Toward a Single Index Overview and Methodology

World Telecommunication / ICT Indicators Meeting

Geneva
13-15 December 2007

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Background

- The ITU membership at the ITU Plenipotentiary Conference 2006 (PP06) and the World Telecommunication Development Conference 2006 Doha Action Plan gave Director of BDT specific mandates for measuring access to telecommunication and ICT
- Also, PP06 (Antalya) Resolution 131 – instructs the Director of BDT to 'promote the activities required to define and adopt new indicators for the purpose of measuring the real impact of community connectivity on the development of communities'

Needs for ITU Indices

- The ITU's mandate means an ICT index needs to measure progress in developing countries
- At the same time, the ITU has an obligation to all of its members, including the developed countries
- The difficulty of providing useful information relevant to all countries within one index has been noted - developed countries may require their own index using the more sophisticated indicators they have available and to measure more advanced technologies
- Thus it may be necessary to maintain a single flagship index as well as develop a 'second-speed' index

Goals for a Single Index

1. Provide a universally accepted measure of access to, and use of ICTs at a national level that includes as many nations as possible
2. The Index should be transparent in its formulation, easy to understand and use, and effective in informing policy decisions
3. Index components should be easily unpacked for more detailed analysis
4. The time period for its use should be until 2015 to correspond to the MDG and WSIS goals
5. Lack of universally available up-to-date data means the smallest number of component indicators will be the most inclusive and comparable across countries

Goals for a Single Index (2)

5. Indicators that measure numbers of ICT users and levels of usage provide the clearest measures of the access to ICTs and their levels of adoption
6. The focus of the index should be on personal or community access measures, rather household or business-use - more relevant for developing countries and complements WSIS and MDG goals
7. To maximise the long-term validity of the index as technologies evolve, the indicators should anticipate future evolution of ICT infrastructure and services
8. Indicator data used should be compiled by credible organisations and be issued on a regular basis to allow for comparisons over time

Indicators Choices

The Partnership on Measuring ICT for Development Core Indicators:

- A1 Fixed telephone lines per 100 inhabitants
- A2 Mobile cellular subscribers per 100 inhabitants
- A3 Computers per 100 inhabitants
- A4 Internet subscribers per 100 inhabitants
- A5 Broadband Internet subscribers per 100 inhabitants
- A6 International Internet bandwidth per inhabitant
- A7 Percentage of population covered by mobile cellular telephony
- A8 Internet access tariffs (20 hours per month), in US$, as a percentage of *per capita* income
- A9 Mobile cellular tariffs (100 minutes of use per month), in US$, and as a percentage of *per capita income*
- A10 Percentage of localities with public Internet access centres (PIACs) by number of inhabitants (rural/urban)

Extended core

- A11 Radio sets per 100 inhabitants
- A12 Television sets per 100 inhabitants

Indicator Choices (2)

The Partnership on Measuring ICT for Development Household Indicators:

- HH1 Proportion of households with a radio
- HH2 Proportion of households with a TV
- HH3 Proportion of households with a fixed line telephone
- HH4 Proportion of households with a mobile cellular telephone
- HH5 Proportion of households with a computer
- HH6 Proportion of individuals who used a computer (from any location) in the last 12 months
- HH7 Proportion of households with Internet access at home
- HH8 Proportion of individuals who used the Internet (from any location) in the last 12 months
- HH9 Location of individual use of Internet in the last 12 months: (a) at home; (b) at work; (c) place of education; (d) at another person's home; (e) community Internet access facility (f) commercial Internet access facility (g) others
- HH10 Internet activities undertaken by individuals in the last 12 months·

Extended Core:

- HH11 Proportion of individuals with use of a mobile telephone
- HH12 Proportion of households with access to the Internet by type of access
- HH13 Frequency of individual access to the Internet in the last 12 months (from any location): (a) at least once a day; (b) at least once a week but not every day; (c) at least once a month but not every week; and (d) less than once a month

