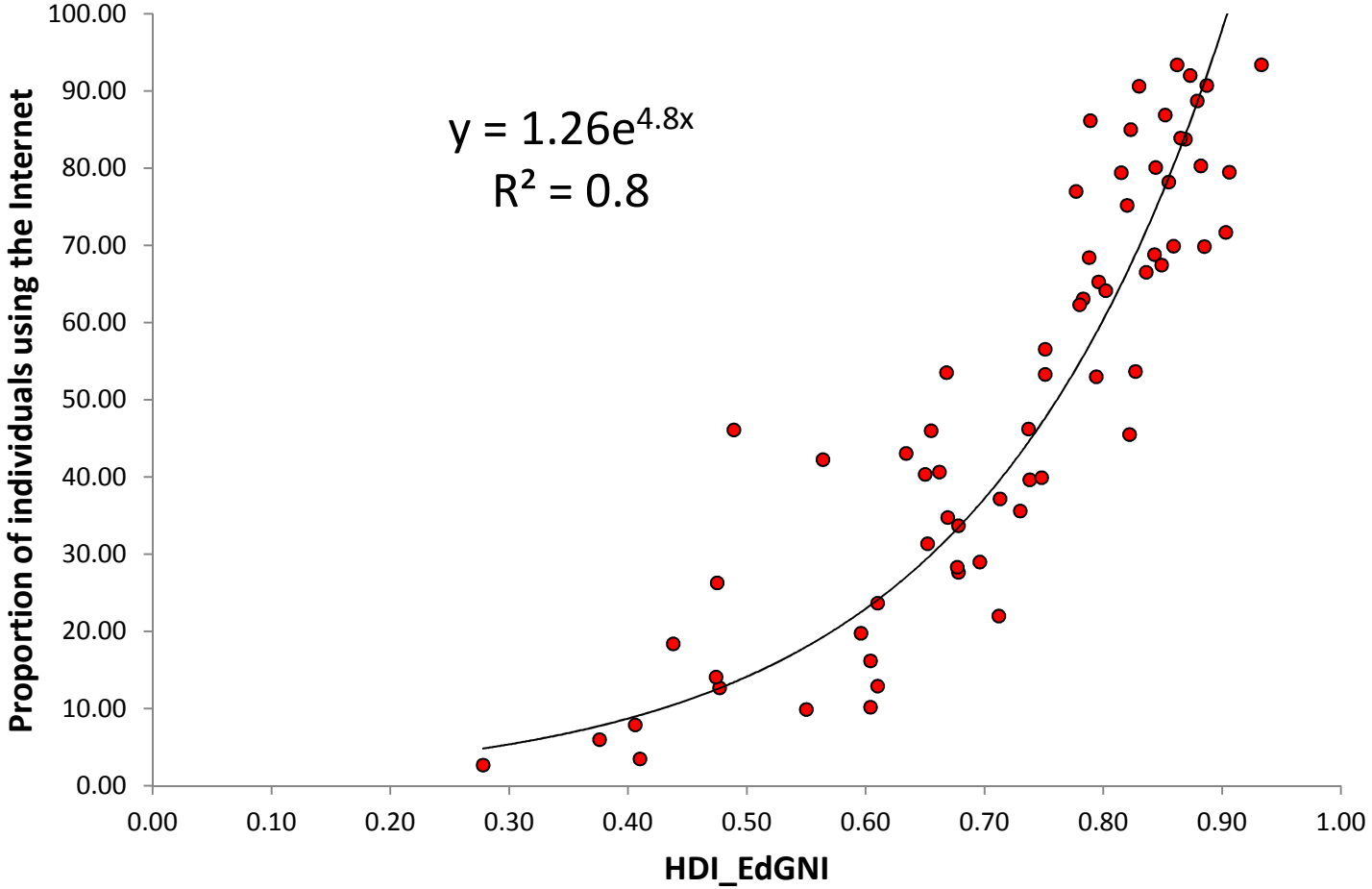
Main two drivers of Internet penetration are income and education

