

HANDBOOK

for the Collection of Administrative Data on

Telecommunications/ICT

2011



**HANDBOOK FOR THE COLLECTION
OF ADMINISTRATIVE DATA ON
TELECOMMUNICATIONS/ICT**

2011



Original language of publication: English
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Place des Nations
CH-1211 Geneva, Switzerland

Foreword

It is a pleasure to present to you the *ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT*, produced by the International Telecommunication Union. The Handbook, which contains over 80 internationally agreed indicators to help track global ICT developments, is an important reference document for collecting and analysing data on the telecommunication services sector. It will help countries monitor their progress towards becoming information societies on the basis of international statistical standards, and thus contribute to improving analysis and benchmarking across countries.

ITU has a long history of collecting, harmonizing and disseminating statistics on telecommunications and ICTs, and is recognized as the prime source of internationally comparable data in this field. The first version of the ITU Handbook was published almost 20 years ago, in 1994. Since then, ICT indicators and definitions have undergone important amendments, reflecting a rapidly changing telecommunication/ICT environment in terms of technologies, market trends and regulations. Mobile-cellular technology, for example, was still at a nascent stage in 1994, with no more than 55 million mobile-cellular subscriptions worldwide, compared with almost 6 billion subscriptions by end 2011. Similarly, there were fewer than 20 million Internet users in 1994, and the only way to access the Internet was through a low-speed, dial-up connection. By end 2011, one-third of the world's population will be online – the majority through a high-speed, broadband connection. While there have been a number of revisions to the list of telecommunication/ICT indicators since its first publication, this Handbook is by far the most comprehensive version in terms of its scope and level of detail.

The expansion and revision of indicators over the last two decades reflects not only the changes in the telecommunication/ICT services sector, but also the fact that ICT developments have become a key feature in today's overall development debate. Some of the indicators included in this Handbook are part of a wider effort to monitor the information society. This includes the *Core List of ICT Indicators* of the *Partnership on Measuring ICT for Development*, and indicators to measure achievement of the World Summit on the Information Society (WSIS) targets. The Handbook also covers indicators included in other international development initiatives, including the Millennium Development Goals (MDGs).

ITU was founded on the principle of international cooperation between governments and the private sector. As in other areas, its statistical work benefits from its close collaboration with its Member States and Sector Members, as well as with regional and international organizations working in the area of ICT measurement. Their input and expertise over the years has allowed ITU to produce a set of harmonized and internationally comparable telecommunication/ICT statistics.

I am confident that this Handbook will become a key reference document for all those involved - directly or indirectly - in measuring the information society.



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Acknowledgements

The ITU *Handbook for the Collection of Administrative Data on Telecommunications/ICT 2011* was prepared by the ICT Data and Statistics Division of ITU's Telecommunication Development Bureau. The team included Susan Teltscher (Head of Division), Esperanza Magpantay, Vanessa Gray, Doris Olaya and Ivan Vallejo. Olivier Poupaert contributed to the data collection for the examples. An initial draft of the Handbook was prepared by Michael Minges and then consolidated by Sheridan Roberts, both consultants to ITU. The Handbook reflects the outcomes of the discussions of the ITU Expert Group on Telecommunication/ICT Indicators (EGTI), and helpful comments and suggestions on the draft text were received from several EGTI members. The work was carried out under the overall direction of Cosmas Zavazava, Acting Chief, Project Support and Knowledge Management Department, Telecommunication Development Bureau.

Various references were consulted and used for this publication. In particular, data published by national regulatory authorities, national statistical offices, ministries and operators were used to illustrate the various examples it contains. Other references used in this Handbook include materials from OECD, the Partnership on Measuring ICT for Development and the United Nations Statistics Division.

The report was edited by the ITU English Translation Section, led by Anthony Pitt. The desktop publishing was carried out by Nathalie Delmas, and the cover was designed by Céline Desthomas.

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Chapter 1. Introduction

1. The main purpose of this *Handbook for the Collection of Administrative Data on Telecommunications/ICT* is to provide a key reference document for a set of internationally comparable indicators on telecommunications/ICT based on administrative sources. The Handbook includes definitions and methodological clarifications for 81 internationally agreed indicators and corresponding sub-indicators. Indicators included in the Handbook refer mainly to telecommunication activities within the ICT services sector, and in some specific cases also to broadcasting activities within the content and media sector as defined in ISIC Revision 4.¹ The Handbook is primarily intended for data collectors, such as national telecommunication regulatory authorities (NRAs) or ministries.

2. The Handbook has evolved from the original *Telecommunication Indicators Handbook* issued by ITU in 1994.² Since then, there have been tremendous changes in the telecommunication sector, such as the enormous growth of mobile-cellular communications and the continuing development of the Internet. This Handbook reflects these developments, with indicators covering mobile-cellular and Internet networks and services in addition to the traditional public switched telephone network (PSTN) and fixed-telephony services. Convergence of networks, services and devices is also changing the way people access and use telecommunication services, and blurring the boundaries between traditionally distinct categories, such as broadcasting and telecommunication activities. The Handbook includes a set of indicators on broadcasting. If and when new developments in terms of convergence materialize, additional indicators may be needed to further track the phenomenon. The Handbook also reflects the growing importance of ICT in helping to implement national development strategies, with reference to indicators proposed for monitoring the Millennium Development Goals (MDGs),³ the targets of the World Summit on the Information Society (WSIS)⁴ and the core ICT infrastructure and access indicators of the Partnership on Measuring ICT for Development (see Table 1).⁵

3. The revision of existing indicators and the definition of new indicators are carried out in close consultation with the ITU membership and international experts. The annual ITU World Telecommunication/ICT Indicators Meeting (WTIM) provides a global forum for discussing emerging issues related to ICT measurement. In May 2009, the Expert Group on

¹ ISIC is the International Standard Industrial Classification of All Economic Activities. A small number of indicators may be covered by the category *Television programming and broadcasting activities* within the content and media sector in ISIC Rev. 4. More information on the classification of information economy activities within ISIC, Revision 4, can be found in Annex 4.

² ITU (1994), *Telecommunication Indicator Handbook*. For one of the earliest applications of telecommunication indicators, see: Tim Kelly (1990), *Performance Indicators for Public Telecommunications Operators*, OECD.

³ See *United Nations Millennium Development Goals* at <http://www.un.org/millenniumgoals>.

⁴ See ITU (2003), 'Plan of Action', *World Summit on the Information Society outcome documents*, Geneva, available at <http://www.itu.int/wsis/docs/geneva/official/poa.html>.

⁵ See *Partnership* (2010), *Core ICT Indicators*, available at <http://www.itu.int/ITU-D/ict/coreindicators/index.html>.

Telecommunication/ICT Indicators (EGTI) was created. EGTI, which is open to ITU members and ICT experts, works through an online discussion forum. It has a mandate to revise the ITU telecommunication/ICT indicators, and reports back to WTIM. The indicators included in this Handbook have been subject to, and reflect the outcomes of, discussion in EGTI.

4. Administrative statistics form the basis of the indicators discussed in this Handbook. They cover operational, technical and financial data from operating entities in the telecommunication services sector, and also some operational data from entities engaged in broadcasting activities. The indicators cover numbers of subscriptions, minutes of usage and revenues generated from the provision of telecommunication/ICT services, as well as subscription data for some television broadcasting services. These data are usually collected by government agencies (NRAs or ministries), which then compile the statistics to produce country-level indicators.

5. The types of indicators in this Handbook are different from statistics collected from ICT users, often through household or business surveys. Such surveys collect information on the ownership or use of ICTs within households and businesses or by individuals.⁶

6. The advantage of administrative statistics is that they are usually readily available for a large number of countries. They are also generally up to date and relatively inexpensive to produce, as they are based on administrative records. On the other hand, administrative data do not necessarily provide as accurate an insight into usage as survey data. For example, subscription indicators can include inactive or duplicate accounts that may provide a misleading interpretation of penetration; this is not a problem with survey data, where respondents are specifically asked if they have used a service. A particular advantage of survey data is that they may be tabulated by respondent characteristics, thus providing important additional information. Data may be classified by individual demographic characteristics (such as age and gender), household characteristics (such as number of members) and business characteristics (such as size and industry).

⁶ For information about core ICT indicator data for households and individuals, see ITU (2009), Manual for Measuring ICT Access and Use by Households and Individuals. For information about core ICT indicator data for businesses, see UNCTAD (2009), Manual for the Production of Statistics on the Information Economy.

Table 1. Telecommunication indicators in global development agendas

	MDGs	WSIS*	Partnership on Measuring ICT for Development
International goals, targets and frameworks	GOAL 8, Target 18F: In cooperation with the private sector, make available benefits of new technologies, especially information and communications	Indicators suggested to track the ten WSIS targets (Plan of Action, B: Objectives, goals and targets)	Core ICT indicators on ICT infrastructure and access
Indicators covered in this Handbook	<ul style="list-style-type: none"> • 8.14: Fixed-telephone lines per 100 population • 8.15: Mobile-cellular subscriptions per 100 population 	<ul style="list-style-type: none"> • Target 1: Proportion of rural population covered by a mobile-cellular telephone network • Target 10: Mobile-cellular subscriptions per 100 inhabitants 	<ul style="list-style-type: none"> • A1: Fixed-telephone lines per 100 inhabitants • A2: Mobile-cellular telephone subscriptions per 100 inhabitants • A3: Fixed-Internet subscribers per 100 inhabitants • A4: Fixed-broadband Internet subscribers per 100 inhabitants • A5: Mobile-broadband subscriptions per 100 inhabitants • A6: International Internet bandwidth per inhabitant • A7: Percentage of the population covered by a mobile-cellular telephone network • A8: Fixed-broadband Internet access tariffs per month • A9: Mobile-cellular telephone prepaid tariffs per month

*Note: The WSIS *Plan of Action* does not specify quantitative indicators for the targets. The indicators shown here are those proposed in Partnership on Measuring ICT for Development (2011), *Measuring the WSIS Targets: A statistical framework*, ITU, Geneva, available at: <http://www.itu.int/ITU-D/ict/partnership/wsistargets/index.html>.

7. The remainder of this Handbook is structured as follows: Chapter 2 discusses issues related to the collection, compilation and dissemination of indicators. Chapter 3 presents each indicator and provides definitions, along with clarifications on the definitions and terms used, scope, method of collection, relationship with other indicators, methodological issues and examples. Annex 1 provides a summary table of the indicators and their relationships. Annex 2 shows a list of indicators previously collected by ITU and not included in this Handbook. Annex 3 is a list of useful terms and abbreviations, and Annex 4 presents the ISIC Rev. 4 breakdown of sectors and activities pertaining to the information economy.

Chapter 2. Data collection, compilation and dissemination

8. This chapter provides guidance on the methodological and technical aspects of collecting, compiling and disseminating telecommunication/ICT indicators (Figure 1). It is aimed at agencies responsible for these tasks, but should also be useful for others interested in the underlying concepts and statistical challenges associated with the indicators. The range of stakeholders involved in processing or using these indicators is shown in Figure 2.

