



# ITU Regional ICT Indicators Workshop for Africa

Lilongwe, Malawi

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## Session 8: Fixed-broadband, mobile-broadband and traffic indicators

ICT Data and Statistics Division  
Telecommunication Development Bureau  
International Telecommunication Union



# Main ITU indicators from administrative sources

## Fixed-broadband indicators



# 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

2017 EGTI  
discussion  
item

“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

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- (5) Satellite broadband
- (6) Fixed wireless broadband

Fixed  
wired



Fixed  
wireless

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

## Main features:

- advertised  $\geq 256$  kbit/s



- wired



## Breakdowns:

- by speed



- $\geq 10$  Mbit/s
- 2 – <10 Mbit/s
- 0.256 – <2 Mbit/s

- by tech

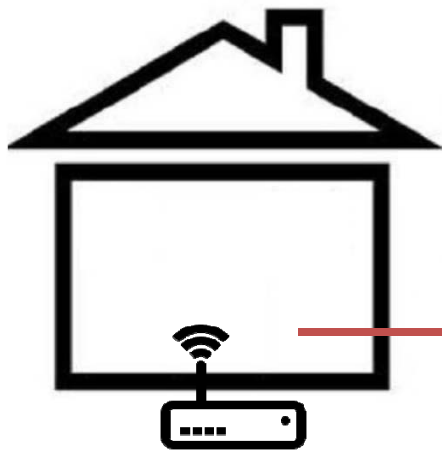
- DSL
- cable
- FTTH/B
- Satellite/fixed wireless/other

# 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**





# Main ITU indicators from administrative sources

## Mobile-broadband indicators



# Active



## mobile broadband subscriptions

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**

- active
  - 1. Monthly fee paid for Internet access
  - OR
  - 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.



# Mobile broadband subcategories

**i271md - Data-only mobile-broadband subscriptions**  
**(i271mw = i271mb\_active+ i271md)**

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

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



# Examples of activity criteria

	Type of plan	Voice	Data	How counted
6	3G modem	No	Prepaid	If Internet used in the last 3 months, <b>Dedicated</b>
7	Voice plan + data credits	Standard voice subscription	Pay per use once credits are filled	If Internet used in the last 3 months, <b>Standard</b>



# % of the population covered by at least an 3G network

**IDI**

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.