- Beilock, R. and Dimitrova D. V. (2003), *An exploratory model of inter-country Internet diffusion*, retrieved from http://danielad.jlmc.iastate.edu/docs/intercountry.pdf
- Calderaro, A. (2009). "The Digital Divide, framing and mapping the phenomenon". In Ferro E., Dwivedi Y.K., Gil-Garcia J.R., Williams M.D. (Eds.), *Handbook of Research on Overcoming Digital Divides*. Hershey: IGI Global
- Chaudhuri, A., Flamm, K. S., & Horrigan, J. (2005). An analysis of the determinants of Internet access. *Telecommunications Policy*, *29*(9-10), 731-755. doi:10.1016/j.telpol.2005.07.001
- Chinn, M. D., Fairlie R. W. (2010), ICT Use in the Developing World: An Analysis of Differences in Computer and Internet, *Review of International Economics*, 18(1), 153–167, http://www.google.lk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCEQFjAA&url=http%3A%2F%2Fwww.ssc.wisc.edu%2F~mchinn%2Fchinn_fairlie_RIE2010.pdf&ei=BnSiT9KlC4nqrAfcv9m2Bw&usg=AFQjCNHvmg1_MDlA3VbK1iuMlIVL9JWJHw
- Donat E., Brandtweiner R., Kerschbaum A. (2009) Attitudes and the Digital Divide: Attitude Measurement as Instrument to predict Internet Usage, in *International Journal of an Emerging Transdiscipline,* Volume 12
- Hilbert, M., (2011) The end justifies the definition: The manifold outlooks on the digital divide and their practical usefulness for policy-making*, Telecommunication Policy September 2011 35: pp 715-736*
- Hilbert, M., & Peres, W. (Eds.). (2010). *Information societies in Latin America and the Caribbean: Development of technologies and technologies for development*. ECLAC Books. Santiago: United Nations Economic Commission for Latin America and the Caribbean. Retrieved from http://www.cepal.org/socinfo/publicaciones/default.asp?idioma=IN
- ITU (2011) *Measuring the Information Society,* Geneva: ITU
- Jipp, A. (1963). Wealth of nations and telephone density. *Telecommunications Journal, July 1963,* pp. 199-201.
- Samarajiva, R. & Lucas R. (2010), *Improving measurement of progress toward Target 10 of the World Summit on Information Society (WSIS)*, retrieved from http://lirneasia.net/wp-content/uploads/2010/10/WSIS_29Sep10.pdf

Proposed new methodology

- % of Internet users increase with Education and Income components of Human Development Index (HDI) of a country
  - Education component - mean of years of schooling for adults and expected years of schooling for children
  - Income component- Logarithm of GNI per capita (PPP$).
  - Health component of HDI is not used, due to lack of evidence that internet penetration is correlated with life expectancy
- Studied the correlation between Internet penetration rate of countries which conducted demand side surveys and the education and income components of HDI 2011
  - Data on countries which have conducted demand-side surveys was obtained from ITU and RIA
  - Sub index Education_GNI Index, consisting of education and income components of the HDI index was calculated using 'DIY HDI: Build Your Own Index' on UNDP website. Both Education and Income were given equal weight