Figure 1. Indicator processing cycle

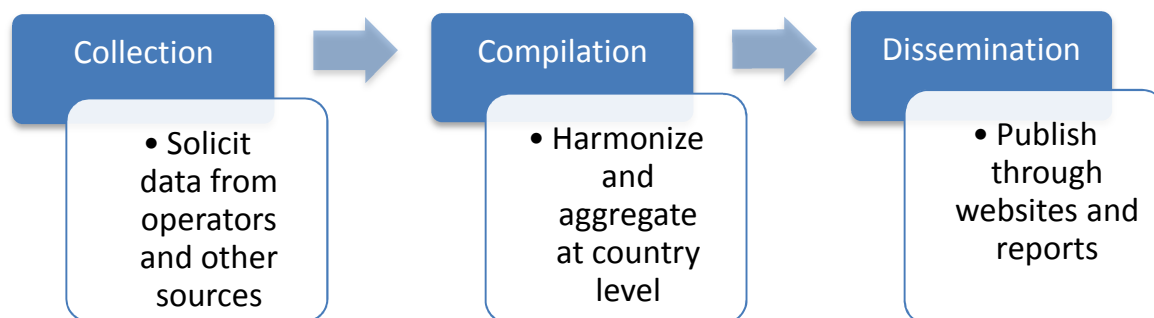
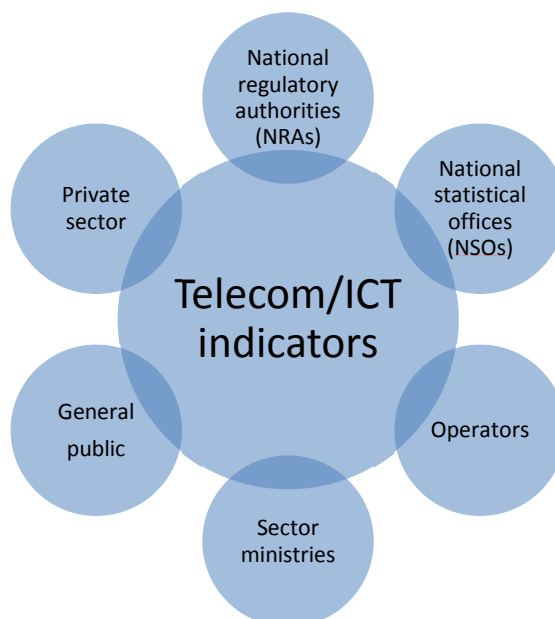


Figure 2. Telecommunication/ICT indicators stakeholders



Source: ITU.

9. *Operators* in Figures 1 and 2 refer to service providers, including fixed- and mobile-telephone operators, Internet service providers, and some television broadcasters.

Data collection

Responsibility

10. In most countries, the national telecommunication regulatory authority (NRA) is responsible for collecting, compiling and disseminating statistics covering the telecommunication/ICT services sector. This typically arises out of the authority's mandate to regulate, analyse and monitor the sector (Box 1). In some countries, sector ministries or national statistical offices (NSOs) are responsible for collecting telecommunication/ICT indicators based on administrative sources.

11. One advantage of the NSO collecting the data is that it has the statistical skills and other resources necessary to compile and manage data that may be lacking in the NRA. Another consideration is that the NSO may collect survey-based ICT data that can be integrated with the telecommunication/ICT indicators to provide a holistic view of the country's ICT status.⁷ This is the case in Mauritius, where the Central Statistics Office disseminates an annual report with ICT statistics.⁸ The report features administrative data on infrastructure, survey-based data on household ownership and usage as well as economic and trade-related ICT statistics.

12. The sector ministry may also play an important role in some countries in respect of telecommunication/ICT data compilation and analysis. A ministry might draw in data from other sources to provide a comprehensive portrait of the status of ICT in the country. In Egypt, for instance, the NRA collects basic telecommunication network statistics, whereas the Ministry of Communications and Information Technology (MCIT) produces monthly data, quarterly bulletins and annual reports that are wider in scope, with analyses of trends and progress towards sector goals. An example is the MCIT Yearbook.⁹

13. Regardless of responsibility, there should be close collaboration between the sector ministry, the NRA and the NSO. This is necessary for several reasons. First, the ministry and NRA are likely to be aware which telecommunication/ICT infrastructure indicators are important and should be collected. Second, even if the NRA collects the data, the NSO's statistical expertise can be very valuable. Third, the NSO may collect ICT household and individual usage data through surveys that can be complemented by – and often combined with – the telecommunication/ICT data from administrative sources.

⁷ Note that in some countries, in the absence of ongoing ICT surveys by the NSO, NRAs commission household and individual ICT access/use surveys. For example, in Malaysia, the NRA carries out Internet and mobile surveys (see http://www.skmm.gov.my/index.php?c=public&v=art_view&art_id=190); in Chile, the NRA commissions consumer surveys (see http://www.subtel.cl/prontus_subtel/site/artic/20100205/pags/20100205163927.html#T0); and in the United Kingdom, a quarterly tracking survey is carried out by the NRA (see <http://stakeholders.ofcom.org.uk/market-data-research/market-data/consumer-experience-reports/ce09/>).

⁸ Central Statistics Office (Mauritius) (2010), *Information and Communication Technologies (ICT) statistics, 2009*, available at: <http://www.gov.mu/portal/goc/cso/ei846/toc.htm>.

⁹ See <http://www.mcit.gov.eg/DocDetails.aspx?ID=434>. For more examples, see the Ministry's ICT Indicators portal at <http://www.mcit.gov.eg/Indicators.aspx>.

Box 1. Legal basis for information collection and dissemination, Malaysia

Malaysia's ICT sector laws establish the legal basis for the national regulatory authority, the Malaysian Communications and Multimedia Commission (MCMC), to collect and disseminate ICT sector information.

Under Section 73 of the *Communications and Multimedia Act 1998* (incorporating amendments up to 1 January 2006), MCMC is allowed to obtain information necessary for carrying out its functions:

73. (1) This section applies to any person if the Commission has reason to believe that the person -

(a) has any information (including but not limited to accounts and records) or any document that is relevant to the performance of the Commission's powers and functions under this Act or its subsidiary legislation; or

(b) is capable of giving any evidence which the Commission has reason to believe is relevant to the performance of the Commission's powers and functions under this Act or its subsidiary legislation.

(2) Notwithstanding the provisions of any other written law, the Commission may, by a written notice, direct any person -

(a) to give the Commission, within the period and in the manner and form specified in the notice, any such information;¹⁰

Furthermore, Section 80 of the Act gives MCMC the right to publish information received in regard to executing its duties:

80. (1) The Commission may publish information received in the course of exercising its powers and functions under this Chapter if it is satisfied that the publication is consistent with the objects of this Act.¹¹

Sources

14. Telecommunication operators, Internet service providers (ISPs) and broadcasters compile statistical information to support their operational, technical, billing, marketing and financial activities. For example, subscription and traffic information is used to generate invoices, which are in turn aggregated to derive revenue. Publicly listed operators publish varying degrees of statistical information in operating reports.

15. NRAs maintain a register of licences that can be used to identify sources of telecommunication/ICT indicators. One challenge is defining the scope of operators as information sources. For example, a country may have resellers of ICT services, such as companies that purchase wholesale capacity from facilities-based operators in order to provide fixed-telephone, mobile or Internet services. In this Handbook, data refer to the retail level – the reselling activity in this example. In countries where ISPs can operate without a licence, data collection is more difficult. Nevertheless, there is generally some type of administrative application required to provide Internet access and this could be exploited for information purposes.

16. Occasionally, operators express confidentiality concerns about the data being collected. In such cases, the NRA may guarantee the non-disclosure of disaggregated data. In the case of publicly listed operators, much of the information solicited is similar to data reproduced in the company's operating reports. In the case of state-owned operators, the government owners should have access to information about operations.

17. Making the data requirement provisions of the law clear to operators when they accept their licence can minimize confidentiality concerns. For example, in many countries the right of NRAs to solicit information is embedded in telecommunication law or licence conditions.

¹⁰ Section 73, "Provision of information" in *Communications and Multimedia Act 1998, Incorporating all amendments up to 1 January 2006*, available at http://www.skmm.gov.my/link_file/the_law/NewAct/Act%20588/Act%20588/a0588s0073.htm.

¹¹ Section 80, "Provision of information" in *Communications and Multimedia Act 1998, Incorporating all amendments up to 1 January 2006*, available at http://www.skmm.gov.my/link_file/the_law/NewAct/Act%20588/Act%20588/a0588s0073.htm.

Confidentiality can also be addressed by aggregating data and not disclosing the data of individual operators. The NRA should meet with stakeholders to explain why data are needed and emphasize the benefits to operators in terms of their understanding of the industry in which they work.¹² NRAs can also point to the indicators available from other countries as evidence that the information being requested is not generally considered confidential, at least at the aggregate level.

18. Data are sometimes available from industry associations. This ensures consistency, since each operator supplies data to the association in the same form. The data are often more timely than those produced by government agencies. The drawback is that the indicators tend to cover only one market segment, thus requiring collection from additional sources to obtain a comprehensive picture of the telecommunication service sector. Definitions may also not be exactly the same as those used by official national or international agencies. Nevertheless, industry associations can be a timely and detailed source of information and may also allay operators' confidentiality concerns.

19. There are several examples of industry associations compiling data, primarily emanating from the mobile sector. For example, the Canadian Wireless Telecommunications Association (CWTA) publishes quarterly data on mobile subscriptions in Canada, broken down by operator and between prepaid or postpaid.¹³ In Japan, the Telecommunications Carrier Association (TCA) compiles comprehensive monthly data on the mobile sector, as well as annual reports on the overall telecommunication market.¹⁴

Periodicity

20. Telecommunication/ICT indicators are structured as time series. Each observation in the series refers to a specific date or time period (e.g. monthly, quarterly, semi-annual, annual) and ideally should be maintained in this structure to support trend analysis. The indicators in this Handbook generally refer to annual data, ideally sufficiently consistent to enable the construction of time series (i.e. a set of comparable observations over time).

21. There may be reasons for compiling data on a more frequent (sub-annual) basis. The ICT sector is dynamic, with some segments growing rapidly and warranting more frequent measurement. Shorter time intervals also generally reduce the timeliness gap. Among NRAs that produce statistics on a sub-annual basis, quarterly is the most frequent period. This is also consistent with the practices of publicly listed operators, which generally report to their shareholders on a quarterly basis. A few NRAs produce indicators on a monthly or semi-annual basis.

22. Data may be point-in-time (e.g. counts at a particular date) or cover a period (e.g. revenue for a given year). Revenue, investment, portability, quality of service and traffic indicators included in this Handbook refer to annual data, while the remaining indicators

¹² Indeed, a number of operators rely on NRA data to provide overall market information in their operating reports. For example, see Singapore Telecommunications Limited (2011), *Management discussion and analysis of financial condition, results of operations and cash flows for the fourth quarter and year ended 31 March 2011*, available at <http://www.optus.com.au/dafiles/OCA/AboutOptus/MediaCentre/SharedStaticFiles/SharedDocuments/4thqtr1011-mda.pdf>.