**Total mobile coverage**

**Mobile-broadband coverage (3G)**





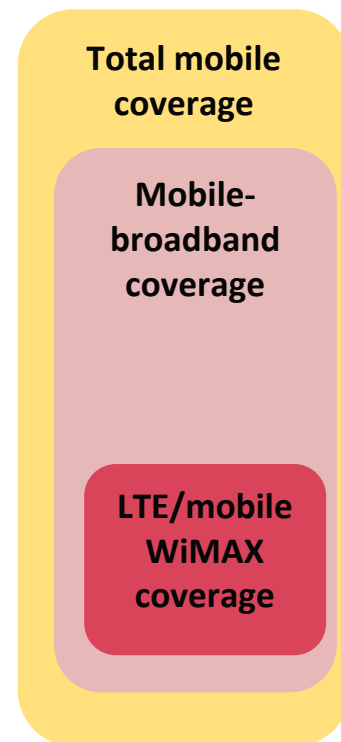
IDI

# % of the population covered by at least an LTE/WiMAX mobile network



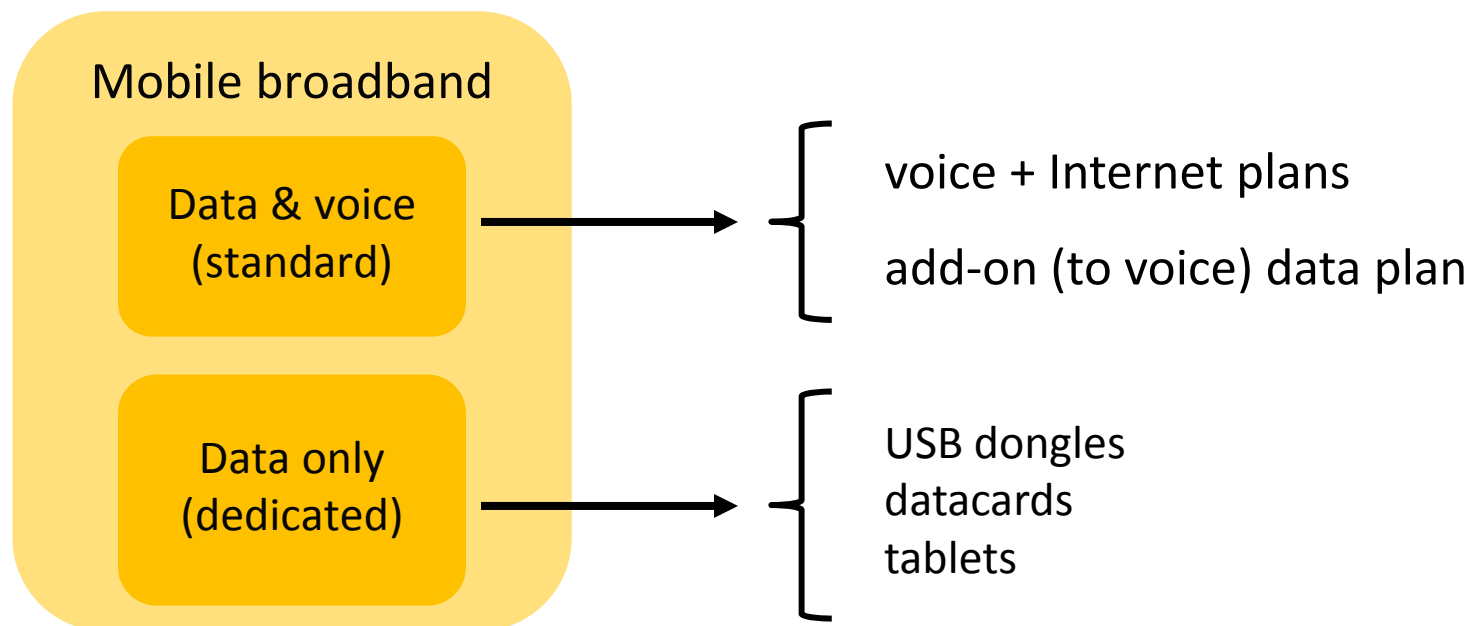
*Percentage of inhabitants that live within range of LTE/LTE-Advanced, mobile WiMAX/WirelessMAN or other more advanced mobile-cellular networks, irrespective of whether or not they are subscribers.*

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



# Mobile broadband subcategories

Following the agreement in the 6<sup>th</sup> EGTI Meeting (September 2015, Geneva) mobile broadband subcategories were adjusted as follows:



