

# **Report on Workshop on ICT Indicators for Benchmarking Performance in Network and Services Development**

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## **Introduction\***

The rapid development of ICTs and the pervasive impacts of their deployment in many different aspects of society have brought to the foreground the need for new, improved and standardized indicators to measure performance of the ICT sector. Standardization of such indicators both on a national and international level is necessary to make comparisons accurate and meaningful. This includes traditional indicators to measure the investment climate, utilization, as well as indicators to gauge the value chain benefits of ICT diffusion. The Partnership for Measuring ICTs for Development, including the ITU, the OECD and the UNCTAD among others, has identified many indicators, but it is important that priorities appropriate for emerging Asia are developed with the participation of key stakeholders.

In March 2006, LIRNE *asia* in collaboration with the Telecom Regulatory Authority of India (TRAI) commenced development of these indicators through a participatory process involving national regulatory agencies (NRAs), national statistical offices (NSOs), operator associations and operators to ensure a representative set of indicators for the current ICT sector context in South Asia. The workshop participants included representatives from Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka along with the foremost authorities on the subject from the Organization for Economic Cooperation and Development (OECD), the International Telecommunication Union (ITU), and the National Regulatory Research Institute (NRRI) from the USA. With more than 60 participants from 16 countries, the Workshop was also attended by telecom researchers from the Asian region.

The participation of both telecom NRAs and NSOs from the region was sought both for the standardization process as well as to establish a sustainable system for measuring and benchmarking ICT sector input and output indicators for South Asia that can be extended to developing Asia.

## **Workshop Objectives**

The overall objective of the indicator workshop was to initiate the first steps in collecting and reporting high quality indicator's data from the telecom and ICT sectors in the South Asian region. The longer term objective was to develop a sustainable system whereby data being collected and reported by the various NRAs in the region would be updated in real-time in an online database accessible to data reporters from South Asia.

In order to collect high quality indicator data that is comparable across the region, it is necessary to develop an indicators manual that would have standardized definitions, methodologies, collection periods, etc. that data collectors and reporters from South Asian telecom regulatory agencies (and possibly NSOs) can agree upon and implement. Through intensive discussions at the New Delhi workshop as well as in Gurgaon at a research

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planning meeting, a basic framework for developing a supply-side sector performance indicators manual was decided on, with input from international experts. In developing the framework, international best practices and regional requirements were considered. In the first instance, the manual would frame the methodology, concepts, definitions and standards for the indicators that will be collected for a six-country, multi-component study that LIRNEasia will conduct in India, Indonesia, Pakistan, Philippines, Sri Lanka and Thailand. Subsequently, the draft manual will be presented at the second indicators workshop to be conducted in late 2006, for review and adoption by the South Asian NRAs (and possibly by the national data collectors). LIRNEasia will also present the results from the application of some key indicators (from the manual) and a conceptual framework report from the six-country study.

In order to build a sustainable system for collecting indicator data for the region, LIRNEasia put forward a proposal to the data reporters at the workshop to host an online database of telecom and ICT indicators for South Asia. The proposed system would allow data reporters to enter indicator data using a web-interface to an online database and in turn have access to real-time, benchmarked data on specific indicators for the entire region. Government agencies contributing to the database will be able to access comparative indicator data for the South Asian region presented in tabular or graphical form. At the workshop it was agreed that data should be only available at the aggregate level and should be password-protected to restrict access to authorised users. Based on participant response, LIRNEasia has decided to develop a prototype web site and a centralized database. The decision on the final design of the online data collection and reporting mechanism will be taken only later in 2006 during the second indicator workshop where the prototype indicators database will be unveiled.