¹³ See <http://www.cwta.ca/CWTASite/english/industryfacts.html>.

¹⁴ See <http://www.tca.or.jp/english/database/index.html>.

correspond to point-in-time data. The Handbook assumes that point-in-time data are provided in respect of the end of the calendar year (i.e. 31 December) and that period data refer to the year ending 31 December. Some countries report period and/or point-in-time data on the basis of a year not ending on 31 December. Where this is the case, countries should specify this in a note along with the date/time period to which the data refer. The data should be disseminated closest to the end of the year to which they refer (e.g. fiscal year data ending 31 March should be published as the previous year with a note stating that the data refer to the year beginning 1 April).

Compilation

23. In most countries, telecommunication/ICT administrative statistics are solicited from operators, typically through questionnaires. The data are then aggregated to generate country-level data. National data may also feature breakdowns by operator or by geographical unit. The former allow market-share analysis to be conducted, while the latter support analysis of the dispersion of networks and services throughout different regions of a country. Different network statistics may also be aggregated to generate overall totals, such as adding together fixed-telephone and mobile-telephone traffic to obtain total telephone traffic for the country.

24. The agency responsible for the data collection at the national level may use separate questionnaires for each type of network (e.g. fixed-telephone line, mobile). Questionnaires should also ask about several reference periods in case operators need to make revisions to previous data. In the case of Luxembourg, the NRA has different questionnaires for fixed-telephone, mobile and broadcast networks, which are downloadable from its website.¹⁵

25. A particular compilation issue relates to indicators that are derived or calculated. In this Handbook, most indicators refer to a base number which may then be used to derive another indicator. For example, the Handbook defines the number of mobile-cellular subscriptions; this statistic can then be used to calculate the number of mobile-cellular subscriptions per 100 inhabitants. Derived indicators are identified in Chapter 3, which also addresses compilation issues for other relevant indicators.

Disaggregation by operator

26. Disaggregation of data by operator allows market-share analysis to be conducted. This can be necessary, for example, to make a significant market power (SMP) determination.¹⁶ When an operator is declared to have SMP in a market, it is usually subject to different regulatory treatment.

27. Another use of operator market-share data is to measure concentration. The Herfindahl-Hirschman index (HHI) is a widely used indicator of market concentration.¹⁷ The HHI is constructed by adding up the squares of the market shares of each operator. Its value ranges between zero and 10 000 – the closer the HHI is to zero, the less concentrated the market. The

¹⁵ Institut Luxembourgeois de Régulation, “Communications électroniques > Statistiques > Questionnaires ILR”, http://www.ilr.public.lu/communications_electroniques/statistiques_new/questionnaires_ILR/index.html.

¹⁶ See <http://www.ictregulationtoolkit.org/en/Section.1711.html#Dominance>.

¹⁷ ICT Regulation Toolkit, *Quantitative Tests for Market Power*, <http://www.ictregulationtoolkit.org/en/PracticeNote.2880.html>.

HHI was used in a case before the Chilean competition authority, with the market shares of mobile operators' revenue used to derive the HHI (see Table 2).¹⁸

Table 2. Participation by revenues in the national mobile telephone market, Chile, September 2006

Company	Market share (%)	Market share squared
TEM	45.4	2 061
ENTEL PCS	38.4	1 475
Claro	16.2	262
HHI		3 798

Source: Adapted from *Fiscalía Nacional Económica*, Chile.

28. Market-share information is also useful to construct weighted averages for indicators that do not lend themselves to aggregation or simple averaging (e.g. pricing data). A particular instance is the calculation of average mobile interconnection rates for countries by weighting each operator's rate according to the number of subscriptions.¹⁹

Disaggregation by administrative unit

29. Some NRAs present telecommunication/ICT indicators at the level of administrative units within the country, such as provinces or states. This allows data to be analysed for disparities between different geographic regions. Countries also sometimes provide a more general disaggregation between urban and rural areas. Information that lends itself well to this kind of analysis is data on fixed networks, where the subscribers are known and their locations are fixed. It has been more problematic to provide a breakdown by administrative unit for mobile networks, particularly because of a lack of information about prepaid subscriptions. This is changing to the extent that prepaid registration requirements are being adopted by countries.

30. One use of geographic breakdowns is to monitor the spread of telecommunication/ICT networks and services. This might be tied to specific regulatory remedies for reducing disparities. In Malaysia, for example, universal service assistance for broadband access is available for underserved areas; these are defined as areas where the penetration rate for broadband subscriptions is below the national rate.²⁰ The NRA in Malaysia publishes broadband subscriptions based on residential or business use, thus allowing it to compile the ratio of residential broadband subscriptions per 100 households per state.²¹ This determines which states would be eligible for universal service support.

¹⁸ Fiscalía Nacional Económica (2007), *Requerimiento en contra de Telefónica Móviles de Chile s.a., Telefónica Móviles Chile s.a., Claro Chile s.a., y Entel Pcs Telecomunicaciones s.a., por exclusión de operadores móviles virtuales*, 14 August, available at [http://mailweb.fne.gob.cl/db/jurispru.nsf/f81156e731dc3a808425733e005de0c3/60948D06182891A084257348005C4114/\\$FILE/OMV.pdf](http://mailweb.fne.gob.cl/db/jurispru.nsf/f81156e731dc3a808425733e005de0c3/60948D06182891A084257348005C4114/$FILE/OMV.pdf).

¹⁹ For example, the Body of European Regulators for Electronic Communications (BEREC) uses the market shares of operators (based on subscriptions) to calculate average mobile interconnection rates for countries. See *MTR Benchmark snapshot (as of January 2010)*, http://www.erg.eu.int/documents/berec_docs/index_en.htm.

²⁰ MCMC, *Universal Service Provision Pushing Broadband to Communities*, myBroadband, September 2009, available at <http://www.skmm.gov.my>.

²¹ MCMC, *Communications and Multimedia: Selected Facts and Figures Q4 2010*, available at <http://www.skmm.gov.my>.

Dissemination

31. There are a number of ways that telecommunication/ICT indicators are disseminated. These include national regulatory or ministry websites and published reports. Some countries opt only to send data to international organizations for dissemination. However, this may lack the context and commentary that is associated with national reporting. Furthermore, there may be some indicators not considered in international lists that are relevant to the country. As noted earlier, disaggregation at the operator or country level also serves important analytical purposes. Periodicity and timeliness are relevant, too. Some countries strike a balance between periodicity and detail, with frequent online updates to a few indicators on a website and more detailed analytical reports on a less frequent basis.

32. Hong Kong (China) is a good example of best practice of using different methods to disseminate indicators. Its NRA, the Office of the Telecommunications Authority, publishes monthly data for key indicators on its website and also has a webpage listing key annual data (see also Table 3).²² Its NSO, the Census and Statistics Department, issues the annual bilingual *Hong Kong as an Information Society* report, which draws together a variety of statistics from different sources.²³ These feature telecommunication/ICT indicators, including a summary of core ICT indicators (Table 4).

Table 3. Telecommunication indicators for Hong Kong (China), fiscal year ending 31 March 2010

Demography, economy

Population	7.033 million
Households	2.311 million

Telephone network

Main telephone lines in operation	4.19 million
% digital main lines	100%
% residential main lines	56.33%
Public payphones	4 797

Mobile services

Cellular-mobile telephone subscribers	12.597 million
Digital cellular subscribers	12.597 million
Percentage of population (%)	178.9%

²² See <http://www.ofta.gov.hk/en/datastat/main.html>.

²³ See http://www.censtatd.gov.hk/products_and_services/products/publications/statistical_report/commerce_and_industry/index_cd_B1110006_dt_detail.jsp.

Other services

ISDN subscribers	10 899
ISDN B channel equivalents	80 074

Traffic

International outgoing telephone (minutes)	7.8 billion
International incoming telephone (minutes)	2.305 billion
International both-way telephone (minutes)	10.105 billion

Staff

Full-time telecommunication staff	17 437
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Tariffs

Connection fee for residential telephone service (HKD)	0
Connection fee for business telephone service (HKD)	0
Monthly subscription for residential telephone service (HKD)	66
Monthly subscription for business telephone service (HKD)	88

Revenue

Total telecom services revenue (HKD) (for the period from 1 Jan to 31 Dec 2009)	57.093 billion
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Capital Expenditure

Annual telecom investment (HKD) (for the period from 1 Jan to 31 Dec 2009)	6.273 billion
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Broadcasting

Terrestrial multi-channel TV subscribers	2 983 132
Home satellite antennas	14 200

Source: Adapted from OFTA.

Table 4. Core Indicators on ICT infrastructure and access, Hong Kong (China), 2010

ICT infrastructure and access	2010
Number of fixed-telephone lines per 100 population	60.0
Number of public mobile subscriber units per 100 population	189.0
Fixed-Internet subscribers per 100 population	40.4
Fixed-broadband Internet subscribers per 100 population	30.0
Mobile-broadband subscriptions per 100 population	74.0
International Internet bandwidth per person (kilobits per second (kbit/s))	616.9
% of population covered by mobile-cellular telephone network	100.0
Average mobile-cellular tariffs (100 minutes of use per month) (HKD)	10.5
Internet access tariffs (per month) (HKD)	
Dial-up modem	68.0
Fixed broadband	123.0
% of localities with public Internet access centres	100.0

Source: Adapted from Census and Statistics Department, Hong Kong (China).

33. Another good example is Mauritius, which has created the Mauritius ICT Indicators Portal, a dedicated website for ICT statistics.²⁴ This initiative is an outcome of the country's National ICT Strategic Plan (NICTSP) 2007-11, and the portal features 147 indicators grouped into seven categories.

34. Regional and international entities collect and disseminate telecommunication/ICT indicators. Inter-country comparisons are facilitated because the data have been collected using common standards and are accessed via a standard interface. Eurostat, the statistical office of the European Union, provides many telecommunication/ICT indicators for member countries in its online database.²⁵ OECD has a dedicated portal for broadband indicators.²⁶ Information on the dissemination of telecommunication/ICT indicators by ITU can be found below.

Role of ITU in the collection and dissemination of telecommunication/ICT data

35. ITU collects, verifies and harmonizes telecommunication/ICT data from about 200 economies worldwide. There are three key sets of data that ITU collects directly from countries:²⁷

- Telecommunication/ICT infrastructure and access data – collected from national telecommunication/ICT ministries and regulatory authorities. These administrative data are collected based on indicators included in this Handbook.
- Data on household access to, and individual use of, ICTs – collected from national statistical offices (NSOs). These survey data are collected based on the indicators defined in the *ITU Manual for Measuring ICT Access and Use by Households and Individuals* (ITU, 2009). Therefore, these indicators are not covered in this Handbook.