# % of a population covered by a mobile-cellular network



Percentage of inhabitants within range of a mobile-cellular network, irrespective of **whether OR not they are subscribers or users.**

Calculation: Divide number of inhabitants within range of a mobile-cellular signal by the total population and multiply by 100.

# SDG indicator

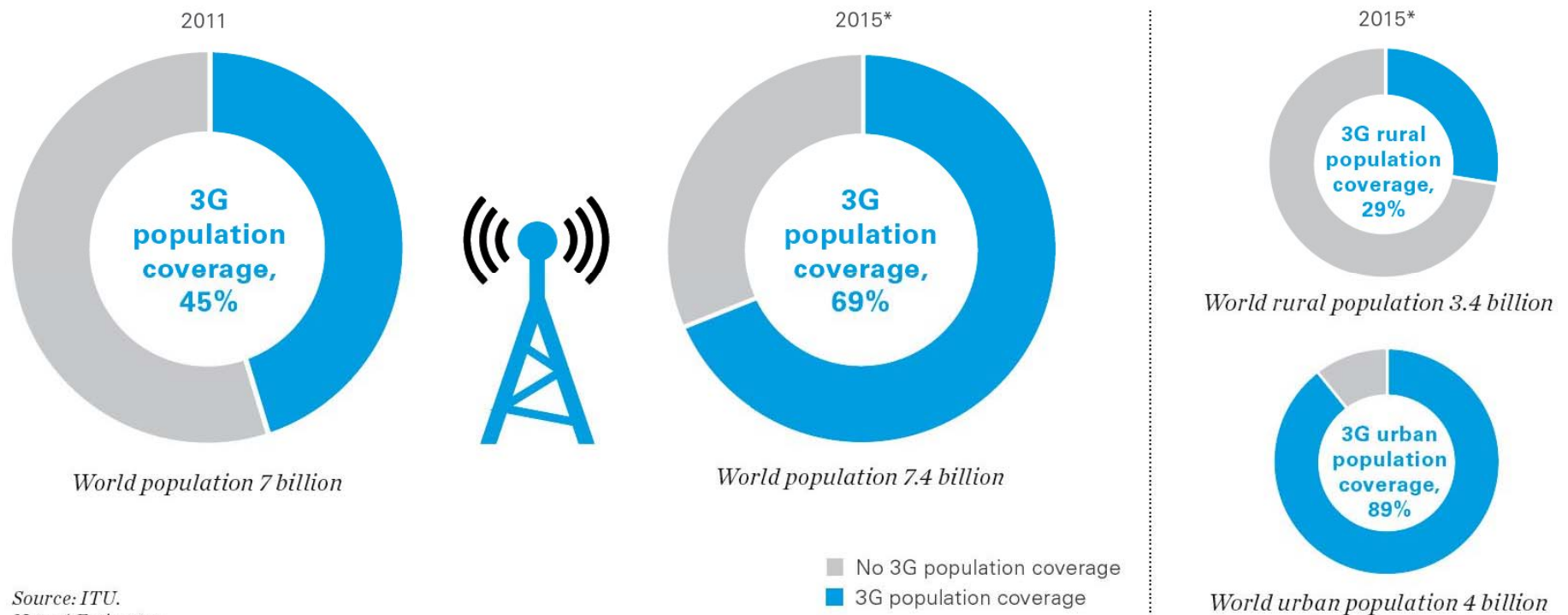
SDG Goal	SDG Target	ICT indicator
 <p><b>Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b></p>	<p><b><u>Target 9.c:</u> Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020</b></p>	<p>Percentage of the population covered by a mobile network, broken down by technology (ITU)</p>