## **Why Indicators?**

In his keynote address, Mr. Pradeep Baijal, Chairman of TRAI highlighted three reasons as to why indicators were important. Indicator data allow regulators to 1) determine where countries stand in relation to their peers; 2) how well they are doing over time; and 3) for measuring the effectiveness of policy and regulatory measures. He emphasized that reliable, standardized ICT indicators provide policy-makers and regulators with an accurate picture of the state of the ICT sector; this can be the basis for designing policy and regulatory measures that influence the spread, utilisation and impact of ICTs in the South Asian region.

On the second day of the workshop, the panel on improving sector performance through indicators and benchmarking along with the panel on international good practices provided a number of compelling reasons as to why indicators are important for regulators and policymakers. Sam Paltridge from the OECD, argued that data collected on indicators provide policymakers not only an overview of the performance of a sector but may be used to make allocative decisions. Most governments when faced with the decision on whether to invest in ICT or telecommunication sector or roads, for example, need to know the payoff from their investment. It is difficult to make the case for investing in ICTs and telecoms unless indicators are collected that allow us to quantify the economic and social benefits from investing in the sector. In the case of developing countries, the benefit of investing in

ICTs to further development has been an important assumption but the data to support the assumption is still incomplete. Anecdotally one can see the benefits of connecting schools in villages. But in order to go to the finance ministry or cabinet to make the case that money should be invested in providing schools with computers and connecting them, it is necessary to have indicators that can quantify the benefits.

Gaurav Singh of the National Association of Software and Services Companies (NASSCOM) that represents the IT software and services industry in India, also made the case that indicator data helps the Association to push the government for better and more reforms, for example, by presenting them with figures on revenue, investment and employment generated by the ICT sector.

Indicator data can have a profound impact on efforts to bridge the digital divide, according to Lilia Perez-Chavolla from the NRRI, USA. Collection of ICT and telecom indicator data may provide policy makers a more precise picture of those who are unconnected due to the digital divide. Armed with relevant data, governments and international agencies can track trends in access and use by different population groups that might be of interest for national and international development goals. Indicator data can help tailor national and international development policies that enable women, youth or the disabled or low income customers and rural users greater and more meaningful access to ICTs.

Furthermore, according to Perez-Chavolla, demand-side indicator data can inform policymakers and operators about the perceptions, values and priorities that consumers have when they make decisions about their use of ICTs. This information can be vital for service providers for tailoring technologies and services to better meet the needs of end-users.

According to Tim Kelly from the ITU, indicators promote better performance through comparison and competition. Benchmarking helps to understand the way telecommunication is driving the world economy, to improve ICT sector performance of the individual countries and evaluate the effectiveness of ICT/telecom policies. Standardized indicators facilitate international comparisons that measure the relative success of a country with its peers. It promotes healthy competition between countries to improve the performance of their regulatory agency as well as the performance of the telecom sector. When a policymaker or regulator introduces a new policy or rule that they think is promoting the growth of the sector, they will not know if that is indeed the case until they have data that benchmarks their performance over time or with the performance of peer countries.

Kelly gave the example of Korea and Japan who are in a race to be the country with the highest broadband penetration and fastest service every time the ITU or the OECD releases new broadband rankings. He also highlighted a similar rivalry between Hong Kong and Singapore to be the world's leading digital city driven by benchmark rankings of their ICT investment and sector performance.

Elucidating the importance of benchmark indicators, Rajendra Singh from TRAI gave the example of how the Indian regulator successfully won their case in court against VSNL using figures from benchmark tariffs on international private circuit lines (IPCL) to argue that the tariff ceilings it imposed on IPCLs were reasonable.

Although the rationale and benefits of collecting indicator data was clear, the panellists emphasized that for meaningful and comparative data, standardization of indicators nationally and within a region was paramount. South Asian NRAs and NSOs were presented with a number of good practices from existing regional and international initiatives on collecting benchmarkable telecom/ICT data that they could draw on for refining their own efforts.

## **International Initiatives & Best Practices**

The panel on international good practices at the workshop highlighted international initiatives that have been undertaken to harmonize indicators across countries. Recent international partnerships in developing ICT indicators are largely a product of the first phase of the World Summit on Information Society (WSIS). In this phase, countries agreed that the measurement of ICTs need to be improved globally.