²⁴ See <http://www.gov.mu/portal/sites/indicators/index.html>.

²⁵ See http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/database.

²⁶ See <http://www.oecd.org/sti/ict/broadband>.

²⁷ For more information on ITU questionnaires and their collection periods, see <http://www.itu.int/ITU-D/ict/datacollection/>.

- Tariff (or price) data – collected from national telecommunication/ICT ministries and regulatory authorities (covering retail prices for fixed-telephony, mobile-cellular and fixed-broadband services). These data are collected based on indicators included in this Handbook.

36. ITU disseminates ICT statistics in a number of ways, such as via the World Telecommunication/ICT Indicators (WTI) Database and the public website ICT Eye.²⁸ Additionally, ITU publishes regional and global reports that benchmark ICT developments and provide further dissemination of the data collected, such as for instance the *Measuring the Information Society* reports or the *Yearbook of Statistics*. ITU also contributes to the monitoring of internationally agreed goals and targets (such as the MDGs and the WSIS targets) through the collection and dissemination of key ICT indicators.

37. ITU standardizes and reviews indicators in close cooperation with other regional and international organizations and bodies, including the United Nations, Eurostat, OECD and the Partnership on Measuring ICT for Development. The World Telecommunication/ICT Indicators Meeting (WTIM) is organized annually by ITU to discuss pertinent issues related to ICT measurement.

38. In order to further advance in the harmonization of international telecommunication/ICT indicators, the ITU Expert Group on Telecommunication/ICT indicators (EGTI) was created in May 2009 (see Chapter 1). EGTI is a working party open to ITU members and ICT experts; it has a mandate to review, revise and finalize the ITU telecommunication/ICT indicators and reports back to WTIM.

39. This Handbook is a major output of the international review process; its role is to harmonize telecommunication/ICT indicator definitions, thereby promoting the availability of internationally comparable data.

²⁸ See <http://www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx>

Chapter 3. Indicators

40. This chapter presents 81 internationally agreed indicators and sub-indicators. The indicators are structured on the basis of type of network, traffic, tariffs, quality of service, persons employed, revenue, investment, public access, broadcasting and other.

41. Information provided for each indicator includes:

- Definition of the indicator
- Clarifications and scope
- Method of collection
- Relationship with other indicators
- Methodological issues
- Relevant examples.

42. Most of the indicators are base indicators presented in their raw form. In some instances, they are aggregations of other indicators, in which case the latter are identified under the heading *Relationship with other indicators*. Indicators that are often used in ratios to make cross-country comparisons are identified, along with the relevant derived indicator. The core ICT indicators identified by the *Partnership on Measuring ICT for Development* are highlighted.

43. For many of the indicators, examples are given from different national sources, illustrating the range and variety of ways in which they are compiled. It is hoped that the indicators as defined will facilitate comparisons and provide a methodology for countries to compile and disseminate their data.

44. Indicators are grouped under the following broad headings:

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

45. Many of the indicators refer to active lines or subscriptions. Active subscriptions are postpaid or *active* prepaid subscriptions, and are defined for fixed-telephone, mobile-cellular

telephone and wired and wireless Internet subscriptions. The meanings of ‘active’ are as follows:

- Active fixed-telephone subscription, prepaid – used at least once in the last three months
- Active mobile-cellular telephone subscription, prepaid – used at least once in the last three months (for making or receiving a call or carrying out a non-voice activity such as sending or reading an SMS or accessing the Internet), using the number assigned, over the mobile-cellular network
- Active fixed (wired) narrowband (dial-up) subscription – used to connect to the Internet at least once in the last three months
- Active wireless narrowband and broadband Internet subscription, prepaid – used to make a data connection using Internet protocol (IP) in the last three months.

46. The difference between subscriptions, users and household access should be noted. A single user can have more than one subscription, and several users can use the same subscription (for example, within a household). A household may have access to a technology, for example, fixed-broadband Internet. However, the subscription to the service may be shared with another household, and a household may have more than one subscription. Residential and commercial subscriptions cannot always be separately identified.

47. Countries will differ on the classification of some indicators (e.g. whether mobile-broadband is categorized under mobile or Internet) and may rearrange the indicator structure to suit their needs.

48. Given the continual evolution of the ICT sector and the growing impact of convergence on the way services are provided, this list of indicators will inevitably undergo revision.

Fixed-telephone networks

49. Fixed telephony is one of the oldest telecommunication networks, with a 125-year history. It has been a key focus of telecommunication statistics for many years. Fixed-telephone penetration was plotted against GDP to create the renowned Jipp Curve in 1963.²⁹ ITU launched its *Yearbook of Common Carrier Statistics* in 1972, featuring a number of telephone network indicators.³⁰ In 1985, *The Missing Link* report proposed bringing “... all mankind within easy reach of a telephone by the early part of the next century.”³¹

50. The public switched telephone network (PSTN) has traditionally used twisted-pair copper wire to connect a subscriber to a telephone exchange, where calls are switched and routed to their destination. Over time, the PSTN has evolved to support digital services using integrated services digital network (ISDN) technology, dial-up Internet access and fixed-broadband Internet access based on digital subscriber line (DSL) technologies. Another development has been fixed wireless or wireless local loop (WLL) where, instead of using a copper wire to connect the subscriber to the telephone exchange, radio technology is used. Fixed-telephone services are also offered by cable television operators and, more recently, over broadband networks using Internet protocol (IP) technologies (see Figure 3).

²⁹ Jipp, A. (1963), *Wealth of nations and telephone density*, *Telecommunications Journal*, July 1963, pp. 199-201.

³⁰ CCITT Recommendation C.1, *Yearbook of Common Carrier Statistics* (Geneva, 1972).

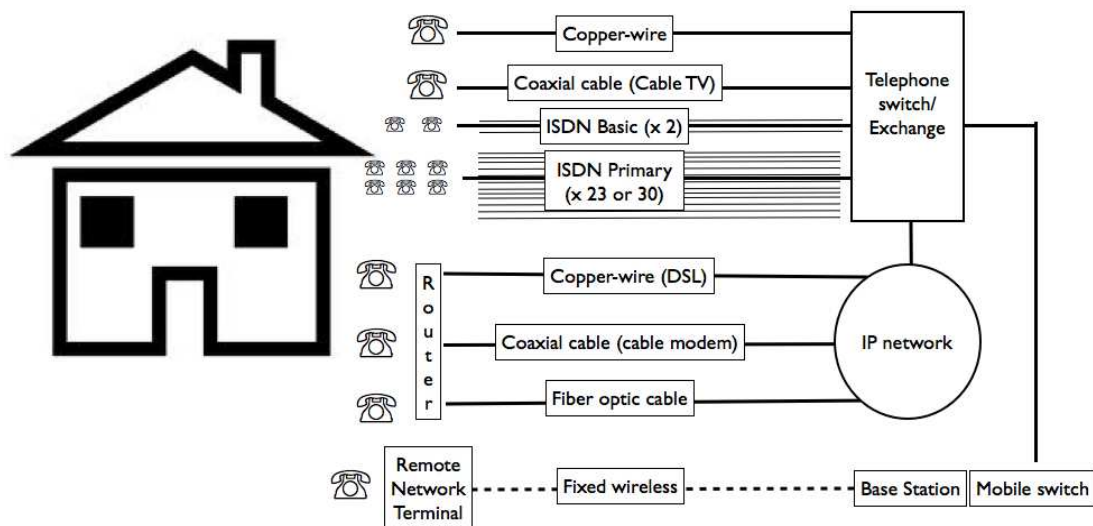
³¹ Independent Commission for World-Wide Telecommunications Development (1985), *The Missing Link*.

51. This evolution has affected the way the fixed-telephone network is conceptualized, measured and analysed. On the one hand, there is a *physical* aspect, where the focus is on the use of wire to provide telephone services. On the other hand, there is a *services* aspect, where the focus is on different telecommunication services delivered over a fixed infrastructure. These developments have introduced methodological issues that cannot always be easily resolved. The indicators in this category strike a compromise by disaggregating the various ways that telephone services can be delivered over fixed networks. This creates analytical flexibility, since the indicators can be arranged to support different concepts of fixed-telephone networks. The indicators covered in this section also include several relating to accessibility.

52. Most of these indicators are collected from fixed-telephone operators that have been licensed by the national telecommunication regulatory authority (NRA). It is expected that most NRAs would have information about entities licensed to provide fixed-telephone line services.

53. This group of indicators is based on annual (reference year) data in respect of the year ending 31 December. Where data are not available for the year ending 31 December, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data). Where countries report data on the basis of a year not ending on 31 December, this should be specified in a note.

Figure 3. Fixed-telephone lines



Source: ITU.

Indicator 1: Total capacity of local public switching exchanges (i117)

Definition:

Total capacity of public switching exchanges refers to the maximum number of fixed-telephone lines that can be connected. This number includes fixed-telephone lines already connected and fixed lines available for future connection, including those used for technical operation of the exchange (test numbers). The measure is the actual capacity of the system, rather than the theoretical potential when the system is upgraded or if compression technology is employed.

Clarifications and scope:

This indicator measures the total number of physical lines available in the PSTN, regardless of whether they are in use or not. The number of fixed-telephone lines in use can be divided by the total capacity to indicate the amount of capacity used. It excludes the capacity of other networks (Internet protocol or mobile).

Method of collection:

Data can be collected at the country level by asking all licensed fixed-telephone line operators for the number of lines they have that are already connected and the number of fixed lines that are available for future connection. Both residential and business lines should be included.

Relationship with other indicators:

Indicator 1 is the sum of the values of Indicator 3 (analogue fixed-telephone lines), inactive prepaid analogue fixed-telephone lines, Indicator 9 (ISDN voice-channel equivalents) and any fixed lines available for future connection.

Methodological issues:

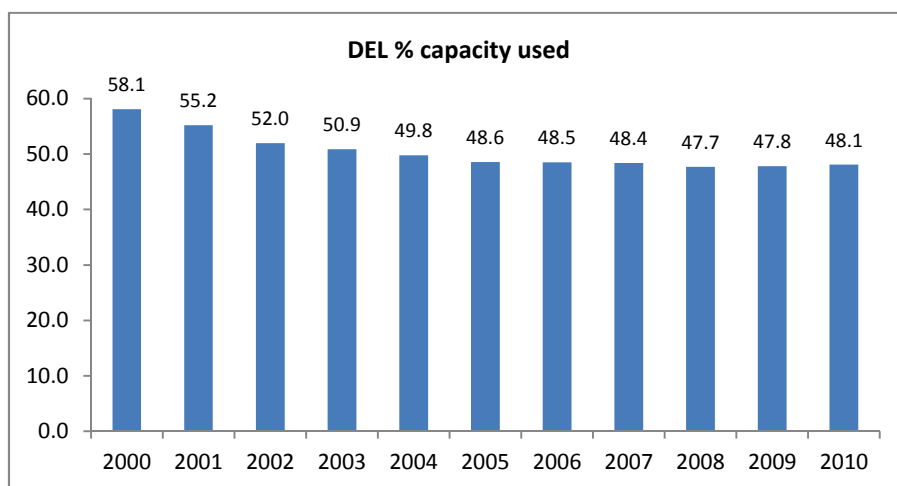
A capacity usage indicator can be compiled by dividing the number of analogue fixed-telephone lines (Indicator 3) by the total capacity (Indicator 1).