# SDG indicator




## Population covered by a 3G mobile network Target 9.c (universal access to ICT)

*3G mobile-broadband coverage is extending rapidly and into the rural areas*



Source: ITU.  
Note: \* Estimates.

# SDG indicator

SDG Goal	SDG Target	ICT indicator
 <p><b>Goal 17:</b> Strengthen the means of implementation and revitalize the global partnership for sustainable development</p>	<p><u>Target 17.6:</u> Enhance North-South, South-South and triangular regional and international cooperation on and access to science, <b>technology</b> and innovations, and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, particularly at the United Nations level, and through a global technology facilitation mechanism</p>	<p>Fixed Internet broadband subscriptions broken down by speed (ITU)</p>

# SDG indicator

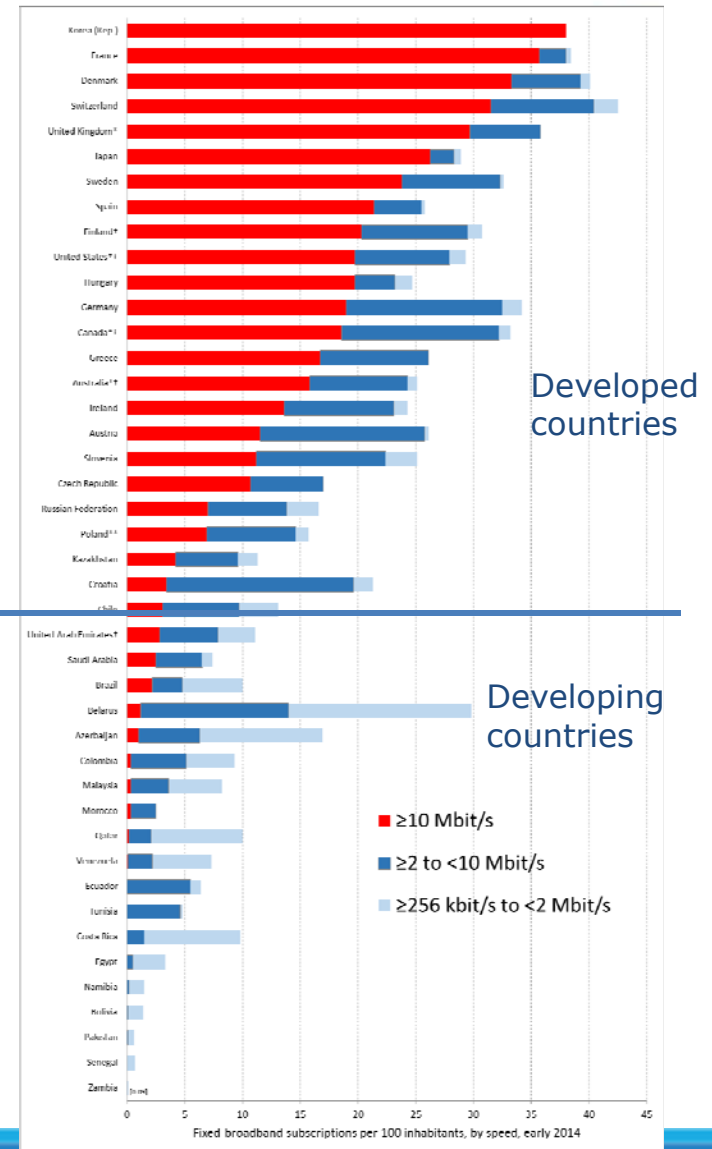


Broadband Internet by speed

**Target 17.6**  
**(access to technology)**

Significant broadband speed divide between developed and developing countries.

Quality and speed of Internet access is essential to guarantee high development impact.





# Traffic

- Fixed telephone: domestic, international minutes
- Mobile cellular: domestic, international minutes and SMS
- Data traffic (**1<sup>st</sup> ITU collection 2013**):
  - Fixed (wired)- broadband Internet traffic (exabytes)
  - Mobile-broadband Internet traffic (inside country)
  - Mobile-broadband Internet traffic (outside, roaming out)

**Measured at the end-user access point**

**Excl. walled-garden, wholesale traffic, IPTV/CATV**





# 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.



# Mobile-broadband Internet traffic (within the country)



IDI

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**.

# Fixed and mobile data traffic – methodology (ii)

- Units:



$10^{12}$	EB	Exabyte
$10^9$	PB	Petabyte
$10^6$	TB	Terabyte
$10^3$	GB	Gigabyte
1	MB	Megabyte

- References:

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



Thank you



For more information  
<http://www.itu.int/ict>  
and  
[indicators@itu.int](mailto:indicators@itu.int)



# Revenue




- Since 1960, revenue from telecommunications  
On average 141 economies reported
- Since mid-1980's, revenue from mobile services  
139 economies reported

**Issue:** harmonization of data reported in view of international comparisons



# Methodology

- ITU Handbook 
- EGTI reviewed the definitions in 2012
- Chapter 4 in MIS 2012 analysed revenue and investment data
- Input from international organizations



## Methodological note

Methodology for the collection of revenue and investment data on telecommunications

### Background

This methodological note provides detailed guidelines for the collection of internationally comparable data on revenue from, and investment in telecommunication services.<sup>1</sup> It covers three main indicators: (i) Revenue from telecommunication services; (ii) Revenue from mobile services; and (iii) Annual investment in telecommunication services. The methodology provided receives and complements the information on these indicators included in the ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT by integrating the definitions of the indicators used in 2012 within the ITU Expert Group on Telecommunications/ICT Indicators (EGTI),<sup>2</sup> as well as additional contributions from international organizations.<sup>3</sup> It also benefits from the agreement signed from 1992, 2012 global data collection of these indicators from operators' annual reports<sup>4</sup> and the lessons learned about the international harmonization of these data.

ITU has been collecting data on revenue from telecommunication services since 1962<sup>5</sup> and on investment in telecommunication services since 1962.<sup>6</sup> ITU data are collected through annual questionnaires sent to national administrations, and compile these indicators from operators, and aggregate the data at global level. Revenue and investment data provide an overview of the economic dimension of the telecommunication sector, its structure and the capital expenditure flow that underpin telecommunication development.

Revenue and investment data from telecommunication operators are widely available through operators' annual reports. In addition, data for the telecommunication sector aggregated at a national level are often collected by regulators or collected as part of their regular data collection exercises, and also made public. Even if not published, data are usually available internally through administrative records. Confidentiality issues will be most cases overcome by ensuring data confidentiality at an operator level and publishing only aggregate values for the sector. In those countries where unreported

<sup>1</sup> Throughout the document, the terms 'telecommunication' and 'telecommunication services' are used interchangeably.  
<sup>2</sup> Available at [http://www.itu.int/ITU-T/ict\\_indicators](http://www.itu.int/ITU-T/ict_indicators)  
<sup>3</sup> EGTI is ITU's expert group on indicators for the collection of administrative data on telecommunication/ICT (i.e. data collected from operators). It is open to all ITU Member States and experts in the field of ICT statistics and data collection. It works through an online discussion forum ([http://www.itu.int/ITU-T/ict\\_indicators](http://www.itu.int/ITU-T/ict_indicators)) and reports periodically back to the World Telecommunication/ICT Indicators Symposium (WTIIS).  
<sup>4</sup> The participating international organizations provided comments on this issue: the European Commission, IMF, OECD and UNCTAD.  
<sup>5</sup> In the field of revenue from mobile services, ITU has been collecting data since the mid 1990s. Revenue previously mobile services had little relevance in terms of revenues.



