The ICT Development Index (IDI)

Methodology, indicators and definitions
(as of February 2019)

ICT Data and Statistics Division
Telecommunication Development Bureau
International Telecommunication Union
IDI METHODOLOGY
Three stages in the evolution towards an information society
The ICT Development Index (IDI)

- The IDI is a composite index that combines 14 indicators
- Designed to be global and reflect changes taking in place in countries of different levels of development
- Was developed by ITU in 2008 in response to member states’ request to establish an overall ICT index
- Results first reported in the Measuring the Information Society Report (MISR) 2009
Objectives of the IDI

To measure:

• the *level and evolution over time* of ICT developments in countries and the experience of those countries relative to other countries;

• progress in ICT development in *both developed and developing countries*;

• the *digital divide*, i.e. differences between countries in terms of their levels of ICT development; and

• the *development potential* of ICTs and the extent to which countries can make use of them to enhance growth and development.
Extraordinary meeting of EGTI/EGH

- Held in Geneva, Switzerland, on 1-3 March 2017
- Meeting was open to all ITU members and experts in the field of ICT statistics and data collection
- Objective - to discuss, debate and agree on a revised set of indicators to be included in the IDI
- Two input documents prepared by the sub-group and the independent group of experts
- Adopted a total of 14 indicators to be included in the IDI compared to the previous list of 11
### Previous IDI: **Indicators dropped** in 2018

<table>
<thead>
<tr>
<th>Access sub-index</th>
<th>Use sub-index</th>
<th>Skills sub-index</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed-telephone subscriptions (/100 inhabitants)</strong></td>
<td>Individuals using the internet (%)</td>
<td>Mean years of schooling (years)</td>
</tr>
<tr>
<td><strong>Mobile-cellular telephone subscriptions (/100 inhabitants)</strong></td>
<td><strong>Fixed-broadband subscriptions (/100 inhabitants)</strong></td>
<td>Secondary gross enrollment ratio (%)</td>
</tr>
<tr>
<td>International Internet bandwidth (bit/s/Internet user)</td>
<td>Active mobile-broadband subscriptions (/100 inhabitants)</td>
<td>Tertiary gross enrollment ratio (%)</td>
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<td>Households with a computer (%)</td>
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<td>Households with Internet access (%)</td>
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<td>Revised IDI: <strong>Indicators added in 2018</strong></td>
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<td>International Internet bandwidth (bit/s) per Internet user</td>
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<tr>
<td><em>Population covered by 3G mobile networks</em></td>
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<tr>
<td>- At least 3G (%)</td>
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<tr>
<td>- At least LTE/WiMAX (%)</td>
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<tr>
<td><em>Fixed-broadband subscriptions by speed tiers</em></td>
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<tr>
<td>- 256 kbit/s to 2 Mbit/s (% of total)</td>
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<td>- Equal to or above 10 Mbit/s (% of total)</td>
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<td><strong>Use sub-index</strong></td>
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<tr>
<td>Individuals using the Internet (%)</td>
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<tr>
<td>Active mobile-broadband subscriptions (per 100 inhabitants)</td>
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<td><em>Mobile-broadband Internet traffic</em></td>
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<tr>
<td>(per mobile-broadband subscription)</td>
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<td><strong>Skills sub-index</strong></td>
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<tr>
<td>Mean years of schooling</td>
<td></td>
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<tr>
<td>Secondary gross enrollment ratio (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary gross enrollment ratio (%)</td>
<td></td>
<td></td>
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<tr>
<td><em>Individuals with ICT skills (%)</em></td>
<td></td>
<td></td>
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<tr>
<td>1. Copying or moving a file or folder</td>
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<tr>
<td>2. Using copy and paste tools to duplicate or move information within a document</td>
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<tr>
<td>3. Sending e-mails with attached files</td>
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<tr>
<td>4. Using basic arithmetic formula in a spreadsheet</td>
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<tr>
<td>5. Connecting and installing new devices</td>
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<tr>
<td>6. Creating electronic presentations with presentation software</td>
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<td></td>
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<tr>
<td>7. Finding, downloading, installing and configuring software</td>
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<td></td>
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<tr>
<td>8. Transferring files between a computer and other devices</td>
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<td></td>
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<tr>
<td>9. Writing a computer program using a specialized programming language</td>
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</tbody>
</table>
### IDI aggregation methodology