The capacity of PSTN lines used to be more relevant in the past. The closer networks were to full capacity, the greater the risk of potential bottlenecks and the possible need for additional investment. The availability of virtual lines through, for example, ISDN, and the popularity of mobile-cellular networks and voice over IP (VoIP) have meant that there is a growing gap between total fixed-line capacity and fixed-telephone lines in use.

Example:

The Malaysian Communications and Multimedia Commission (MCMC) employs a capacity usage indicator based on the total capacity of local public switching exchanges (Example 1). This is derived from total PSTN lines in operation and data on total capacity obtained from licensed operators.

Example 1. Total fixed-telephone line capacity used, Malaysia



Source: Adapted from MCMC (2011), Communications & Multimedia – Selected Facts & Figures Q4 2010, available at http://www.skmm.gov.my/link_file/facts_figures/stats/pdf/Q4%202010%20Text.pdf.

Indicator 2: Fixed-telephone subscriptions (i112)

Definition:

Fixed-telephone subscriptions refers to the sum of active number of analogue fixed-telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones.

This indicator was previously called Main *telephone lines in operation*.

Clarifications and scope:

This indicator refers to all accesses over fixed infrastructure that provide voice telephony, including telephone lines using copper wire and voice services using IP delivered over fixed (wired)-broadband infrastructure, for example digital subscriber line (DSL), fibre optic and coaxial cable television networks (cable modem). It also includes fixed WLL connections, which are defined as services provided by licensed fixed-line telephone operators that provide last-mile access to the subscriber using radio technology (the call being subsequently routed over a fixed-line telephone network and not a mobile-cellular network). It includes both postpaid and prepaid subscriptions. If prepaid, the fixed-telephone subscription should be active, i.e. used at least once in the last three months. It should include data from all licensed fixed-telephone line providers. In the case of VoIP, it should include all operators that have been licensed to provide IP telephony, provided that the service includes a subscriber telephone number, allows the ability to place and receive calls at any time and does not require a computer. Both residential and business subscriptions should be included.

The indicator does not cover mobile-cellular telephony subscriptions, computer-mediated IP telephony services or the unused capacity of the fixed-telephone line network. If it is not possible to include public payphones (Indicator 75a), then this should be indicated. Some countries may not include all the elements mentioned. In this case, countries should specify the items included in this indicator in a note.

Method of collection:

Data can be collected at the country level by asking all licensed fixed-telephone line operators how many fixed-telephone subscriptions they have. Generally, the provision of any fixed-telephone service requires a licence, whether provided by an operator using the PSTN, a coaxial cable television provider, a VoIP provider or a fixed wireless provider.

Relationship with other indicators:

Indicator 2 is the sum of values of Indicator 3 (Analogue fixed-telephone lines), Indicator 4 (VoIP subscriptions), Indicator 5 (Fixed wireless local loop subscriptions), Indicator 9 (ISDN voice-channel equivalents) and Indicator 75a (Fixed public payphones).

Methodological issues:

The definition of this indicator includes virtual items and items with regulatory implications, which may restrict comparability. For example, the indicator includes the number of ISDN channels, which are not physical lines, and which some countries do not include or instead include the number of ISDN subscriptions.

Some countries also do not include the number of VoIP subscriptions, whether because they do not consider them to be fixed-telephone lines or because they cannot obtain the data.

The inclusion of fixed wireless subscriptions is premised on a regulatory distinction rather than on physical topology, since to all intents and purposes the network architecture of most fixed wireless services is the same as a mobile-cellular network. A regulatory change removing the limitation on fixed wireless mobility would cause these subscriptions to be classified as mobile-cellular rather than fixed-telephone lines. Given these factors, the comparability of fixed-telephone lines over time is problematic.

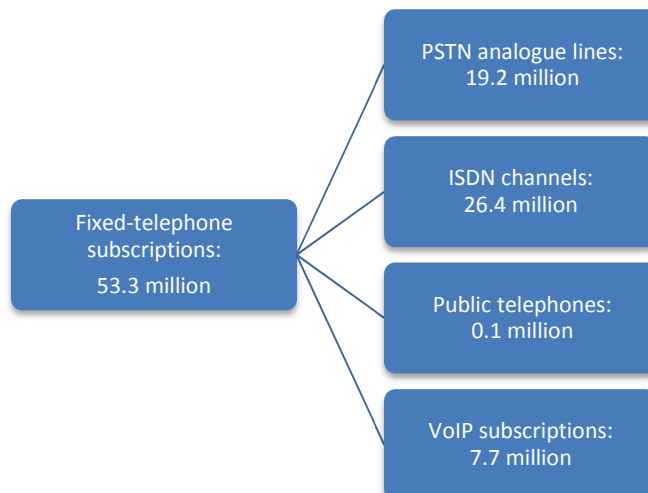
This indicator is divided by the population and multiplied by 100 to derive the number of fixed-telephone lines per 100 inhabitants, *Partnership* core ICT indicator, A1.

Examples:

The examples below illustrate two ways in which the number of fixed-telephone subscriptions can be computed. In the case of Germany, fixed-telephone subscriptions are aggregated from different components. In the case of India, they are aggregated from operator data.

The data in Example 2, from the German Federal Network Agency, illustrate how fixed-telephone subscriptions are calculated based on the different technologies.

Example 2. Fixed-telephone subscriptions, Germany, 2010



Note: Voice-over-IP (VoIP) subscriptions include voice access over cable.

Source: Adapted from Federal Network Agency (2011), *Jahresbericht 2010*, available at http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/BNetzA/Presse/Berichte/2011/Jahresbericht2010pdf.pdf?__blob=publicationFile.

The data in Example 3, from the Telecommunications Regulatory Authority of India (TRAI), show how fixed-telephone subscriptions are aggregated from each operator to obtain the country total.

Example 3. Wireline subscriptions (millions), India

Service providers	QE March 2010	QE June 2010	QE September 2010	QE December 2010	QE March 2011
BSNL	27.83	26.94	26.22	25.65	25.22
MTNL	3.50	3.49	3.47	3.47	3.46
Bharti	3.07	3.15	3.22	3.26	3.30
Reliance	1.18	1.19	1.21	1.22	1.23
Tata	1.16	1.20	1.23	1.27	1.28
Quadrant (HFCL)	0.17	0.18	0.18	0.19	0.19
Sistema	0.05	0.04	0.04	0.04	0.04
Total	36.96	36.18	35.57	35.09	34.73

Source: Adapted from TRAI (2011), *The Indian Telecom Services Performance Indicators, January-March 2011*, available at http://www.trai.gov.in/WriteReadData/trai/upload/Reports/55/Indicator_Report-Mar-11.pdf.

Indicator 3: Analogue fixed-telephone lines (i112a)**Definition:**

Analogue fixed-telephone lines refers to the number of active lines connecting subscribers' terminal equipment to the PSTN and which have a dedicated port in the telephone-exchange equipment. It includes all postpaid lines and those prepaid lines that have registered an activity in the past three months. This term is synonymous with the terms 'main station' and 'direct exchange line' (DEL) that are commonly used in telecommunication documents.

Clarifications and scope:

This indicator refers to the number of active analogue fixed-telephone lines with a direct connection to the PSTN. It covers the physical line (typically copper wire) that is in use. It also includes analogue fixed lines used for DSL services. It excludes fixed wireless accesses, fibre-optic lines, coaxial cable television lines, ISDN channels and ISDN subscriptions. Both residential and business lines should be included.

Method of collection:

Data can be collected from licensed fixed-telephone line operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 3 is a component of Indicator 2 (Fixed-telephone subscriptions).

Methodological issues:

This indicator reports the physical number of analogue fixed-telephone lines in operation that are connected to the PSTN. It provides a consistent indicator for trend analysis, since, unlike the fixed-telephone line indicator, it is not affected by erratic adjustments.

Indicator 4: VoIP subscriptions (i112IP)

Definition:

VoIP subscriptions refers to the number of voice-over-Internet protocol (VoIP) fixed-line subscriptions. It is also known as voice over broadband (VoB), and includes VoIP subscriptions through fixed wireless, DSL, cable, fibre optic and other fixed-broadband Internet platforms that provide fixed telephony using IP. It excludes software-based VoIP applications (e.g. VoIP with Skype using computer-to-computer or computer-to-telephone). Those VoIP subscriptions that do not imply a recurrent monthly fee should only be counted if they have generated inbound or outbound traffic within the past three months.

Clarifications and scope:

VoIP subscribers have their own telephone number and are able to call and be called by other telephone subscribers at any time. The key distinction between a VoIP service and a software-based VoIP application (such as Skype) is that the former includes a telephone number, is always connected, can both make and receive telephone calls to and from other telephone subscribers, and does not require the intermediation of a computer. If VoIP is not yet allowed in the country, even through licensed telephone operators, this should be specified in a note. Both residential and business subscriptions should be included.

Method of collection:

IP telephony, as defined above, generally requires licensing as a telephone service, therefore the number of IP telephone subscriptions can be collected from licensed telephone operators in the country, and then aggregated at the country level.

While Internet service providers (ISPs) may offer VoIP, the service generally does not correspond to the definition above. However, where ISPs do offer a VoIP service to retail consumers that complies with the definition but is not licensed as a fixed-telephone service, then data should be collected from those ISPs.

Data collectors may want also to enquire about the type of network over which IP telephony is provided (e.g. DSL, cable modem).

Relationship with other indicators:

Indicator 4 is a component of Indicator 2 (Fixed-telephone subscriptions).

Methodological issues:

The legal status of VoIP may be uncertain in some countries. If VoIP is not yet allowed, even through licensed telephone operators, then it is unlikely that the service as defined above is available in the country. In the case where the provision of VoIP is illegal only for unlicensed operators, the number of VoIP subscriptions, as defined above, should be obtained from licensed telephone operators.

Example:

The Swedish telecommunication regulator, the Post and Telecom Agency (PTS), collects these data twice a year using a compulsory web-based survey. The questionnaire asks whether operators provide “Fixed-call services (incl. IP telephony)”.

The definition used by Sweden for IP telephone subscriptions is as follows: “This relates to the form of IP-based telephony where an ordinary telephone is linked to a broadband connection via, for example, a terminal adapter. Alternatively, an IP telephone or the corresponding is used, which is linked directly to a broadband connection. PBXs that are connected via IP protocol should also be included. A telephone call that is made by a subscriber for IP telephony should be able to reach, and be reached by, telephones connected to the PSTN and ISDN networks.”³²

The data are disseminated twice a year, giving breakdowns by residential (private) and business as well as by type of transport technology (i.e. DSL, cable modem, LAN, etc.). See Example 4.