Strong correlation between Education_GNI Index and Internet penetration



Education_GNI Index 2011

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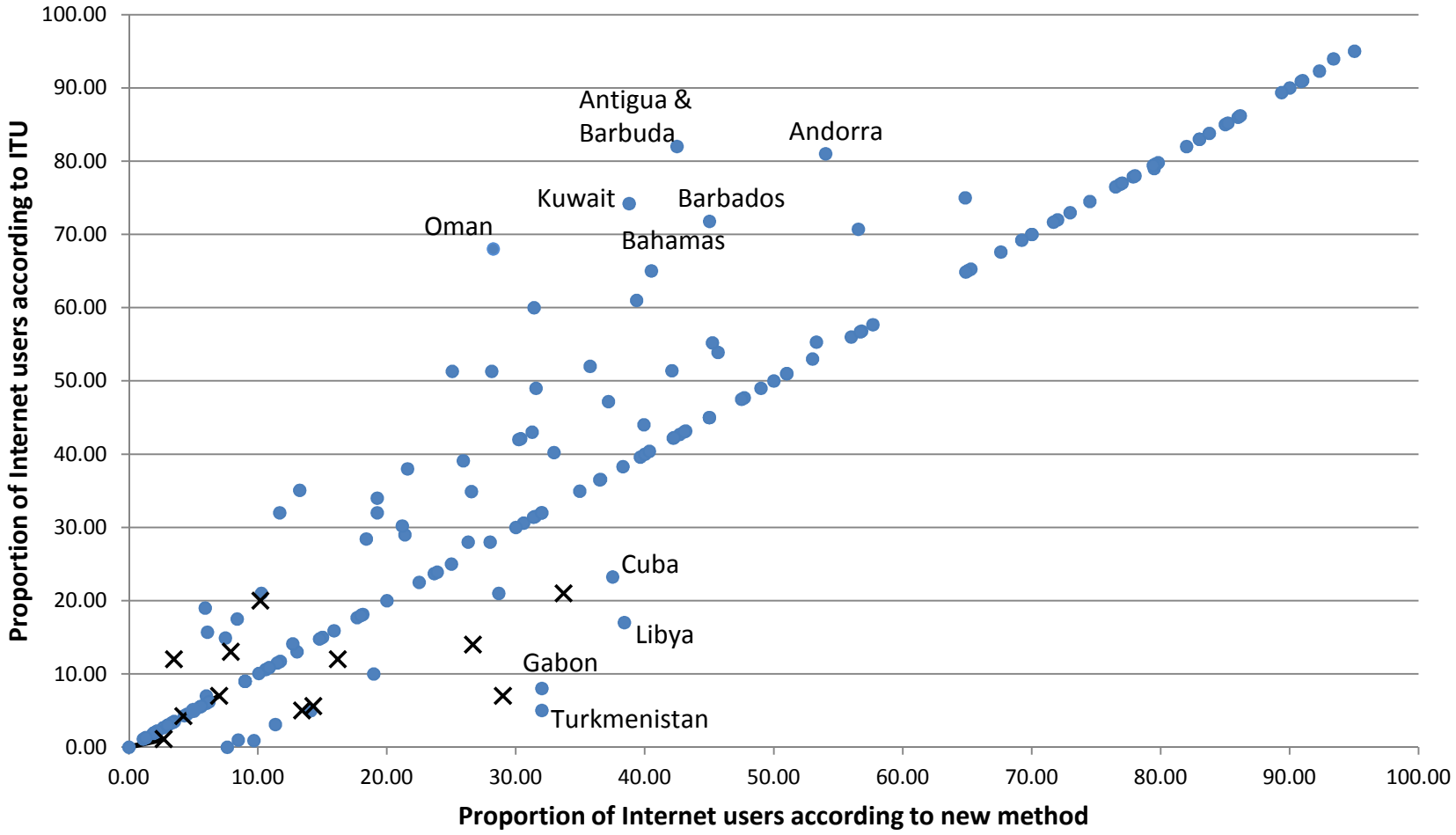
Step 1: If survey is available, use it since survey results are first best

- If representative survey from regional organization is available, use their data (e.g. RIA)
- If survey from current year is not available, use previous year's data with adjustment
  - Adjust by average growth for country grouping (e.g., middle income countries etc.)

Step 2: In the absence of survey data use Education_GNI Index to estimate proportion of Internet users

- Derive model using income and education components of Human Development Index (HDI) vs. Proportion of Internet users for countries which have conducted a survey (annually after HDI report has been released)
- Use this model to impute % of Internet Users for countries which have never conducted a survey
- If Internet penetration rate provided by country administrator is within +/- 7 percentage point band around calculated estimate -> use country reported figure
- Else use imputed figure