<table>
<thead>
<tr>
<th>ICT access</th>
<th>Reference value</th>
<th>(%)</th>
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</thead>
<tbody>
<tr>
<td>1. % households with a computer</td>
<td>20</td>
<td></td>
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<tr>
<td>2. % households with Internet</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3. International Internet bandwidth per Internet user</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4. % population covered by 3G / LTE mobile network (^{1,2,3})</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>5. Fixed-broadband subscriptions by speed (^{1,2,3}) as a % total fbb</td>
<td>20</td>
<td></td>
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</tbody>
</table>

<table>
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<tr>
<th>ICT use</th>
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<tbody>
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<td>1. % individuals using the Internet</td>
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<tr>
<td>2. Active mobile-broadband subscriptions per 100 inhab</td>
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<td></td>
</tr>
<tr>
<td>3. Mobile broadband Internet traffic per mobile-bb subs</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4. Fixed-broadband Internet traffic per fixed-bb subs</td>
<td>20</td>
<td></td>
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<tr>
<td>5. % individuals who own a mobile phone</td>
<td>20</td>
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</tbody>
</table>

<table>
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<tr>
<th>ICT skills</th>
<th>Reference value</th>
<th>(%)</th>
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</thead>
<tbody>
<tr>
<td>1. Mean years of schooling</td>
<td>25</td>
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<tr>
<td>2. Gross enrollment ratio (secondary level)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>3. Gross enrollment ratio (tertiary level)</td>
<td>25</td>
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</tr>
<tr>
<td>4. Proportion of individuals with ICT skills (^{1,2,3})</td>
<td>25</td>
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</tbody>
</table>

\(^{1,2,3}\): indicator composed of sub-indicators
Three data sources

• Telecommunication data
  – Usually collected by the regulator from operators
  – International data collection through the ITU WTI questionnaire

• Household/individual ICT data
  – Usually collected by the NSO through a household survey
  – International data collection through the ITU household questionnaire

• Education data
  – Usually collected by the education ministry
  – International data collection by the UNESCO Institute for Statistics (UIS)
  – ITU doesn’t collect data from countries, but uses data from UIS
## The ICT Development Index

### Sources

<table>
<thead>
<tr>
<th>Access</th>
<th>Source</th>
<th>Use</th>
<th>Source</th>
<th>Skills</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Households with a computer (%)</td>
<td>HH</td>
<td>2.1 Individuals using the Internet (%)</td>
<td>HH</td>
<td>3.1 Mean years of schooling (years)</td>
<td>UIS</td>
</tr>
<tr>
<td>1.2 Households with Internet access (%)</td>
<td>HH</td>
<td>2.2 Active mobile-broadband subscriptions (/100 inhabitants)</td>
<td>WTI</td>
<td>3.2 Secondary gross enrollment ratio (%)</td>
<td>UIS</td>
</tr>
<tr>
<td>1.3 International Internet bandwidth (bit/s/Internet user)</td>
<td>WTI</td>
<td>2.3 Mobile-broadband Internet traffic (/subscription)</td>
<td>WTI</td>
<td>3.3 Tertiary gross enrollment ratio (%)</td>
<td>UIS</td>
</tr>
<tr>
<td>1.4 Population covered by mobile networks (%)</td>
<td>WTI</td>
<td>2.4 Fixed-broadband Internet traffic (/subscription)</td>
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<td>3.4 Individuals with ICT skills (%)</td>
<td>HH</td>
</tr>
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<td>1.5 Fixed-broadband subscriptions by speed tiers (% of total)</td>
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<td>2.5 Individuals who own a mobile phone (%)</td>
<td>HH</td>
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</table>
WTI HANDBOOK
ITU Handbook

• Covers **81 indicators** on telecommunication/ICT services

• Covers data collected from **administrative sources** (e.g. telecom operators)

• Discussed in the ITU Expert Group on Telecom/ICT Indicators (**EGTI**)

• Available at:  
ITU Handbook (cont.)