Example 4. Subscriptions for fixed telephony – via IP, Sweden, 2010

Subscriptions for fixed telephony – via IP	1 189
Private	1 064
Business	125
via xDSL access	426
via cable-television access	382
via LAN network access	299
via other IP-based access	82

Note: * LAN network access means a fixed connection that is reached via a LAN (local network, property network), usually based on Ethernet technology. The LAN is linked to a public fibre network, for example, an area network. The LAN (which may comprise fibre-optic cable or copper-based cable) links the individual dwellings/operations with a centrally located data switch in the premises, which, in turn, is connected with the routers available in the area and backbone networks.

Source: Adapted from PTS (2011), *The Swedish Telecommunications Market 2010*, available at <http://www.statistik.pts.se/pts2010e/>.

³² PTS (2011), *The Swedish Telecommunications Market 2010*, available at <http://www.statistik.pts.se/pts2010e/>. Note: PBX refers to “private branch exchange”, which is a telephone switching system within an organization.

Indicator 5: Fixed wireless local loop subscriptions (i112w)

Definition:

Fixed wireless local loop (WLL) subscriptions refers to subscriptions provided by licensed fixed-line telephone operators that provide 'last-mile' access to the subscriber using radio technology and where the subscriber's terminal equipment is either stationary or limited in its range of use.

Clarifications and scope:

WLL has proven popular in a number of countries where it is cheaper and faster to deploy wireless technologies between the telephone switching equipment and the user. A number of technologies have been deployed around the world. Although some use cellular technologies, the key distinction is that the end user is restricted in terms of the distance (range) within which they can use their telephone ('limited mobility'). Both residential and business subscriptions should be included.

Method of collection:

Data can be collected from licensed fixed-telephone operators in the country that provide a service using WLL technologies, and then aggregated at the country level.

Relationship with other indicators:

Indicator 5 is a component of Indicator 2 (Fixed-telephone subscriptions).

Methodological issues:

Some WLL technologies are based on cellular technologies, the main distinction between mobile cellular and WLL being that, for the latter, subscribers cannot make calls from their handset when beyond the range of their calling area. Since this is a legal rather than a technical distinction, if the regulation changes, then WLL subscriptions based on cellular technologies are liable to be reclassified as mobile-cellular subscriptions.

Indicator 6: Percentage of fixed-telephone subscriptions that are residential (i116)**Definition:**

Percentage of fixed-telephone subscriptions that are residential refers to the percentage obtained by dividing the number of active fixed-telephone subscriptions serving households (i.e. lines that are not used for business, government or other professional purposes or as public telephone stations) by the number of fixed-telephone subscriptions (Indicator 2) and then multiplying by 100. A household is defined as consisting of one or more people, who may or may not be related to each other, who share accommodation and who make common provision for food. Active subscriptions include all postpaid subscriptions and those prepaid subscriptions that have registered an activity in the past three months.

Clarifications and scope:

This indicator refers to the total number of fixed-telephone subscriptions in operation in households, divided by the number of fixed-telephone subscriptions (Indicator 2). It does not refer to the percentage of households with a telephone (which is obtained from surveys), nor does it cover the percentage of mobile-cellular subscriptions that are residential.

Method of collection:

Data can be obtained from licensed fixed-telephone operators in the country, and then aggregated at the country level. In countries where there are different subscription charges for residences, it should be easy to identify the number of residential telephone subscriptions. Instead of asking for the percentage, data collectors could ask for the number of fixed-telephone subscriptions that are used by households and carry out the calculation themselves (number of residential telephone subscriptions / total number of fixed-telephone subscriptions). The data may be difficult to collect in countries where there is no distinction between residential and non-residential subscriptions.

Relationship with other indicators:

The denominator of Indicator 6 is Indicator 2 (Fixed-telephone subscriptions).

Methodological issues:

The proportion of residential fixed-telephone subscriptions is a useful indicator for showing the distribution of fixed-telephone subscriptions. It can also be used to calculate the proportion of residential subscriptions per 100 households. However, as it only refers to fixed-telephone subscriptions, it cannot be used to derive the percentage of households with any type of telephone.

Example:

The Malaysia Communications and Multimedia Commission (MCMC) collects data on residential telephone subscriptions (Example 5). In the fourth quarter of 2010 there were 2 804 000 residential fixed-telephone subscriptions out of a total 4 406 000 fixed-telephone subscriptions in Malaysia. Therefore, the percentage of fixed-telephone subscriptions that were residential was 63.6% (2 804 000/4 406 000). MCMC compiles a household availability measure based on this indicator. This is based on the number of fixed-telephone subscriptions that are residential divided by the number of households and multiplied by 100. The figure in Malaysia for the fourth quarter of 2010 was 42.5.

Example 5. Residential fixed-telephone subscriptions, Malaysia

Number of DEL* connections and penetration rate					
Year	Qtr	Residential		Number of business subscriptions ('000)	Total subscriptions ('000)
		Number of subscriptions ('000)	Penetration rate (per 100 households)		
2000		3 392	66.4	1 236	4 628
2001		3 400	65.1	1 310	4 710
2002		3 323	62.3	1 347	4 670
2003		3 194	58.0	1 378	4 572
2004		2 938	52.3	1 508	4 446
2005		2 839	49.5	1 527	4 366
2006		2 831	48.3	1 511	4 342
2007		2 851	47.8	1 499	4 350
2008		2 734	44.9	1 558	4 292
2009	1	2 734	44.7	1 563	4 297
	2	2 741	44.5	1 570	4 311
	3	2 735	44.2	1 574	4 309
	4	2 734	44.0	1 578	4 312
2010	1	2 745	42.5	1 583	4 328
	2	2 767	42.3	1 592	4 359
	3	2 796	42.4	1 595	4 391
	4	2 804	42.5	1 602	4 406

Note: * A direct exchange line (DEL) connects a customer's equipment to the public switched telephone network (PSTN) and has a dedicated port on a telephone exchange.

Source: Adapted from MCMC (2011), *Communications & Multimedia – Selected Facts & Figures Q4 2010*, available at http://www.skmm.gov.my/link_file/facts_figures/stats/pdf/Q4%202010%20Text.pdf.

Indicator 7: Percentage of fixed-telephone subscriptions in urban areas (i1162)**Definition:**

Percentage of fixed-telephone subscriptions in urban areas refers to the percentage obtained by dividing the number of fixed-telephone subscriptions in urban areas by the number of fixed-telephone subscriptions (Indicator 2) in the country and then multiplying by 100. The definition of urban used by the country should be provided.

Clarifications and scope:

This indicator tracks the proportion of fixed-telephone subscriptions in urban areas and therefore, by implication, in rural areas. It can help monitor the distribution of fixed-telephone subscriptions between urban and rural areas. The proportion should reflect active subscriptions (i.e. all postpaid subscriptions and those prepaid subscriptions used in the last three months). This excludes mobile-telephone accesses in urban areas. Both residential and business subscriptions should be included.

Method of collection:

Data can be collected by asking licensed operators to provide the proportion of fixed-telephone subscriptions they have in urban areas. This should be aligned with the definition of urban areas used in the country. Alternatively, the number of fixed-telephone subscriptions in urban areas can be collected and the calculation performed by the data collector (fixed-telephone subscriptions in urban areas / total fixed-telephone subscriptions).

Relationship with other indicators:

The denominator of Indicator 7 is Indicator 2 (Fixed-telephone subscriptions).

Methodological issues:

The indicator by itself is insufficient to reflect disparities in the distribution of telephone subscriptions. To gauge inequalities, a linkage needs to be made between the indicator and the percentage of the population living in urban areas. Most countries are keen to monitor access in rural areas, which tend to be underserved, so this indicator is often reversed to indicate the proportion of fixed-telephone subscriptions in rural areas.

Example:

The Telecommunications Regulatory Authority of India (TRAI) collects data on the number of urban fixed-telephone subscriptions from licensed fixed-telephone operators (Example 6). The number of urban subscriptions (26.04 million) is divided by the total number of fixed-telephone subscriptions (34.73 million) to obtain the percentage of fixed-telephone subscriptions in urban areas ($26.04/34.73 = 75\%$).

Example 6. Fixed-telephone subscriptions in rural and urban areas, India, March 2011

Service provider	Subscriber base (millions)			Share of urban subscriptions
	Rural	Urban	Total	
BSNL	8.64	16.58	25.22	65.74%
MTNL	-	3.46	3.46	-
Bharti	-	3.30	3.30	-
Tata	0.04	1.24	1.28	96.72%
Reliance	0.002	1.23	1.23	99.87%
Quadrant (HFCL)	-	0.19	0.19	-
Sistema	0.005	0.03	0.04	86.87%
Total	8.69	26.04	34.73	74.97%

Source: Adapted from TRAI (2011), *The Indian Telecom Services Performance Indicators, January-March 2011*, available at http://www.trai.gov.in/WriteReadData/trai/upload/Reports/55/Indicator_Report-Mar-11.pdf.

Indicator 8: ISDN subscriptions (i28)

Definition:

ISDN subscriptions refers to the number of subscriptions to the integrated services digital network (ISDN). This can be separated into basic-rate and primary-rate interface service (ITU-T Rec. I.420). The indicator can therefore be broken down, as follows:

Indicator 8a: Basic-rate ISDN subscriptions (i281)

Refers to the number of subscriptions to the ISDN basic-rate interface service.

Indicator 8b: Primary-rate ISDN subscriptions (i282)

Refers to the number of subscriptions to the ISDN primary-rate interface service.

Clarifications and scope:

An ISDN is implemented over the PSTN to provide digital telephone and data transmission services. ISDN consists of 'B-channels' of 64 kbit/s each. Both residential and business subscriptions should be included.

Method of collection:

Data should be collected from all licensed fixed-telephone line operators in the country that offer ISDN services, and then aggregated at the country level. Care should be taken that only subscriptions and not channels are included.

Relationship with other indicators:

Indicator 8 is equal to the sum of values of Indicator 8a and Indicator 8b. Indicator 8 and its sub-indicators are not related to other indicators in the Handbook.

Methodological issues:

This indicator will not be relevant for countries that do not have ISDN services.

Example:

See Example 7.

Indicator 9: ISDN voice-channel equivalents (i28c)

Definition:

ISDN voice-channel equivalents refers to the sum of basic-rate and primary-rate voice-channel equivalents (B-channel equivalents). Basic-rate voice-channel equivalents is the number of basic-rate ISDN subscriptions (Indicator 8a) multiplied by 2, and primary-rate voice-channel equivalents is the number of primary-rate ISDN subscriptions (Indicator 8b) multiplied by 23 or 30, depending on the standard implemented.

Clarifications and scope:

An ISDN is implemented over the PSTN to provide digital telephone and data transmission services. ISDN consists of 'B-channels' of 64 kbit/s each.³³ Both residential and business channels should be included.