As a result, a multi-stakeholder initiative among a number of international organizations called the Partnership for Measuring ICTs for Development, which includes the ITU, the OECD and the UNCTAD, sought to develop a common set of core ICT indicators and harmonize them internationally to enable cross country comparisons. The Core ICT Indicators document<sup>1</sup> that arose out of this partnership, establishes a set of 41 indicators under four categories namely:

1. indicators on ICT infrastructure and access,
2. indicators on access to and use of ICT by households and individuals;
3. indicators on use of ICT by businesses; and
4. indicators on the ICT sector and trade in ICT goods.

With the objective of defining and seeking agreement on the core set of indicators among countries, regional indicators workshops have been held as part of this initiative. The idea is that all participating countries can collect data on indicators using the same methodology and definitions. Commitments have been obtained from some of the countries to implement the core set of indicators. However, Sam Paltridge from the OECD and Tim Kelly from the ITU stressed that a lot of work has to be done in terms of capacity building and helping the NRAs and NSOs collect high quality standardized data on core indicators, particularly in developing countries.

In the context of the WSIS, the ITU has undertaken a separate initiative to identify 10 major goals that it wants to see the world reach by 2015 in the context of ICTs and telecoms. And these includes connecting all villages with ICTs, connecting all education institutions to the Internet, ensuring all people have access to TV and radio services etc. But in order to track the progress on meeting these goals it is necessary to develop indicators and collect data for them. Tim Kelly from the ITU described the indicators that have been developed for the above purpose that are different from the ones ITU has traditionally collected data for.

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<sup>1</sup> The complete document on the core indicators and their corresponding methodological notes can be found at: <http://www.itu.int/ITU-D/ict/partnership/material/CoreICTIndicators.pdf>

The new set of indicators measure how much of a particular service is available and at what price. The ITU has developed the Digital Opportunity Index (DOI) that would allow countries to compare their progress in bridging the digital divide. The DOI is a set of 11 separate indicators brought together to form a greater composite index. They are structured around three broad areas:

- 1) what opportunities individuals in a country have to use the ICT;
- 2) measures of infrastructure such as penetration rates for both individuals and for households;
- 3) levels of utilization and access to the Internet and broadband.

The index was first launched in 40 countries and has now been extended to cover 176 countries. Data collected from various countries to determine their DOI will be published shortly. According to Kelly from the ITU, the strength of the DOI compared to other composite indicators, is that it is more balanced. Hence, the index allows countries to compare themselves with their peers and also to track whether their performance is going up or down by year. The DOI is being introduced as a tool with 11 sub indicators that could be used as basis for comparisons within the South and Southeast Asian regions. The suggestion to explore the possibility of adapting the DOI to LIRNE *asia's* six country, multi-component study was made and accepted.

Among examples of best practices in indicators reporting, is Hong Kong with its concentration of literate population in a small geographical space that make data gathering easier than a country of the size of India with a larger and more dispersed population. According to Kelly of ITU, the secret of Hong Kong's success in data collection is that the policymakers have a clear idea of what they want to achieve. Hong Kong has a strategy called Digital 21 strategy, which was set out in 1998 with the clear mission to become the leading digital city in the world. This overarching mission has informed the process of data collection and prioritized the kinds of indicators they were interested in. An important lesson from Hong Kong for collecting indicator data is to know why one is collecting the data.

Another lesson that can be learnt from Hong Kong, is that their data collection is coordinated which doesn't mean to say the same agency is collecting data in all areas. But it does mean that there are links between the different agencies and coordination between agencies with the Chief Information Officer (CIO) of the government taking the overall responsibility and being in charge of policy formulation. In the case of other countries, the nodal agency for collecting indicator data for the ICT and telecom sector could be the regulator in coordination with the national statistics office. The NRAs already report ICT/telecom data either on their website or to the ITU and may be the logical coordinating body.