Groupings:
- Fixed-telephone networks
- Mobile-cellular networks
- Internet
- Traffic
- Tariffs
- Quality of service
- Persons employed
- Revenue
- Investment
- Public access
- Broadcasting and other indicators

- Definition
- Clarifications and scope
- Method of collection
- Relationship with other indicators
- Methodological issues
- Examples
ITU Handbook – additions

- Revision of revenue and investment indicators

- New indicators from administrative sources 2011-2013
  - Fixed broadband and mobile QoS
  - Broadband Internet traffic
  - Pay-TV subscriptions
  - Mobile-broadband prices
ITU Handbook – additions (ii)

- New indicators from administrative data sources added in 2015:
  - M2M mobile-network subscriptions
  - Fixed-broadband subscriptions for organizations
  - Percentage of the population covered by at least an LTE/WiMAX mobile network
  - Subscriptions to bundled telecommunication services
ITU Handbook – additions (iii)

New indicators from 2016:
- Active subscriptions to LTE/WiMAX mobile-broadband networks
- Change in mobile-bb sub-categories

New indicators from 2017:
- Fixed wired network coverage
- Extension fixed-broadband speed tiers
- Modification price baskets
Methodological note on the indicator “Fixed-broadband Internet traffic”

New March 2018

Context: indicators from administrative sources

- Indicators ITU Handbook
- Indicators collected in ITU administrative questionnaires
- Admin indicators included in the ICT Development Index
- Administrative indicators collected by countries

- Data per operator
- Sub-national data
- Data for market analysis
- Data to track national ICT policies
HOUSEHOLD MANUAL

• Chapter 1. Introduction
• Chapter 2. Coordination among national stakeholders in ICT measurement
• Chapter 3. Planning and preparation for ICT household surveys
• Chapter 4. Statistical standards and measurement topics for ICT household statistics
• Chapter 5. Data sources and collection techniques for ICT household statistics
• Chapter 6. Question and questionnaire design for ICT household surveys
• Chapter 7. Designing ICT household surveys
• Chapter 8. Data processing for ICT household statistics
• Chapter 9. Data quality and evaluation for ICT household statistics
• Chapter 10. Dissemination of ICT household data and metadata
Preparation and revision process

• First release in 2009
• 2012-13: two rounds of complete revisions
• Comments from Expert Group on Household Indicators (EGH) forum
• Version 2 launched at WTIS 2013 (December 2013, Mexico)
• Revision of indicators in 2014-2015:
  – added HH16
  – HH17, HH18, HH19 on the website, but **not yet in the Manual**
ITU statistical standards: ICT household statistics

• Statistical standards associated with the core ICT indicators for household access to, and individual use of, ICT:
  – concepts
  – definitions of terms
  – model questions
  – classificatory variables (breakdowns)
  – scope
  – units (households and individuals)
• Formula of calculation
• Use (policy relevance)
Core household indicators, main concepts

• The indicators consist of those:

  – Referring to household *access* to ICT equipment and services

  – Referring to individuals’ *use/ownership* of ICT equipment and services
Concept of access

• ICT device/service should be available for use of any member of the household at any time
• Device can be owned or not by the household
• Applies to all indicators referring to household ICT access
• Device should be in a working condition
Age scope

• Countries should report ICT usage information for the three main core indicators on individuals’ use of ICTs (computer, mobile phone and Internet) for the entire population of the country, i.e. there is no minimum age scope any more for these indicators
Reference period

• Information on ICT usage should be collected and reported with a reference period of the last 3 months
Conducting household surveys

• Much more in the separate presentation “Getting ICT data through surveys” with information on:
  – Collaborating and coordinating for household ICT statistics
  – Getting ICT data through surveys: good practices
  – The ITU Manual
  – Data disaggregations
IDI indicator 1.1

- Percentage of households with a computer
- Access sub-index
- Source: Household survey
Indicator HH4: Proportion of households with a computer

Definitions:
This is the proportion of households that have a computer. A computer refers to a desktop computer, a laptop (portable) computer or a tablet (or similar handheld computer).

- Desktop: a computer that usually remains fixed in one place; normally the user is placed in front of it, behind the keyboard.
- Laptop (portable) computer: a computer that is small enough to carry and usually enables the same tasks as a desktop computer; it includes notebooks and netbooks but does not include tablets and similar handheld computers.
- Tablet (or similar handheld computer): a tablet is a computer that is integrated into a flat touch screen, operated by touching the screen rather than (or as well as) using a physical keyboard.

It does not include equipment with some embedded computing abilities, such as smart TV sets, and devices with telephony as their primary function, such as smartphones.
IDI indicator 1.2

• Percentage of households with Internet access
• Access sub-index
• Source: Household survey
Indicator HH6: Proportion of households with Internet

Definitions:
This is the proportion of households with Internet access at home.