Method of collection:

Data should be collected from all licensed fixed-telephone line operators in the country that offer ISDN services, and then aggregated at the country level. Care should be taken that only channels and not subscriptions are included. Alternatively, the number of basic-rate and primary-rate subscriptions can be requested and the calculation made by multiplying each basic-rate subscription by 2 and each primary-rate subscription by 23 or 30, depending on the standard implemented.

Relationship with other indicators:

Indicator 9 is a component of Indicator 2 (Fixed-telephone subscriptions). Indicator 9 is related to indicators 8a and 8b, as follows: Indicator 9 value = (Indicator 8a value * 2) + (Indicator 8b value * (23 or 30)).

Methodological issues:

This indicator will not be relevant for countries that do not have ISDN services.

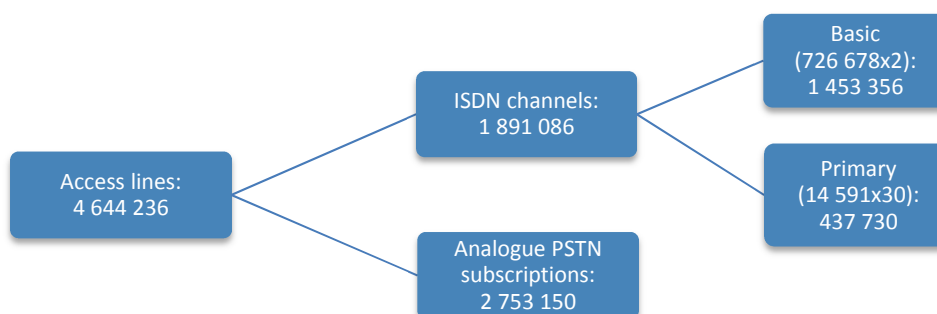
Example:

Data from the Swiss Federal Office of Communication (OFCOM) illustrate how ISDN-channel equivalents are added to the number of PSTN lines to obtain the number of access lines (Example 7). Switzerland uses the 30-channel implementation standard for the primary-rate interface.

Using the Swiss data shown below for 2009:

Access lines = analogue PSTN subscriptions (2 753 150) + ISDN basic-rate channels (726 678 x 2 = 1 453 356) + ISDN primary-rate channels (14 591 x 30 = 437 730) = 4 644 236.

Example 7. PSTN and ISDN subscriptions and access lines, Switzerland, 2009



Source: Adapted from Federal Office of Communication (OFCOM), *Statistique officielle des télécommunications 2009*, available at <http://www.bakom.admin.ch/dokumentation/zahlen/00744/00746/index.html?lang=fr>.

³³ For more on ISDN, see the ITU I series Recommendations at <http://www.itu.int/rec/T-REC-I/e>.

Indicator 10: Fixed-telephone numbers ported (i112pt)

Definition:

Fixed-telephone numbers ported refers to the number of porting transactions within the fixed-telephone line network that have been carried out for fixed-telephone numbers during the reference year.

Clarifications and scope:

Number portability is defined in terms of the number of porting transactions (a transaction occurs each time a number is ported, and one number can be ported several times). This indicator refers to the ability of residential and business subscribers to keep their telephone number if they switch service providers. In other words, it refers to the number of transactions whereby fixed-line telephone numbers have been transferred from one fixed-telephone line operator to another fixed-telephone line operator for users who have requested to keep the same telephone number. The data should refer to actual porting transactions that have been completed, and not pending transactions. The indicator excludes mobile telephone number porting, fixed-telephone line to mobile-cellular network number porting and mobile-cellular network to fixed-telephone network number porting.

Method of collection:

The data for this indicator can be collected from the portability administrator where one exists in the country. The portability administrator is the entity responsible for managing the database of ported numbers that operators access in order to route calls to the correct network. If there is no portability administrator, then the data can be collected from operators by asking them how many incoming ported numbers they handled during the year.

Relationship with other indicators:

Indicator 10 is not related to other indicators in the Handbook.

Methodological issues:

Fixed-number portability needs to be available in the country for this indicator to be relevant. The indicator is also only relevant for countries with more than one operator providing fixed-telephone services. If operators or the regulator have established a centralized number portability system, it should be possible to query how many numbers have been ported or request this from the portability administrator. Data should refer to the sum of the incoming numbers ported to each operator or, alternatively, to the sum of the outgoing numbers ported from each operator. The total obtained should be the same as long as all operators report the same portability figures (either incoming or outgoing). Data should not refer to the sum of the net portability of each operator.

Example:

The United States Federal Communications Commission (FCC) publishes quarterly statistics on fixed-telephone porting (Example 8). It collects the data from the number portability database, designed for the purpose of routing calls. The FCC has appointed an entity to administer the number portability database. The administrator sends out questionnaires twice a year to operators that use numbering resources for providing telephone services to their customers. The administrator compiles the data into the database and submits it to the FCC. The table below shows the quarterly portability statistics published by the FCC.

Example 8. Telephone number porting in the United States (thousands)

Year	Quarter	Wireline to wireline [†]	Wireline to wireless	Wireless to wireless*	Wireless to wireline	Total
2003	Fourth	1 199	14	817	2	2 032
2004	First	2 296	168	1 936	4	4 404
	Second	2 263	287	2 175	4	4 729
	Third	2 143	281	2 417	4	4 845
	Fourth	2 327	314	2 384	4	5 029
2005	First	2 891	208	2 358	5	5 462
	Second	2 915	149	2 812	4	5 880
	Third	3 323	135	2 750	6	6 213
	Fourth	3 093	88	2 723	6	5 911
2006	First	4 011	78	2 562	9	6 659
	Second	3 318	95	2 422	6	5 840
	Third	3 012	152	2 658	5	5 828
	Fourth	2 933	114	2 628	7	5 683
2007	First	2 801	117	3 225	6	6 149
	Second	2 925	160	3 290	8	6 382
	Third	3 963	363	3 283	11	7 619
	Fourth	5 340	257	3 489	7	9 093
2008	First	3 987	63	3 266	10	7 326
	Second	3 828	62	3 169	8	7 067
	Third	3 907	134	4 006	12	8 059
	Fourth	3 696	134	3 983	13	7 827
2009	First	3 601	118	4 010	14	7 743
	Second	3 844	113	3 802	14	7 773
	Third	3 973	215	4 134	15	8 337
	Fourth	3 812	181	3 961	16	7 969
2010	First	4 048	97	3 797	13	7 954
	Cumulative total	85 448	4 097	78 057	211	167 813

Note: When a customer who is using a ported number discontinues service entirely, the ported number reverts to the original carrier. Therefore, this is counted as an additional porting transaction, and included in the porting figures.

* Excludes significant porting activity between Cingular and AT&T Wireless following the closing of their merger in October 2004. † Refers to indicator 10.

Source: Adapted from FCC (2011). *Numbering Resource Utilization in the United States*, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-303900A1.pdf.

Mobile-cellular networks

54. This section of the Handbook considers indicators related to mobile-cellular subscriptions and network coverage. Mobile cellular is the predominant form of voice telephony in most countries. It also includes indicators on data subscriptions via mobile networks.

55. This group of indicators is based on annual (reference year) data in respect of the year ending 31 December. Where data are not available for the year ending 31 December, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data). Where countries report data on the basis of a year not ending on 31 December, this should be specified in a note.

56. Both residential and business subscriptions should be included.

Indicator 11: Mobile-cellular telephone subscriptions, by postpaid/prepaid (i271)

Definition:

Mobile-cellular telephone subscriptions refers to the number of subscriptions to a public mobile-telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile-cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.

Mobile-cellular subscriptions can be broken down by type of contract, as follows:

Indicator 11a: Prepaid mobile-cellular telephone subscriptions (i271p)

Refers to the total number of mobile-cellular telephone subscriptions that use prepaid refills. These are subscriptions where, instead of paying an ongoing monthly fee, users purchase blocks of usage time. Only active subscriptions should be included (those used at least once in the last three months for making or receiving a call or carrying out a non-voice activity such as sending or reading an SMS or accessing the Internet).

Indicator 11b: Postpaid mobile-cellular telephone subscriptions

Refers to the total number of mobile-cellular subscriptions where subscribers are billed after their use of mobile services, at the end of each month. The postpaid service is provided on the basis of a prior arrangement with a mobile-cellular operator. Typically, the subscriber's contract specifies a limit or allowance of minutes, text messages, etc. The subscriber will be billed at a flat rate for any usage equal to or less than that allowance. Any usage above that limit incurs extra charges. Theoretically, a subscriber in this situation has no limit on use of mobile services and, as a consequence, unlimited credit.

Clarifications and scope:

This indicator refers to telephone subscriptions to networks using mobile-cellular technology. It includes both postpaid and prepaid subscriptions. It includes mobile-cellular telephone subscriptions with access to data communications at low and medium speeds and mobile-cellular subscriptions with access to data communications at broadband speeds. It excludes trunked radio, radio-paging machine subscriptions and data-only subscriptions. Both residential and business subscriptions should be included.

Method of collection:

Data can be collected from all licensed mobile-cellular operators in the country, and then aggregated at the country level. If retail mobile-cellular services are also provided by non-facilities-based operators (i.e. mobile virtual network operators), care should be taken to avoid double counting. One difficulty that may arise is that operators may have different definitions of 'active' and therefore may not be able to provide the data according to the recommended definition (i.e. used in the last three months).

Relationship with other indicators:

Indicator 11 is equal to the sum of the values of Indicator 11a and Indicator 11b. Indicator 11 is complemented by Indicator 12 (Mobile-cellular telephone subscriptions, by speed of data access), in which the number of mobile-cellular subscriptions is broken down by access speed.

Methodological issues:

This indicator refers to mobile-cellular telephone subscriptions and therefore does not include subscriptions to mobile networks based on other technologies. Since the indicator refers to subscriptions, it does not represent the number of users. The indicator is divided by the population and multiplied by 100 to derive *Partnership* core ICT indicator A2 (Mobile-cellular telephone subscriptions per 100 inhabitants).

Example:

See Example 9.

Indicator 12: Mobile-cellular telephone subscriptions, by speed of data access (i271)

Definition:

The number of *mobile-cellular telephone subscriptions* (Indicator 11) can be broken down by speed, as follows:

Indicator 12a: Mobile-cellular telephone subscriptions with access to data communications at low and medium speeds (i271L)

Refers to the number of mobile-cellular telephone subscriptions with access to data communications (e.g. Internet) at downstream speeds below 256 kbit/s. This includes mobile-cellular technologies such as GPRS, CDMA2000 1x and most EDGE implementations. The indicator refers to the theoretical ability of subscribers to use non-broadband speed mobile data services, rather than the number of active users of such services.

Indicator 12b: Mobile-cellular telephone subscriptions with access to data communications at broadband speeds (i271mb_access)

Refers to the number of mobile-cellular subscriptions with access to data communications (e.g. the Internet) at broadband downstream speeds (defined here as greater than or equal to 256 kbit/s). The indicator refers to the theoretical ability of subscribers to use broadband speed mobile data services, rather than the number of active users of such services.