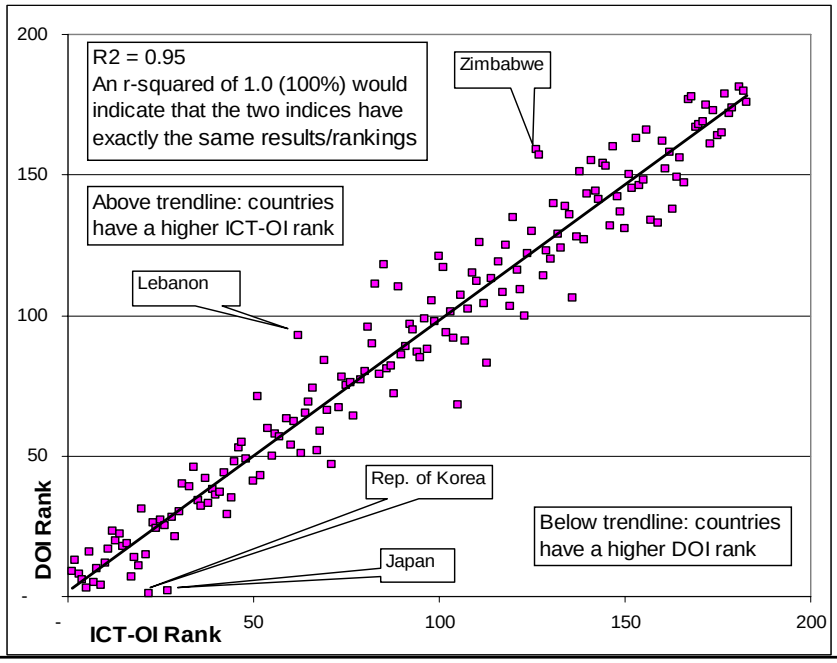
The Key Indices Compared (1)

Index	Main stake-holders	Number of Indicators	Number of Countries	Data years	Sub indices
DAI - Digital Accessibility Index	ITU	8	178	2002	1) **Infrastructure** 2) **Affordability** 3) **Knowledge** 4) **Quality** 5) **Usage**
DOI – Digital Opportunity Index	ITU	11	181	2000-2005	**1) Opportunity 2) Infrastructure 3) Usage**
Orbicom's DDI - Digital Divide Project Index (also referred to as InfoStates)	Orbicom	17	139	2003	**1) Infodensity** – the sum of all ICT stocks (capital and labour) (networks and skills) and **2) Info-Use** – consumption flows of ICT over a set period (uptake and intensity) **Infostate** is the aggregation of infodensity and info-use.
ICT-OI – ICT Opportunity Index	ITU	10	183	2001-2005	**1) Infodensity** (networks and skills) and **2) Info-Use** (uptake and intensity)

The Key Indices Compared (2)

Digital Opportunity Index (DOI) First published in 2005.	Measures the possibility for citizens to benefit from access to information that is "universal, ubiquitous, equitable and affordable". It is a measure of each countries' performance and prospects for progress in building an Information Society
ICT Opportunity Index (ICT-OI) The result of the merger of the Digital Access Index (DAI) and Orbicom's InfoState conceptual framework and model. First published in 2005	The prime objective is to identify the digital divide and to help understand how it has evolved since the beginning of this century. The ICT-OI has an explicit conceptual framework closely linked to economic theory, focusing on the dual nature of ICTs, as a productive asset, as well as a consumable – Infodensity as a country's overall capital and labour stocks and Info-use, which refers to the consumption flows of ICTs.

ICT-OI and the DOI Ranks Compared



The DOI and the ICT-OI Indicators

Digital Opportunity Index (DOI)	*ICT Opportunity Index (ICT-OI)*
Opportunity	**Infodensity: Networks**
1. Percentage of population covered by mobile telephony (A7)	**1. Main telephone lines per 100 inhabitants (A1)**
2. Internet access tariffs as a percentage of per capita income (A8)	**2. Mobile cellular subscribers per 100 inhabitants (A2)**
3. Mobile cellular tariffs as a percentage of per capita income (A9)	**3. International Internet bandwidth (kbit/s per inhabitant) (A6)**
Infrastructure	**Infodensity: Skills**
1. Proportion of households with a fixed-line telephone (HH3)	1. Adult literacy rate
2. Proportion of households with a computer (HH5)	2. Gross enrolment rates (primary, secondary and tertiary)
3. Proportion of households with Internet access at home (HH7)	**Info-use: Uptake**
***4. Mobile cellular* subscribers per 100 inhabitants (A2)**	1. Internet users per 100 inhabitants
5. Mobile Internet subscribers per 100 inhabitants	**2. Proportion of households with a TV (HH2)**
Utilisation	**3. Computers per 100 inhabitants (A3)**
1. Proportion of individuals that have used the Internet (HH8)	**Info-use: Intensity**
2. Ratio of fixed broadband subscribers to total Internet subscribers (A5:A4)	**1. Total broadband Internet subscribers per 100 inhabitants (A5)**
3. Ratio of mobile broadband subscribers to total mobile subscribers	2. International outgoing international traffic (minutes) per capita