Less than 30% countries show different Internet penetration rates



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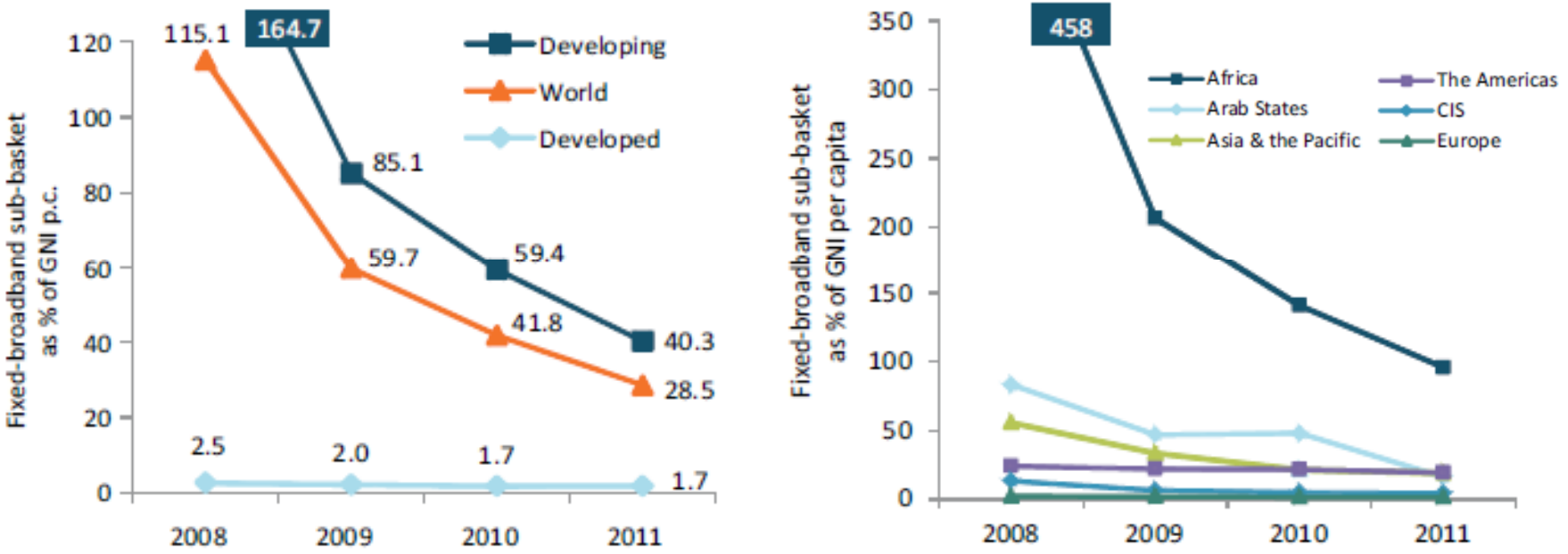
'X' Survey data from RIA but not same as ITU Internet penetration rate

PRICE & AFFORDABILITY

Broadband Baskets: a realistic method of price comparison

- In selecting an operator, consumers are likely to think about ALL costs including Connection charge, monthly rental etc.
- ITU ICT price basket methodology takes these issues into account and has created Fixed Broadband and Mobile Broadband Baskets consisting of
  - Monthly cost of 1 GB use per month with at least 256kbps connection for a period of 24 months (includes Initial Connection Fee/24)
  - ITU measures affordability by dividing the cost of the Broadband basket by National average monthly GNI per capita
- RIA (Research ICT Africa) has further developed this methodology and also measure the cost of the following baskets in addition to the ITU basket
  - Monthly cost of 5 GB use per month with at least 256kbps connection for a period of 24 months.
  - Monthly cost of uncapped use per month with at least 256kbps connection for a period of 24 months.