In Hong Kong, in addition to collecting supply side data from telecom operators the government agencies also collect demand side data from users through household surveys which they have been conducting annually since the year 2000. Around 13,000 households are surveyed every year as part of this exercise. Around 5000 business establishments are also surveyed each year. Specialists, educationists, manpower bureau, the office of the government's CIO among others conduct surveys to look at ICT availability in certain critical areas of the economy including in government, in education etc.

Lilia Perez-Chavolla from the NRRI, gave the example of the FCC that uses both qualitative and quantitative methods of collecting data from the telecom sector to help develop and implement policies that promote consumer protection. The FCC, for example, conducts focussed group interviews to gather data on customers' experience of quality of ICT services to assesses the impact of universal service programs on low-income ICT users to better tailor policy in that area. The FCC has a contract with bureau of census to collect national and state level statistics on indicators such as telephone penetration and availability of telecom. The results are published annually.

Information on quality of service for the telecom sector is collected in the US both at the federal and state level. At the state level information is collected on 11 categories of services that include information on call completion, connection and installation, billing, customers' satisfaction, access to public pay phones etc. In most cases, data on quality of service comes directly from surveys conducted by operators. But there also examples of states like Maine that conducts their own consumer satisfaction surveys for telecom services. In many cases, regulators classify the various service offerings of the operators on their website so that consumers can make informed choices on which bundle or provider of service is most suited to their needs.

In India, the telecom industry associations play an important role in coordinating the collection of data on comparative indicators by the telecom operators. According to S.C. Khanna from the Association of Unified Telecom Providers of India (AUSPI), operators who are members of the association report their data on a monthly basis to the AUSPI which in turn reports it to the regulator. India's NASSCOM, conducts an annual survey that collects data points across variety of indicators including sector revenue, investment and employment figures. In addition, a number of surveys are conducted by the association amongst its member base to collect information on employee satisfaction levels in the industry.

The number of good practices at the national and international level presented at the workshop provided participants from the NRAs and NSOs from the South Asian region the opportunity to select approaches that would be effective and feasible within their local context.

## **Nitty-Gritty of Measurement**

### Quality of service (QoS) indicators

Quality of service is a difficult indicator to measure because internationally, operators have different measures of quality of services. Even within a country there are variations in the measures used for quality of service. According to Paltridge from the OECD, it is therefore important to start out with standardized quality of service indicators for the South Asian region.

In India, TRAI came out with quality of service regulation that was developed through an iterative process that started in the year 2000 and ended in 2005. In order to select the parameters that should be included in the quality of service regulation, the Indian regulator

went through a public consultation process where a consultation paper was produced and international practices were discussed and input sought from various stakeholders including consumer organizations and service providers. According to Rajendra Singh from TRAI, when the Authority started monitoring the performance of operators with respect to the QoS benchmark that was developed in 2000, it realized that fixed operators faced difficulties in complying because of their legacy problems and that some of the parameters were not relevant to mobile operators and some of the threshold values needed to be modified. Another consultation process was initiated and based on comments received from stakeholders a new QoS regulation was issued in July 2005.

### Basket methodology

Because of the great variety in the service offerings of telecom operators straight price comparisons between various packages both domestically and internationally become difficult. The OECD has undertaken a basket methodology which allow for cross-comparison of various ICT/telecom tariffs. According to Paltridge from the OECD, there are small business baskets and residential baskets which include things like connection cost, cost of line rental and different distance terms. Cross-comparisons of the mobile tariffs are also made possible by creating composite baskets for low, medium and high users.