# Revenue from all telecommunication services

- Revenue from all telecommunication services refers to revenue earned from retail fixed-telephone, mobile-cellular, Internet and data services offered by telecommunication operators (both network and virtual, including resellers) offering services within the country during the financial year under review.
- It includes retail revenues earned from the transmission of TV signals
- It excludes revenues from TV content creation.
- Any deviation from the definition should be specified in a note, including clarifications on what TV revenues are included/excluded (e.g. IPTV, cable TV, pay satellite and free-to-air TV).



# Revenues

- Breakdowns: Total / mobile
- Main issues:



Additional breakdowns not comparable because of  $\neq$  revenue allocation

	INCLUDED
Retail revenues from residential customers	YES
Retail revenues from business customers	YES
<b>Wholesale revenues, e.g. interconnection revenues</b>	<b>NO</b>
Revenues from resellers and mobile virtual operators	YES
VAT and excise taxes	NO
Corporate taxes and administrative fees, e.g. numbering fees	YES (not to be deducted from total revenues)
Revenues from device sales and rents	NO
Revenues from added value services, e.g. premium SMS	YES



# Investment



- Since 1965, investment in telecommunication : 128 economies reported
- Only total investment →
- Definition of investment  
≈ gross fixed capital formation (as in SNA 2008)

Difficult to allocate investment to services

**investment** made by entities providing telecommunication networks and/or services (including fixed, mobile and Internet services, as well as the transmission of TV signals) **for acquiring or upgrading fixed assets (usually referred to as CAPEX) less disinvestment owing to disposals of fixed assets**

# Investment



- Main issues

	INCLUDED
Additions less disposals of tangible fixed assets	YES
Additions less disposals of intangible fixed assets	YES
Investment from national-owned operators in the country	YES
Investment from foreign-owned operators in the country	YES
<b>Investment from national-owned operators outside the country</b>	<b>NO</b>
<b>Licence fees</b>	<b>NO</b>
R&D expenditures	YES



# Definition of bundle

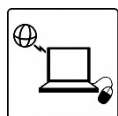
- A bundle is a prepaid or postpaid subscription meeting all of the following criteria:
  1. A commercial offer that includes two or more of the following services: fixed telephone, mobile voice, fixed broadband, mobile broadband, pay TV
  2. marketed as a single offer, with a single invoice and with a single price for the set of services included in the bundle
  3. subscribed under conditions that cannot be obtained by adding single play offers together

# ITU indicators on bundles

New indicators, collected from 2016:

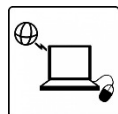


1. Subscriptions to fixed-broadband and fixed-telephone bundles



Subscriptions that include additional telecommunication services – such as triple play subscriptions including fixed telephony, fixed broadband and pay TV – should be excluded

2. Subscriptions to fixed-broadband, fixed-telephone and pay-TV bundles





# Quality of service (QoS)

- Fixed telephone:
  - Faults per 100 fixed-telephone lines per year
  - Percentage of fixed-telephone faults cleared by next working day
  
- Mobile-cellular services:
  - Mobile-cellular unsuccessful call ratio
  - Mobile-cellular dropped call ratio
  - Complaints per 100 mobile-cellular subscriptions
  
- Fixed broadband
  - Complaints per 100 fixed (wired)-broadband subscriptions
  - Service activation time for fixed (wired)-broadband service

# Mobile-cellular unsuccessful call ratio (i146u)



- *Mobile-cellular unsuccessful call ratio* refers to the ratio of unsuccessful mobile-cellular calls to the total number of mobile-cellular call attempts in a given year. An unsuccessful call is a call attempt to a valid number where (a) the call is not answered, (b) there is no called party busy tone, and (c) there is no ringing tone on the caller's side within 40 seconds from the moment when the last digit of the called number is received by the network. The caller must be within coverage of a mobile-cellular network.

# Mobile-cellular dropped call ratio (i146d)



- *Mobile-cellular dropped call ratio* refers to the proportion of incoming and outgoing mobile-cellular calls which, once they have been correctly established and therefore have an assigned traffic channel, are dropped or interrupted prior to their normal completion by the user, the cause of the early termination being within the operator's network.