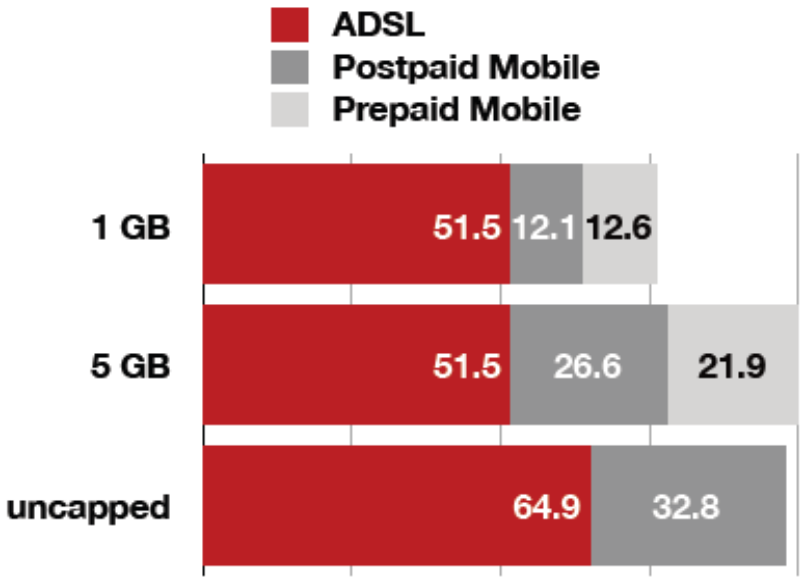
Affordability of Fixed Broadband is declining in developing countries, but still higher than developed countries



Source: ITU, Measuring the Information Society 2012, http://www.itu.int/ITU-D/ict/publications/idi/