The ITU also uses some basket based models for tariff comparisons. According to Kelly from the ITU, baskets used by his organization are revised periodically, about once in five years, at workshops where governments, regulators and operators are invited to improve the existing indicators. In order to develop the baskets it is necessary to adopt usage figures that fairly reflect the average usage across all the member countries. In order to do this, it is necessary to bring the operators on board with the methodology and usage patterns. Because the press, government and regulators pay increased attention to output of the baskets, the operators themselves have an incentive in looking at the methodology and making sure that comparisons are fair across different economies and across different operators. This ensures very rigorous quality control in the development of basket methodologies.

Sriganesh Lokanathan from LIRNEasia presented the results of some preliminary work on adopting OECD basket methodologies for mobile tariffs in South Asia. The ensuing discussion highlighted the willingness of operators and regulators in helping to refine the methodology for application in South Asia where average calling patterns are significantly different from OECD countries.

### Defining peer groups

Defining a peer group for comparing performance across a number of countries is not a straight-forward task. Whether peer countries should be of similar size, in the same region, with similar per capita income etc. would be based on the purpose of the comparison. According to Paltridge, it is a good idea to take at least one country outside the immediate peer group for getting a better contrast in the picture.

### Defining broadband

One of the measurement questions which is being discussed in the last few years is what should be the threshold for broadband Internet. Whether 128 Kbps, 256 kbps or some other speed should constitute the threshold for broadband Internet depends largely on the development of broadband services in the peer countries. Though ADSL speeds in the 10

mbps-100 mbps range are common in some OECD countries, ADSL offerings at those speeds are non-existent in South Asia. Similarly, broadband speeds in some countries are so low that they are not offered as an option in some other countries, making it difficult to conduct cross-country comparison of broadband service.

#### Using Purchasing Power Parity (PPP)

For purposes of cross-country comparisons of prices, the OECD typically adjusts the prices to reflect purchasing power in each of the countries. According to Paltridge from the OECD, when adjusted for PPP, many of the dollar tariffs that seemed low in countries like Turkey, Mexico or Eastern European countries become very expensive and many of the operators in the countries do not like the results. In many cases, governments do or don't like the results adjusted for PPP if the comparisons make them look better or worse for a particular measure. The ITU does not adjust prices for PPP for cross country comparisons.

### **Recent Challenges of Collecting Data**

Measuring employment generated by the telecom sector used to be simple to measure in the past but not so since the sector has been liberalized in many parts of the world. When telecom monopolies were the norm in most countries of the world, the incumbent operator had information on investment and employment in the sector. So it was possible to go to the annual reports of NTT, AT&T, BT etc. to obtain the telecom statistics for the entire country. With liberalization, since more players have entered into the market, it has made it harder to get information, for example, on employment or investment from multiple operators. In Paltridge's view, in addition to looking at supply side data from telecom operators it is now necessary to look at the data from the national statistical offices to try and get a clearer picture on national ICT investment and employment.

Rohan Samarajiva from LIRNE *asia*, highlighted the difficulty of obtaining investment data because in many countries the companies are harassed based on what they tell the government. Data on employment generated by the sector is also difficult to quantify according to him. When grocery stores sell calling cards how does one assign some part of the employment that is generated in the store to the telecom sector? Similarly, it is difficult to measure the number of jobs created in sectors like banking that rely heavily on telecom and ICT infrastructure and services.

Rapid changes in ICT technologies are blurring the lines between services that were traditionally distinct making it more challenging to gather data for indicators that were developed for a non-converged world. The Internet provides many functions of the traditional telephone services like fax and voice calling making measurement of use and tariffs more complex. Participants at the workshop agreed that this problem has not manifested itself in a big way for South Asian countries where Internet penetration, especially broadband, is low making traditional indicators still applicable for the near future.

## Developing an Indicators Manual

One of the prime objectives of the workshop was to initiate the development of an Indicators Manual with a set of core indicators relevant for South Asia along with definitions and methodologies on how to collect data on those core indicators. The process of identifying the core set of indicators was started during the last session of the workshop.