# Complaints per 100 mobile-cellular subscriptions (i146c)



- *Complaints per 100 mobile-cellular subscriptions* refers to the number of complaints related to the provision of mobile-cellular services received in a given year, divided by the total number of active mobile-cellular subscriptions, multiplied by 100. Statistics should include all complaints related to the provision of mobile-cellular services (including voice, SMS and data) received in the given year, regardless of the validity and subject of the complaint. Where more than one complaint is made by the same customer on the same subject, each instance of the complaint should be counted separately. If a customer complains again before an existing complaint has been closed, then this should not be treated as a separate complaint, but as a continuation of the first unclosed complaint.



# Complaints per 100 mobile-broadband subscriptions (i146mw)



- *Complaints per 100 mobile-broadband subscriptions* refers to the number of complaints related to the provision of mobile-broadband services received in a given year, divided by the total number of active mobile-broadband subscriptions, multiplied by 100. Statistics should include all complaints related to the provision of mobile-broadband services received in the given year, regardless of the validity and subject of the complaint. Where more than one complaint is made by the same customer on the same subject, each instance of the complaint should be counted separately. If a customer complains again before an existing complaint has been closed, then this should not be treated as a separate complaint, but as a continuation of the first unclosed complaint.



# Complaints per 100 fixed (wired)- broadband subscriptions (i147c)



- *Complaints per 100 fixed (wired)-broadband subscriptions* refers to the number of complaints related to the provision of fixed (wired)-broadband services received in a given year, divided by the total number of fixed (wired)-broadband subscriptions, multiplied by 100. Statistics should include all complaints related to the provision of fixed (wired)-broadband services received in the given year, regardless of the validity and subject of the complaint. Where more than one complaint is made by the same customer on the same subject, each instance of the complaint should be counted separately. If a customer complains again before an existing complaint has been closed, then this should not be treated as a separate complaint, but as a continuation of the first unclosed complaint.

Service activation time for fixed (wired)-  
broadband service (in days) (i147t)



- *Service activation time for fixed (wired)-broadband service* refers to the time from the date of application to the date of service activation. The average service activation time for all new applications received within the given year should be provided.



# Telecommunications in ISIC 4

## Division 61

Telecommunications includes businesses that operate, maintain and provide access to telecommunication networks. Resellers of telecommunication services are also included.

→ Content & media sector



# Convergence

- Telecommunications or content and media sector?

## Rule:

If a business engages both in the creation of content and its distribution through telecommunication networks, revenue and investment data should be reported only for those activities that relate to the distribution of content, and exclude those that relate to the creation of content



# Persons Employed

- **Persons employed in full-time equivalents**

Persons employed in full-time equivalents refers to the total number of persons, in full-time equivalent (FTE) units, employed by telecommunication operators in the country for the provision of telecommunication services, including fixed-telephone, mobile-cellular, Internet and data services.

  - This indicator excludes staff working in broadcasting businesses that offer only traditional broadcasting services. Part-time staff should be expressed in terms of full-time staff equivalents (FTE).



# Persons Employed

- Persons employed by all telecommunication operators, female

Refers to the total female, in full-time equivalent (FTE) units, employed by telecommunication operators in the country for the provision of telecommunication services, including fixed, mobile and Internet services.

–This indicator excludes staff working in broadcasting businesses that offer only traditional broadcasting services.



# Persons Employed

## **Definition of Full-time equivalent:**

Full-time equivalent employment is the number of full-time equivalent jobs, defined as total hours worked divided by average annual hours worked in full-time jobs.

Source Publication: SNA 17.14[15.102.17.28]