The DOI and the ICT-OI Methodologies

Feature	DOI	ICT-OI
Number of indicators used	11	10
Number of Partnership core ICT indicators	8	6
Framework used	No explicit framework, but sub-indices are sequenced	Economic model framework
Sub-Index category hierarchy levels	1	2
How Digital Divide is measured	Absolute	Relative
Index formula	Arithmetic mean	Geometric mean
Index computation	Can be done easily by the country, since based on absolute values	Depends on average of values included in the study.
Indicator selection focus	Mobile & internet	Skills, basic infrastructure and utilisation
Indicator type emphasis	Household	Individual
Treatment of outliers and large values	Goalposts	Maximum value adjustments/Scalars

Scenarios for a Single Index

1. Adopt one of the two indices already in use – either the ICT-OI or the DOI.
2. Adopt a slightly modified version of either the ICT-OI or DOI by adding or removing some of the indicators currently used, and retaining the same methodology of the chosen index
3. Formulate a revised index that merges the best features of the two existing indices:
   - Build on the body of work already carried out in developing the ICT-OI and the DOI
   - Use a combination of the existing indicators
   - Use the methodologies of the ICT-OI or the DOI or a mix of the two
   - Possibly incorporate some new indicators - better internet metrics and equity factors such as gender

Also, consider the need for a 'second speed index'

Scenarios For A Single Index

Scenario 1 – Use either the ICT-OI or the DOI

This approach has the advantage that the two indices are already well known and extensively analysed. The disadvantage is that the different problems which have been identified with each of the indices suggests that choosing one over the other may be difficult or could lead to even more protracted debate with an unclear outcome.

Scenario 2 – Use a slightly modified ICT-OI or DOI

This option has some of the advantages of Scenario 1 but it may be difficult to make changes to sufficiently address the issues.

The conceptual framework and intricate methodology which is imbedded in the ICT-OI makes it less appropriate for piecemeal modification, while in the DOI it may be possible to simply change, remove or add indicators with little additional effort.

Removing the 'mobile internet subscriber 'indicator and the ratio of 'mobile broadband to total mobile subscribers' indicators from the DOI could make the index less focused on developed countries.

Removing the tariff indicators could focus the index more closely on actual uptake.

But even removing both of these types of measures may not address the other concerns that have been identified, especially the use of household indicators, which are not available through household surveys for the majority of developing countries.

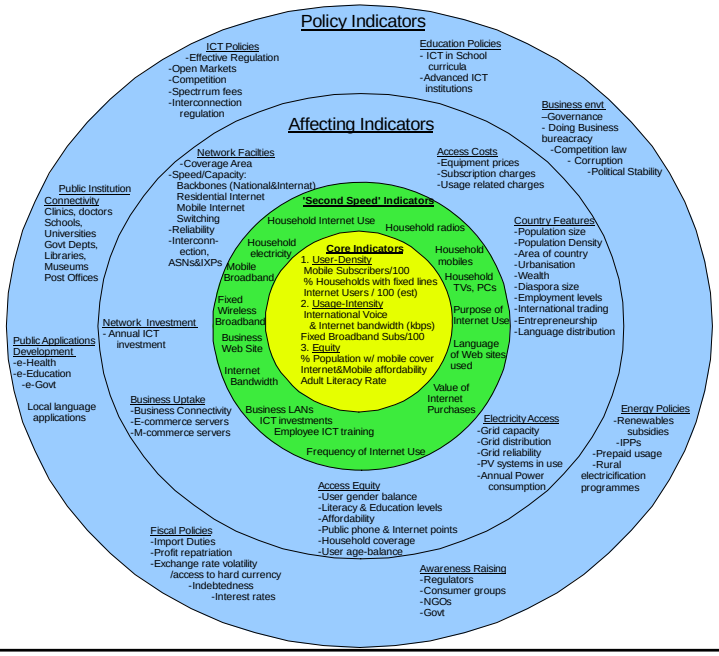
Scenario 3 – Formulate a revised Index

The drawback of this approach (and to some extent the approach of scenario 2) is that it would create yet another (third) index, which has not been tested yet.

Conceptual Framework for Revising the Single Index

- The number and range of ICTs available today has never been greater and a conceptual framework is needed to make sense of them
- A good conceptual framework makes it possible be much more systematic about the process of selecting indicators

Conceptual Framework for A Revised Index



Considerations for Revising the Single Index

- The conceptual model makes clear the separation of influencing factors from measures of demand-led uptake and use. Thus the Indicators are a set of grouped measures of ICT adoption, whose levels are affected by a wide range of factors
- User-Density indicators ideally comprise all demand-side measures of network and equipment uptake such as fixed, mobile and internet subscribers, PCs, TVs and radios per capita. But some of these are inaccurate or of less interest
- Usage-Intensity better implies measures of the extent to which ICT is actually used, and could comprise voice and internet traffic, and broadband subscribers
- The saturation of uptake in some parts of the world forms the rationale for a two-speed element to the new index – where User-Density is of key concern to developing countries, while Usage-Intensity is more important to developed countries.