The Internet is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network.
IDI indicator 1.3

• International Internet bandwidth (bit/s) per Internet user
• Access sub-index
• Source: WTI
International Internet bandwidth

ITU collects data on two indicators:

1. Lit/equipped capacity
2. Used capacity
Average usage of all international links including fiber-optic cables, radio links and traffic processed by satellite ground stations and teleports to orbital satellites (expressed in Mbit/s).

All international links used by all types of operators, namely fixed, mobile and satellite operators should be taken into account. The average should be calculated over the 12-month period of the reference year.

For each individual international link, if the traffic is asymmetric, i.e. incoming traffic is not equal to outgoing traffic, then the higher value out of the two should be provided. The combined average usage of all international links can be reported as the sum of the average usage of each individual link.
What is counted as usage?

- Self-supply and leased international links.
- Clients, subsidiaries and own usage.
- Transit and Peering agreements.
- Content providers or OTT’s.
- All IP based services (IPLC, IPVPN, VoIP, …)
- National traffic not included!

Source: ANACOM Portugal & EGTI sub-group on international Internet Bandwidth
Methods of data collection

Method 1

Collect data from facilities-based carriers that provide wholesale international connectivity.

Method 2

Collect data from all operators that lease or self-supply international bandwidth, namely fixed, mobile and satellite operators.

Strive to collect data from OTT’s and content-providers who use direct international connections.

BEWARE OF DOUBLE COUNTING

Double counting can occur if data are collected from both service providers and facilities-based carriers.

Source: ANACOM Portugal & EGTI sub-group on international Internet Bandwidth
<table>
<thead>
<tr>
<th>Lit/equipped international Internet bandwidth, in Mbit/s</th>
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</table>

Total lit/equipped international bandwidth capacity refers to the total lit/equipped capacity of international links, namely fiber-optic cables, international radio links and satellite uplinks to orbital satellites in the end of the reference year (expressed in Mbit/s). If the traffic is asymmetric (i.e. incoming traffic and outgoing traffic is not equal), then the higher value out of the two should be provided.
Examples of network monitoring tools

- MRTG-Multi Router Traffic Grapher
- PRTG
- Cacti ([www.cacti.net](http://www.cacti.net))
- OpenNMS ([www.opennms.com](http://www.opennms.com))

Source: Gigapix

Source: ANACOM Portugal & EGTI sub-group on international Internet Bandwidth
IDI indicator 1.4

• Percentage of the population covered by mobile networks
  – At least 3G
  – At least LTE/WiMAX

• Access sub-index

• Source: WTI
% of the population covered by at least an 3G network

Percentage of the population covered by at least a 3G mobile network refers to the percentage of inhabitants that are within range of at least a 3G mobile-cellular signal, **irrespective of whether or not they are subscribers**. This is calculated by dividing the number of inhabitants that are covered by at least a 3G mobile-cellular signal by the total population and multiplying by 100. It excludes people covered only by GPRS, EDGE or CDMA 1xRTT.
% of the population covered by at least an LTE/WiMAX mobile network

Percentage of inhabitants that live within range of LTE/LTE-Advanced, mobile WiMAX/WirelessMAN or other more advanced mobile-cellular networks, irrespective of whether or not they are subscribers.

It excludes people covered only by HSPA, UMTS, EV-DO and previous 3G technologies, and also excludes fixed WiMAX coverage.
Mobile coverage – methodology

Possible ways of collecting the data:

1. Each operator reports total country coverage
   ⇒ Max value of all reported

2. Each operator reports total per admin unit
   ⇒ Max value of all reported per admin unit
   ⇒ Aggregation according to population/admin unit
Mobile coverage – methodology

Example:

<table>
<thead>
<tr>
<th>Region</th>
<th>Op 1</th>
<th>Op 2</th>
<th>Op 3</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>3</td>
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</tbody>
</table>

Region 2
(25% pop)

- 50%
- 60%
- 70%

Total coverage: 80% * 25% + 70% * 25% + 80% * 50% = 77.5%
Mobile coverage – methodology

3. Ask each operator to report coverage according to a given division of the land area

Example of Japan:

- Mesh 1: 100% Covered
- Mesh 2: 90% Covered
- Mesh 3: 40% Covered
- Mesh 4: 10% Covered

Approx. 500 meter

Covered Area

Counted as ‘Covered’