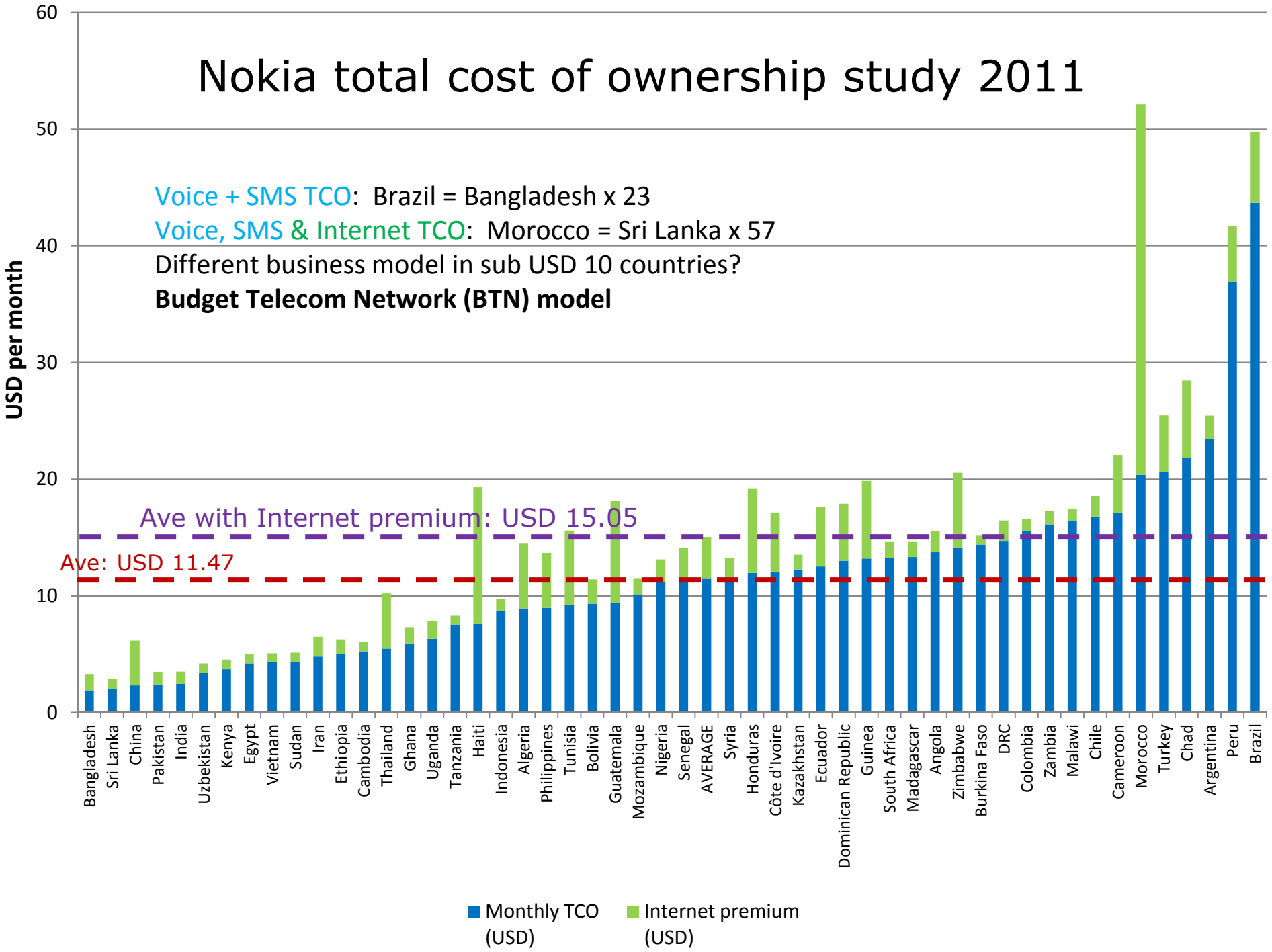
South Africa

		2012
Households with	Fixed-line	18%
	Computer	24.5%
	Internet	19.7%
Individuals 15+	use the Internet	33.7%
	use Internet on a mobile	70.6%
	first used Internet on mobile	34.9%



cheapest products available, USD per month

- Telkom South Africa appears to have neglected its ADSL products
- Its own mobile postpaid broadband (8ta) is faster and cheaper
- MTN is the only mobile operator in South Africa that offers uncapped mobile broadband
- But: ffter 3 GB usage in a month, the maximum download speed is reduced to 256kbps
- ADSL only for uncapped usage at higher speeds than 256kbps


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)

What about other prices? E.g. BB, wholesale & retail?

Oct 2011

Table 1- Broadband Prices in Emerging Asia (USD[1])

	Whole sale packages		Fixed broadband retail packages				USB-Dongle based broadband retail packages				
Country[2]	Annual cost, 2Mbps, 2km DPLC (tail cost)	Annual cost, 2Mbps, 100km DPLC	Annual cost, 2Mbps Broadband (unlimited download)	Annual cost, 512kbps Broadband (unlimited download)	Annual cost, 256kbps Broadband (unlimited download)	Price per GB (lowest cost, limited download)[3]	Annual cost, 2Mbps Broadband (unlimited download)	Annual cost, 512kbps Broadband (unlimited download)	Annual cost, 256kbps Broadband (unlimited download)	Price per GB (lowest cost, limited download)[4]	Value of 1 USD in local currency as at August 30, 2011[5]
South Asia											
Afghanistan	[6]	N/A	N/A	1,531[7]	765[8]	[9]	N/A	N/A	510[10]	N/A	47
Nepal	9935[11]		N/A	248[12]	149[13]	3[14]	N/A	N/A	N/A	N/A	72
Bangladesh	83[15]	3,741[16]	N/A	249[17]	150[18]	1[19]	873[20]	208[21]	N/A	2[22]	72
Pakistan[23]	54[24]	2,720[25]	210[26]	140[27]	112[28]	3[29]	336[30]	168[31]	168[32]	1[33]	86
India	370[34]	3,842[35]	1,959[3637]	163[38]	109[39]	5[40]	248[41]	N/A	130[42]	1[43]	46
Bhutan	271[44]	2,64									
Sri Lanka	4,371[51]	9,87									
Maldives[58]	10659[59]										
Philippines[64] [65]	392[66]	N/									
Indonesia	3,296[70]	9,283[71]	1,404[72]	35[73]	N/A	N/A[74]	N/A	141[75]	71[76]	12[77]	8,503
Thailand[78] [79]	1471[80]		240[81]	N/A	N/A	N/A	320[82]	N/A	N/A	12[83]	30

With 83 footnotes in the most recent publications we did

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