Considerations for use of Sub-Indices

- The User-Density and Usage-Intensity sub-indexes could be combined as-is but this would not take into account the skills component and other Equity/Opportunity factors
- A separate sub-index is important to measure access-equity – i.e. the extent to which some people are excluded from access to or the use of ICT.
- Average per capita measures of ICT-use obscure the fact that in many countries women do not have as much access to technology, and neither do the illiterate. Also the poor may not be able to afford access to broadband, and networks often do not extend uniformly across the country.
- The Equity sub-index would aim to highlight these problems and create a composite measure of the equitability of access and use of ICT in any given country

User-Density Indicator Considerations

- User-Density is the sub-index aimed at measuring the per capita penetration of ICT and would ideally include fixed, mobile and internet subscribers, PCs, TVs and radios per capita. But because of data accuracy and availability limitations, PCs, TVs and radios could be eliminated

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- Also, the definition of what actually constitutes one of these devices is becoming increasingly blurred because of mobile-PC-TV convergence and the embedding of computing devices in other equipment such as cars and fridges

User-Density Indicator Considerations (2)

- Including a fixed-line measure is likely to bias against developing countries - in contrast to fixed lines, mobile phone access is becoming the de facto measure of basic access and this indicator is of particular concern to developing countries where growth is still rapid and has not come close to reaching saturation.
- In addition mobile phones are now being more used for internet access than PCs in some countries
- . But use of fixed lines for delivering broadband in developed countries, suggests this indicator should still be included in the index

Usage-Intensity Indicator Considerations

The Usage-Intensity sub-index would aim to measure the levels of ICT activity:

- international internet bandwidth
- international voice traffic
- broadband-use.

This would aim to provide a sufficient level of detail to allow the more developed countries at the top end of the User-Density scale to make effective national comparisons.

These indicators do not give an ideal picture of usage intensity, but until more widespread national data is available the use of these simple proxy indicators is necessary.

Usage-Intensity Indicators (2)

- Using both voice traffic and internet bandwidth helps to create balance in the move toward NGN infrastructure where voice minutes decrease while internet bandwidth will increase
- Voice traffic is usually measured in minutes, but can be converted to bandwidth equivalents to allow a more direct comparison with internet bandwidth
- In the longer term, as networks move toward an NGN infrastructure the indicator is future-proofed as growth in internet bandwidth compensates for decreases in switched voice minutes
- Although the availability of international voice traffic data is patchy, this could be partially addressed by adding incoming and outgoing minutes together, which is also necessary because there is a tendency for outgoing calls to be replaced with incoming calls.

Equity Indicator Considerations

- An Equity sub-index would aim to introduce a measure for the level of exclusion from ICTs amongst the public
- It could comprise mobile coverage, mobile and internet affordability, and literacy levels
- This may also be the place to bring in the public internet access point indicator that is currently being developed by the ITU
- This has not been the explicit focus of any of the other indices but many of the indexes have used the indicators proposed here - an equity measure can be a way to group the indicators in a more meaningful way to illuminate the equity issue.

Equity Indicators (2)

- Ideally the coverage indicator should include national broadband coverage but as this figure is not available, the index could use the proportion of population covered by mobile networks, which may also give some indication of broadband coverage
- The affordability component could use the cost per Mbps/month for a broadband subscription package as a percentage of average monthly household income. As this is not yet widely available, the OECD defined basket of costs for low-end mobile usage could be used, combined with the estimated costs for 20 hours of dial-up internet access per month.
- Adult literacy levels are a well-represented measure of the extent to which the public can use the internet

Making the Index More User |Friendly

- Software tools and online web-based database systems help make the index more accessible and understandable by tailoring it to the needs of the particular user

- These tools allow selection of countries according to many more categories – neighbouring countries, economic union, levels of indebtedness, small islands, small populations etc, the user is not restricted to using pre-packaged categories which may be of less relevance to their particular interests

- More special ranking categories can also be used, for example, countries that grew the most, countries that grew the least, or countries furthest from the GNI benchmark.

- Grouping countries by rank is also important in measuring and highlighting progress – for example, the top 10 adopters, low adopters, most rapid adopters.

- Similarly the same tools can be used to combine different indicators and essentially allow the user to create their own index, which makes reaching consensus on the use of specific indicators far less necessary

Naming the Revised Index

1. The Integrated ICT Opportunity Index (IIOI)
2. The Digital Inclusion Index (DII)
3. The Interactive ICT Index (III)
4. The Digital Equity Index (DEI)
5. The New Information Opportunity Index (NIOI)
6. The Digital Adoption and Usage Index (DAUI)
7. The ITU ICT Index (ICT-I)

Thank You