Counted as ‘Not covered’
IDI indicator 1.5

- Fixed-broadband subscriptions by speed (as % of total broadband subscriptions):
  - 256 kbit/s to 2 Mbit/s
  - 2 to 10 Mbit/s
  - Equal to or above 10 Mbit/s
- Access sub-index
- Source: WTI
Definition of broadband

- For statistical purposes: *Minimum download speed of 256 kbit/s*

Importance of breakdown by speed

Breakdown by technology gives additional information on infrastructure

“transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0 Megabits per second (Mbits)”

– ITU-T Definition
Classification of broadband subscriptions

**Fixed broadband**
- (1) xDSL
- (2) Cable modem
- (3) FTTH/FTTB
- (4) Other fixed wired
- (5) Satellite broadband
- (6) Fixed wireless broadband

**Active mobile broadband**
- (1) Data and voice
- (2) Data only
Fixed (wired)-broadband subscriptions

Fixed-broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fibre-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband.

This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations.
Fixed (wired)-broadband subscriptions by speed tiers

Main features:
- advertised $\geq 256$ kbit/s
- wired

Breakdowns:
- by speed
  - $256$ kbit/s – $<2$ Mbit/s
  - $2$ – $<10$ Mbit/s
  - $\geq 10$ Mbit/s

- by tech
  - DSL
  - cable
  - FTTH/B
  - Satellite/fixed wireless/other
Clarifications on WiFi networks

- The 2016 EGTI meeting clarified the following use cases of WiFi networks:

1) WiFi used on top of other fixed-broadband subscriptions to distribute the signal at home

These connections are already counted as “Fixed broadband subscriptions” and should not be reported separately.

fixed broadband connection
(ADSL, cable, fiber, etc.)
Clarifications on WiFi networks

2) WiFi used as a last mile technology and associated with a specific monthly fixed-broadband contract

these connections should be reported as “Fixed wireless broadband subscriptions”

3) WiFi hotspots (public, private, free, paid)

Individual country experiences, but in most cases out of the scope of regulators’ data collections. Will not be reflected in ITU supply-side indicators
IDI indicator 2.1

• Percentage of individuals using the Internet
• Use sub-index
• Source: Household survey
Indicator HH7: Proportion of individuals using the Internet

Definitions:
This is the proportion of individuals who used the Internet from any location in the last three months.

The Internet is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network.
IDI indicator 2.2

- Active mobile-broadband subscriptions per 100 inhabitants
- Use sub-index
- Source: WTI
Active mobile-broadband subscriptions refers to the sum of **active handset-based** and **computer-based** (USB/dongles) mobile-broadband subscriptions to the public Internet. It covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets. Subscriptions must include a recurring subscription fee or pass a usage requirement – **users must have accessed the Internet in the last three months.**

It includes subscriptions to mobile-broadband networks that provide download speeds of at least 256 kbit/s (e.g. WCDMA, HSPA, CDMA2000 1x EV-DO, WiMAX IEEE 802.16e and LTE), and excludes subscriptions that only have access to GPRS, EDGE and CDMA 1xRTT.
Active mobile-broadband subscriptions

Main features:

- advertised $\geq 256$ kbit/s

GPRS and EDGE excluded

1. Monthly fee paid for Internet access
2. Accessed the Internet in the previous three months

- allows access to the open Internet
Mobile broadband subcategories

**i271mb_active - Data and voice mobile-broadband subscriptions** *(i271mw = i271mb_active + i271md)*

Data and voice mobile-broadband subscriptions refers to subscriptions to mobile-broadband services that allow access to the open Internet via HTTP and in which data services are contracted together with voice services (mobile voice and data plans) or as an add-on package to a voice plan. These are typically smartphone-based subscriptions with voice and data services used in the same terminal. Data and voice mobile-broadband subscriptions with specific recurring subscription fees for Internet access are included regardless of actual use. Prepaid and pay-per-use data and voice mobile-broadband subscriptions should only be counted if they have been used to access the Internet in the last three months. M2M subscriptions should be excluded.
<table>
<thead>
<tr>
<th>i271md - Data-only mobile-broadband subscriptions</th>
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<tbody>
<tr>
<td>(i271mw = i271mb_active+ i271md)</td>
</tr>
</tbody>
</table>