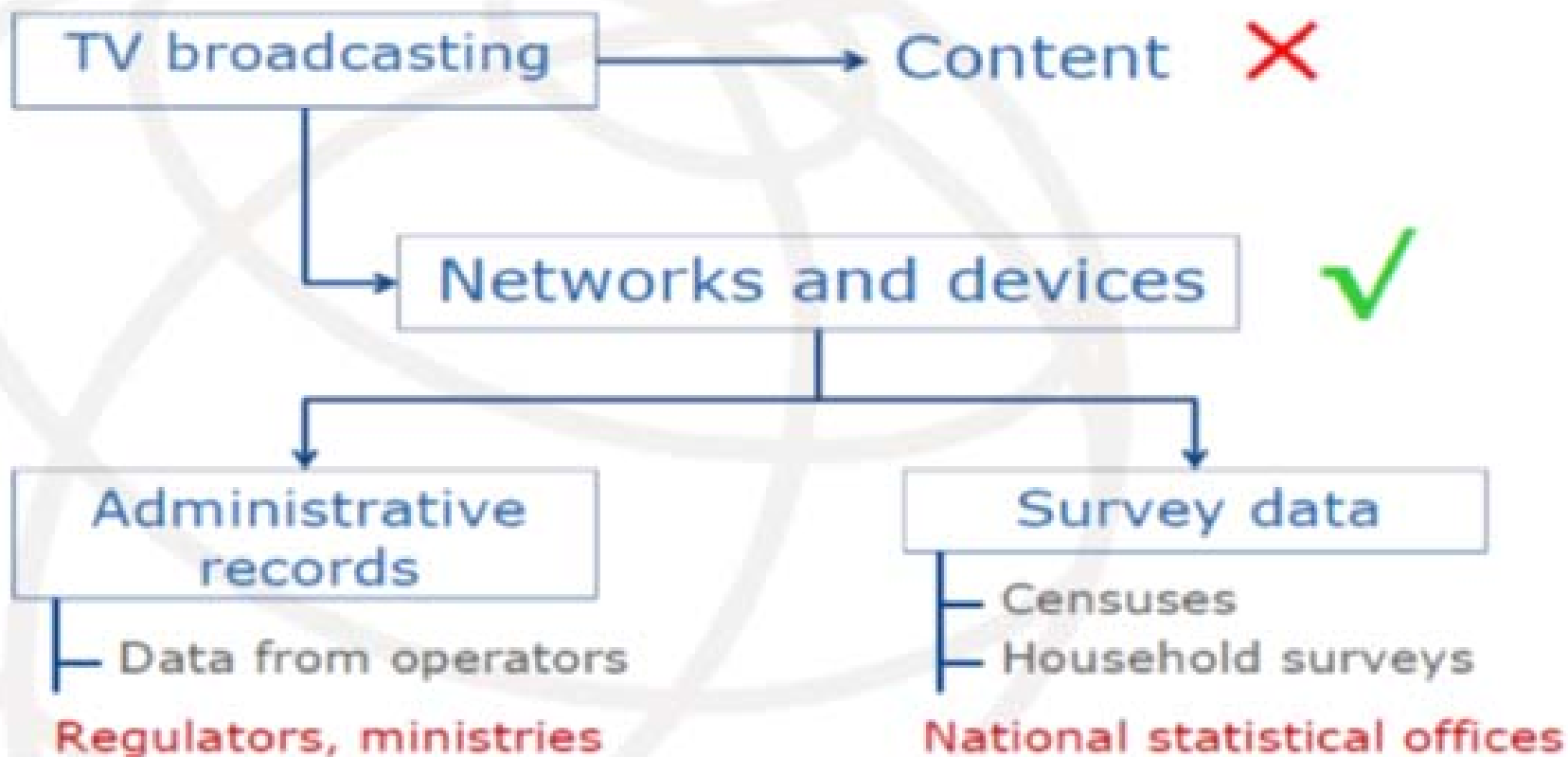


# Example calculation of FTE

- Full time and part time staff at a service provider works 24,960 hours in a given year. There are 2,080 working hours in that year.
- $FTE = 24,960 \div 2,080$  the result is 12 FTEs.
- ILO recommends recording total hours actually worked as the preferred measure of labour input; the use of full-time equivalents is likely to be gradually phased out.