The starting point for identifying and prioritizing a set of indicators for the region was the list of core and extended core indicators developed under the Partnership for Measuring ICTs for Development<sup>2</sup>, that include the ITU, the OECD and the UNCTAD among others. The participants at the workshop systematically went through the list to assess the core indicators individually.

Samarajiva asked whether for Internet access and mobile tariffs (A-8, A-9) the indicators should be collected as percentage of per capita GDP or adjusted for PPP. According to Kelly from the ITU, it is conceptually difficult to explain PPP to people and data is not always available for all the countries. Hence, monthly incomes are conceptually easier to understand and data is more easily available.

There was also a discussion on whether to adopt 100 minutes of use (A-9) for mobile tariffs or whether to adopt OECD's high, medium and low user basket methodology with modifications on number of minutes to reflect South Asian usage patterns.

Samarajiva from LIRNEasia, underlined the difficulty of obtaining data on some of the basic core indicators for access and use of ICTs (HH1-HH3) that the NRAs don't collect data on. For many of the indicators, data has to be obtained from the NSO or through surveys. Laveesh Bhandari from Indicus Analytics, said that most of the data required in this section are available for India from the NSO and other institutes.

The data on proportion of households with Internet access or computers (HH5, HH6) will be hard to obtain in many of the South Asian countries according to a participant at the workshop. There was also question asked as to whether those two indicators were relevant for the region when so few can use, let alone own a computer. According to Kelly from the ITU, those questions would be asked by the NSO offices but mostly in the developed countries. But in developing countries if there is a policy priority on those particular questions, they could be added to the survey that NSOs conduct nationally.

According to Harsha De Silva from LIRNEasia, the most important information he would like to obtain from households would be data on demand elasticity because with this information it would be possible to forecast policy impacts for different regulatory setups. There was concern expressed by a participant as to the level of micro analysis that would be required to obtain this data.

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<sup>2</sup> Available here: [http://www.lirneasia.net/wp-content/uploads/2006/03/workshop\\_documentation\\_v1.3.pdf](http://www.lirneasia.net/wp-content/uploads/2006/03/workshop_documentation_v1.3.pdf)

## Next Steps

In order to develop sustainable supply- and demand-side data collection procedures with the participation of national data collection authorities (principally national regulatory authorities in telecom) in South Asia, LIRNE*asia* will undertake the following steps:

- 1) It will develop an Indicators Manual based on input received from participants at the Delhi Workshop;
- 2) Develop a prototype indicators database and web interface that NRA data reporters in South Asia will use for inputting ICT/telecom indicator data;
- 3) Organize a second Indicators Meeting during mid-November of 2006 in Pakistan or Sri Lanka (TBA) where participants and experts from the Delhi Workshop will be invited;
- 4) Present the draft Indicators Manual at the second Indicators Meeting for review by NRA participants and approval for adoption;
- 5) Present the prototype database and web interface to NRA participants for suggestions on improvement.

Currently, indicators for the ICT sector are collected in three principal ways: data are collected from suppliers (especially regulated suppliers) either directly by NRAs or through operator associations; data are collected from national household surveys by NSOs; data for specific purposes are collected on a case-by-case basis by various entities. Given LIRNE*asia*'s focus on ICT infrastructure, the limited resources available for research and the necessity of ensuring that data collection conducted on a sustainable basis, the focus of the current activity will be primarily on the first of the above three modes, with strong efforts being made to catalyze greater attention to ICT use on the part of NSOs. LIRNE*asia* does not envisage replicating the work of NSOs or doing their work for them; only assisting them in their work and moving them toward the inclusion of ICT questions in their surveys.

In light of the critical importance of NRA buy-in, the initial focus is to get South Asian NRAs to co-develop and adopt the Indicators Manual. Subsequently, formal endorsement of the Manual will be sought from the South Asian Telecom Regulators' Council (SATRC). Once the indicators manual has been accepted by the SATRC, it will be taken to the ASEAN Telecommunication Regulators' Council. If accepted there, most, if not all, of emerging Asia will be covered.