Data-only mobile-broadband subscriptions refers to subscriptions to mobile broadband services that allow access to the open Internet via HTTP and that do not include voice services, i.e. subscriptions that offer mobile broadband as a standalone service, such as mobile-broadband subscriptions for datacards, USB modem/dongle and tablets. Data-only mobile-broadband subscriptions with recurring subscription fees are included regardless of actual use. Prepaid and pay-per-use data-only mobile-broadband subscriptions should only be counted if they have been used to access the Internet in the last three months. M2M subscriptions should be excluded. It excludes data subscriptions that are contracted together with mobile voice services.
### Examples of activity criteria

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<tr>
<th></th>
<th>Type of plan</th>
<th>Voice</th>
<th>Data</th>
<th>How counted</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Standalone voice</td>
<td>Standard voice</td>
<td>Pay as you go</td>
<td>If Internet used in the last 3 months, <strong>Standard</strong></td>
</tr>
<tr>
<td></td>
<td>voice subscription</td>
<td>subscription</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3G modem</td>
<td>No</td>
<td>Monthly subscription</td>
<td><strong>Dedicated</strong></td>
</tr>
<tr>
<td>3</td>
<td>Bundled voice and data</td>
<td>X minutes included</td>
<td>Y MB included</td>
<td>If Internet used in the last 3 months, <strong>Standard</strong></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>4</td>
<td>Bundled voice and data</td>
<td>X minutes included</td>
<td>Unlimited</td>
<td>If Internet used in the last 3 months, <strong>Standard</strong></td>
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<tr>
<td>5</td>
<td>Standalone voice plan + data add-on</td>
<td>Standard voice</td>
<td>Data paid separately (Y MB/month)</td>
<td><strong>Dedicated</strong></td>
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<tr>
<td></td>
<td>voice plan + data add-on</td>
<td>subscription</td>
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## Examples of activity criteria

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<th>Voice</th>
<th>Data</th>
<th>How counted</th>
</tr>
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<tr>
<td>3G modem</td>
<td>No</td>
<td>Prepaid</td>
<td>If Internet used in the last 3 months, Dedicated</td>
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<tr>
<td>Voice plan + data credits</td>
<td>Standard voice subscription</td>
<td>Pay per use once credits are filled</td>
<td>If Internet used in the last 3 months, Standard</td>
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</table>
IDI indicator 2.3

- Mobile-broadband Internet traffic per mobile-broadband subscription
- Use sub-index
- Source: WTI
Mobile-broadband Internet traffic (within the country)

Mobile-broadband Internet traffic (within the country) refers to broadband traffic volumes originated within the country from 3G networks or other more advanced mobile networks, including 3G upgrades, evolutions or equivalent standards in terms of data transmission speeds.

Traffic should be collected and aggregated at the country level for all 3G or more advanced mobile networks within the country. Download and upload traffic should be added up and reported together. Traffic should be measured at the end user access point. Wholesale and walled-garden traffic should be excluded. The traffic should be reported in exabytes.
IDI indicator 2.4

• Fixed-broadband Internet traffic per fixed-broadband subscription
• Use sub-index
• Source: WTI
Fixed (wired)- broadband Internet traffic

Fixed (wired)- broadband Internet traffic (**exabytes**) refers to traffic generated by fixed broadband subscribers measured at the end-user access point. It should be measured adding up download and upload traffic. This should exclude wholesale traffic, walled garden, IPTV and cable TV traffic.
Fixed and mobile data traffic – methodology (ii)

- Units:

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<tr>
<th>10^{12}</th>
<th>EB</th>
<th>Exabyte</th>
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<tr>
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<tr>
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<tr>
<td>1</td>
<td>MB</td>
<td>Megabyte</td>
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</table>

- References:
  - Fixed: 0.05 – 30 EB
  - Mobile (domestic): 0.04 – 4 EB
  - Mobile (roaming): 10^{-6} – 10^{-2} EB
Telecommunication operator

IPDRs or Internet access log records available?

YES

NO

Aggregate per year and report data

Can an estimate be produced based on other measurements of retail Internet traffic?