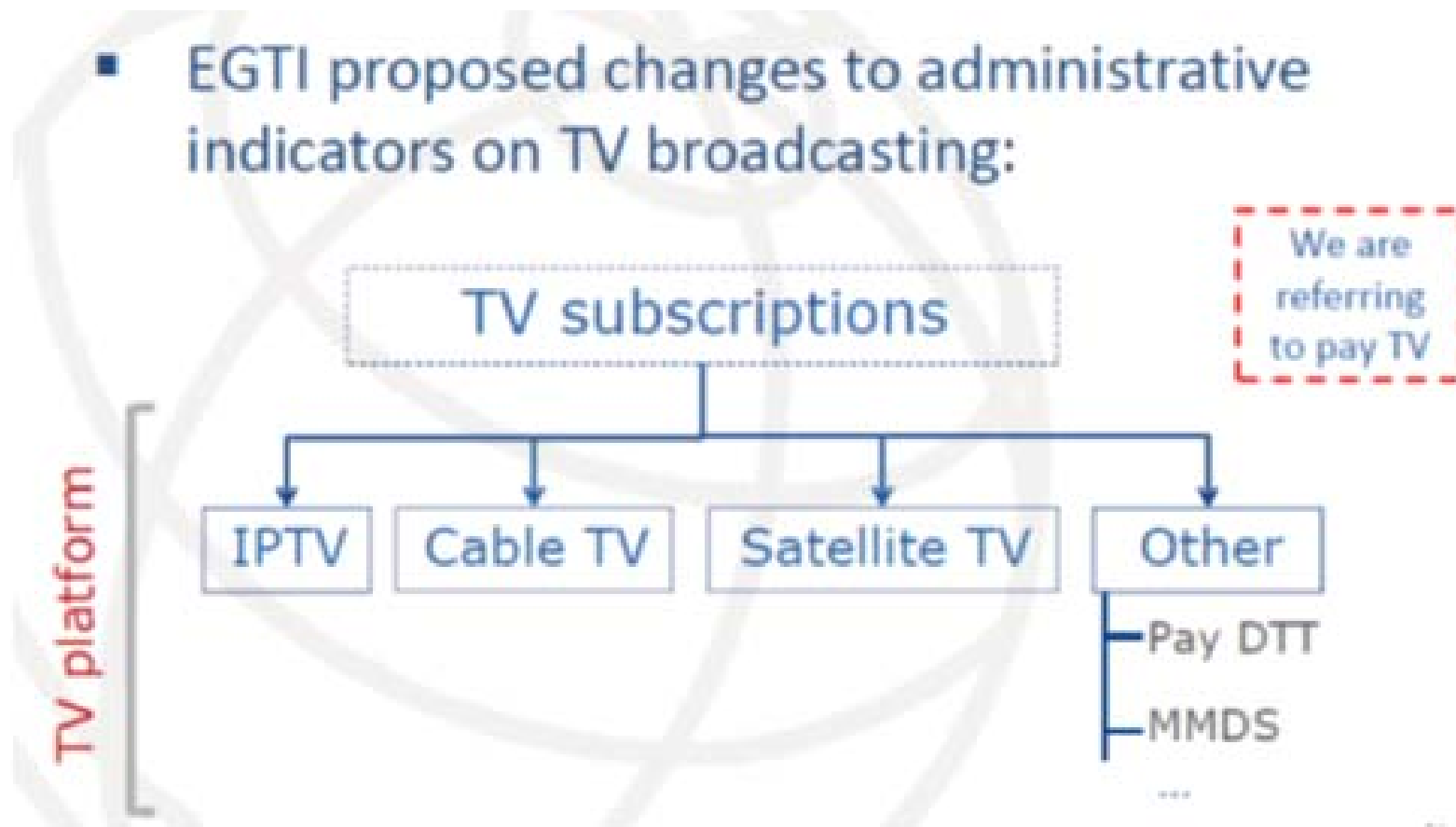
# Broadcasting

## ITU data on TV broadcasting



# TV broadcasting

- EGTI proposed changes to administrative indicators on TV broadcasting:





# IPTV subscriptions

- *IPTV subscriptions* refers to the number of subscriptions to Internet protocol television (IPTV), i.e. TV delivered over an IP-based network managed to support the required level of quality of service, quality of experience, security, interactivity and reliability.
- This does not include video accessed over the public Internet – for example, by streaming – and subscriptions to over-the-top audiovisual content providers.



# Cable-TV

- *Cable-TV subscriptions* refers to multichannel TV programming delivered over coaxial cable networks. It includes both
- analogue and digital cable-TV subscriptions. If the breakdown of analogue/digital cable-TV subscriptions is available,
- data for each type of cable-TV subscriptions should be specified in a note. It excludes IPTV delivered over cable-TV
- networks.



# Satellite TV subscriptions

- *Satellite-TV subscriptions* refers to the number of pay direct-to-home (DTH) satellite subscriptions, i.e. pay TV received via a satellite dish capable of receiving satellite television broadcasts.
- Does not include free-to-air satellite TV.



# Other TV subscriptions

- *Other TV subscriptions* refers to pay-TV subscriptions other than IPTV, satellite TV and cable TV. This includes subscriptions to TV platforms such as microwave multipoint distribution systems (MMDS) and pay digital terrestrial television (pay DTT).
- Free-to-air TV should not be included. The TV platforms corresponding to the data reported should be indicated in a note.