YES

NO

Report estimate based on traffic exchanged with wholesalers

Either

Report estimate based on load of international Internet channels

Example 1

Example 2

Example 3

The portion of on-net Internet traffic should be considered in the

The portion of on-net Internet traffic should be considered in the
Fixed and mobile data traffic – examples

- Example 1: Internet log records

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<tr>
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<th>TYPE_SPEED</th>
<th>TYPE_IP_ACCESS</th>
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### Fixed and mobile data traffic – examples

- **Example 2: traffic data at IXPs**

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</tr>
</tbody>
</table>

Source: Autoridade Nacional de Comunicações (ANACOM), Portugal.
Fixed and mobile data traffic – examples

- Example 3: load international channels

Source: Autoridade Nacional de Comunicações (ANACOM), Portugal.
IDI indicator 2.5

- Percentage of individuals who own a mobile phone
- Use sub-index
- Source: Household survey
HH18: Proportion of individuals who own a mobile phone

This is the proportion of individuals who own a mobile phone. An individual owns a mobile cellular phone if he/she has a mobile cellular phone device with at least one active SIM card for personal use. It includes mobile cellular phones supplied by employers that can be used for personal reasons (to make personal calls, access the Internet, etc.) and those who have a mobile phone for personal use that is not registered under his/her name. It excludes individuals who have only active SIM card(s) and not a mobile phone device.

First collected in 2015 (agreed by EGH in 2014)
IDI indicator 3.1

- Mean years of schooling
- Skills sub-index
- Source: UNESCO Institute for Statistics
Mean years of schooling

Definition
Average number of completed years of education of a country's population aged 25 years and older, excluding years spent repeating individual grades.

Data required
Population aged 25 years and above by highest level of education attained.

Data source
Mainly national population census; household and/or labour force surveys.

Types of disaggregation
By sex.
Mean years of schooling
Sample calculation

Take a country where primary education lasts 4 years, secondary education lasts 8 years, and tertiary education lasts 4 years, and assume that these durations have remained constant over time. Assume further that 10% of the population aged 25 years and older have no schooling, 10% have incomplete primary education, 40% completed primary education, 30% completed secondary education, and 10% completed tertiary education.

MYS estimate for the population aged 25 years and older can be computed as follows:

\[
(0.1 \times 0) + (0.1 \times 4/2) + (0.4 \times 4) + [0.3 \times (4 + 8)] + [0.1 \times (4 + 8 + 4)]
\]

\[
= 0 + 0.2 + 1.6 + 3.6 + 1.6
\]

\[
= 7 \text{ years}
\]
IDI indicators 3.2 and 3.3

- Gross enrollment ratio (secondary level)
- Gross enrollment ratio (tertiary level)
- Skills sub-index
- Source: UNESCO Institute for Statistics
Gross enrolment ratio

Definition
Number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

Data required
Total enrolment for a given level of education; population of the age group corresponding to the specified level.

Data source
School register, school survey or census for data on enrolment by level of education; population census or estimates for school-age population.

Types of disaggregation
By sex and by level of education.
**GER Sample calculation**

**Gross enrolment ratio (GER)**

Assume a country has 512,314 students of official secondary school going age.

The enrolment in all secondary schools is 490,188 of all ages including repeaters.

The GER secondary = \(\frac{490,188}{712,314} \times 100 = 68.8\)

For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.
IDI indicator 3.4

- Proportion of individuals with ICT skills
- Skills sub-index
- Source: Household survey
Indicator HH15: Individuals with ICT skills, by type of skills

Definitions:
This refers to ICT skills, defined for the purpose of this indicator as having undertaken certain computer-related activities in the last three months.

Computer-related activities to measure ICT skills are as follows:

- Copying or moving a file or folder
- Using copy and paste tools to duplicate or move information within a document
- Sending e-mails with attached files (e.g. document, picture, video)
- Using basic arithmetic formulae in a spreadsheet
- Connecting and installing new devices (e.g. a modem, camera, printer)
- Finding, downloading, installing and configuring software
- Creating electronic presentations with presentation software (including text, images, sound, video or charts)
- Transferring files between a computer and other devices
- Writing a computer program using a specialized programming language
Skills aggregation

• **Basic skills**: the highest proportion among the following four computer-based activities within a country:
  - copying or moving a file or folder,
  - using copy and paste tools to duplicate or move information within a document,
  - sending e-mails with attached files, and
  - transferring files between a computer and other devices.

• **Standard skills**: the highest proportion the highest value among the following four computer-based activities within a country:
  - using basic arithmetic formula in a spreadsheet;
  - connecting and installing new devices;
  - creating electronic presentations with presentation software; and
  - finding, downloading, installing and configuring software.

• **Advanced skills**: the value for
  - writing a computer program using a specialized programming language.

Note: ITU will do the aggregation into basic, standard and advanced
Thank you

For more information
and
indicators@itu.int