This includes all high-speed mobile-cellular telephone subscriptions with access to data communications, and includes mobile-cellular technologies such as WCDMA (UMTS) and associated technologies such as HSPA, CDMA2000 1x EV-DO, mobile WiMAX 802.16e and LTE. It excludes low-speed mobile-broadband subscriptions and fixed (wired) Internet subscriptions.

Clarifications and scope:

If countries use a different definition of broadband, this should be indicated in a note. The indicator refers to the theoretical ability of subscribers to use non-broadband and broadband speed mobile data services, rather than the number of active users of such services. Depending on the methodology used in the country, Indicator 12b may refer to the number of subscribers with mobile broadband-enabled handsets and/or data cards, or to subscriptions to mobile networks capable of providing broadband, regardless of whether the subscriber uses the network to access the Internet. In contrast, Indicator 25a (Standard mobile-broadband subscriptions) measures subscriptions that actively use mobile-broadband to access the Internet. Both residential and business subscriptions should be included.

Method of collection:

Data can be collected from all licensed mobile-cellular operators in the country, and then aggregated at the country level. If retail mobile-cellular services are also provided by non-facilities-based operators (i.e. mobile virtual network operators), care should be taken to avoid double counting. One difficulty that may arise is that operators may have different definitions of 'active' (i.e. use during the three months) and therefore may not be able to provide the data according to the recommended definition.

Relationship with other indicators:

Indicator 12 is equal to the sum of the values of Indicator 12a and Indicator 12b. Indicator 12 is complemented by Indicator 11 (Mobile-cellular telephone subscriptions, by postpaid/prepaid), in which the number of mobile-cellular subscriptions is broken down by postpaid and prepaid.

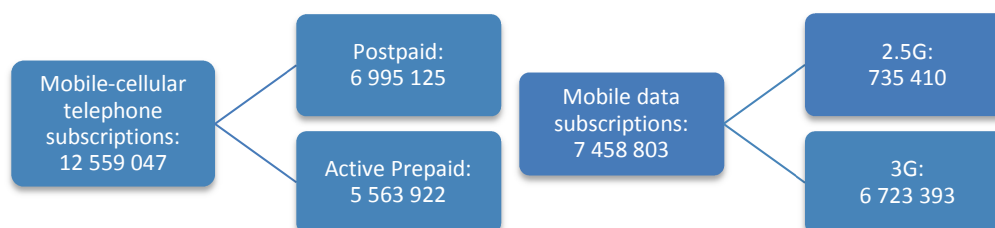
Methodological issues:

This indicator refers to mobile-cellular telephone subscriptions and therefore does not include subscriptions to mobile networks based on other technologies.

Examples:

The Office of the Telecommunications Authority (OFTA) in Hong Kong (China) publishes detailed statistics on mobile subscriptions (Example 9). The data published can be adapted partly to the indicator definitions in this document. For example, the data include postpaid and prepaid accounts and the total number of mobile subscriptions. However, the prepaid accounts indicated in the total are not necessarily *active*. Since the data also include activated prepaid accounts, this can be added to the postpaid subscriptions to get the number of active mobile-cellular subscriptions.

Likewise, there are data on the number of 2.5G + 3G customers that can be used to obtain the number of mobile subscriptions with access to data communications. Since the number of 3G customers is also shown separately, this can be used to obtain the 2.5G customers. However, not all 3G technologies provide access to data communications at broadband speeds (CDMA2000 1x and most EDGE implementations, for instance, do not), and therefore the 3G figure would need further adjustment in order to derive Indicator 12b. If this is not possible, it should be reported with a note specifying which low- and medium-speed technologies it includes.

Example 9. Mobile-cellular telephone subscriptions, Hong Kong (China), July 2011

Source: Adapted from OFTA, *Key Statistics for Telecommunications in Hong Kong. Wireless Service*, available at http://www.ofta.gov.hk/en/datastat/eng_wireless.pdf.

Indicator 13: Percentage of the land area covered by mobile-cellular network (i271Land)

Definition:

Percentage of the land area covered by mobile-cellular network refers to the total mobile-cellular coverage of the land area in per cent. This is calculated by dividing the land area covered by a mobile-cellular signal by the total land area and multiplying by 100.

Clarifications and scope:

This indicator refers to the proportion of a country's land area covered by a mobile-cellular network signal. It does not measure the percentage of the population covered by a mobile-cellular signal, nor the percentage of the population subscribing to a mobile-cellular service. Coverage should refer to all mobile-cellular technologies. If this is not the case, it should be specified in a note.

Method of collection:

The data can be collected from licensed mobile-cellular operators in the country. However, they are likely to have different locations of coverage. Another method would be to request each operator's coverage maps. These could then be compared in order to determine the total land area covered by any mobile-cellular signal.

Relationship with other indicators:

Indicator 13 is not related to other indicators in the Handbook, although it complements Indicator 14 (Percentage of the population covered by a mobile-cellular network).

Methodological issues:

Some countries have difficulty calculating overall mobile-cellular land area coverage. In many cases, data refer only to the operator with the largest coverage, and this may understate the true coverage. If the coverage only refers to one operator, this should be specified in a note.

Example:

See Example 10.

Indicator 14: Percentage of the population covered by a mobile-cellular network (i271pop)

Definition:

Percentage of the population covered by a mobile-cellular network refers to the percentage of inhabitants within range of a mobile-cellular signal, irrespective of whether or not they are subscribers or users. This is calculated by dividing the number of inhabitants within range of a mobile-cellular signal by the total population and multiplying by 100.

Clarifications and scope:

This indicator refers to proportion of the population that lives within range of a mobile-cellular network signal, regardless of whether they actually subscribe to the service or use it. It is based on where the population lives, and not where they work or go to school, etc. The indicator is not the same as the mobile subscription density or penetration. When there are multiple operators offering the service, the maximum population number covered should be reported. Coverage should refer to all mobile-cellular technologies. If this is not the case, it should also be specified in a note.

Method of collection:

The data can be collected from licensed mobile-cellular operators. However, they are likely to have different levels and locations of coverage. Another method would be to request each operator's coverage maps, which can be overlaid with maps showing the population of the country.

Relationship with other indicators:

Indicator 14 includes the value of Indicator 15 (Percentage of the population covered by at least a 3G mobile network). Indicator 14 complements Indicator 13 (Percentage of the land area covered by mobile-cellular network).

Methodological issues:

Some countries have difficulty calculating overall mobile-cellular population coverage. In many cases, data refer only to the operator with the largest coverage, and this may understate the true coverage. If the coverage only refers to one operator, this should be specified in a note.

The percentage of the population covered by a mobile-cellular network is *Partnership* core ICT indicator A7.

Example:

See Example 10.

Indicator 15: Percentage of the population covered by at least a 3G mobile network (i271G)

Definition:

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.

Clarifications and scope:

This indicator captures mobile-broadband coverage, and refers to the proportion of the population that lives within range of at least a 3G mobile-cellular network signal, regardless of whether they actually subscribe to the service or use it. It is based on where the population lives, and not where they work or go to school. It includes the percentage of the population covered by mobile-cellular technologies such as WCDMA (UMTS) and associated technologies such as HSPA, CDMA2000 and related technologies such as EV-DO, mobile WiMAX 802.16e and LTE. It excludes the percentage of the population covered by a 2G mobile-cellular network, and by GPRS and EDGE technologies. Coverage should refer to all broadband mobile-cellular technologies. If this is not the case, it should be specified in a note.

Method of collection:

The data can be collected from licensed 3G mobile-cellular operators in the country. However, they are likely to have different levels and locations of coverage. Another method would be to request each operator's 3G coverage maps, which can then be overlaid with maps showing the population of the country.

Relationship with other indicators:

Indicator 15 is a component of Indicator 14 (Percentage of the population covered by a mobile-cellular network).

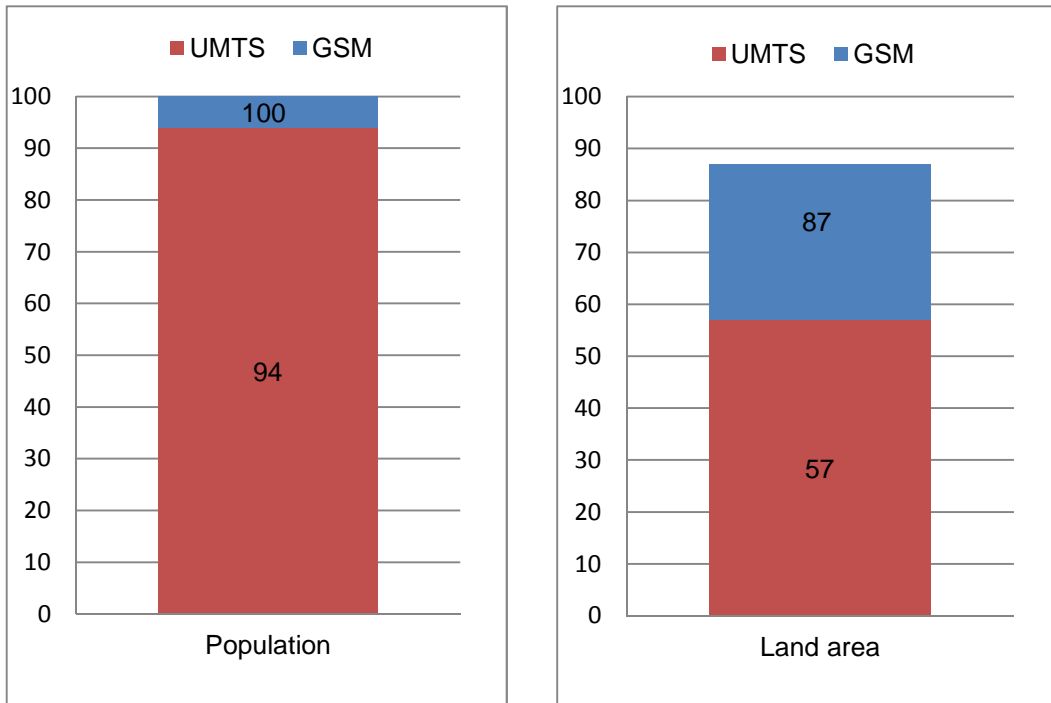
Methodological issues:

Some countries have difficulty calculating overall broadband mobile-cellular population coverage. In many cases, data refer only to the operator with the largest coverage, and this may understate the true coverage. If the coverage only refers to one operator, this should be specified in a note.

Example:

The national regulatory authority in Switzerland publishes data on land and population coverage of GSM and broadband UMTS mobile networks (Example 10).

Example 10. Mobile-cellular coverage, Switzerland, 2009



Note: UMTS refers to Universal Mobile Telecommunications System, the European term used for 3G mobile networks.

Source: Federal Office of Communication (OFCOM), *Statistique officielle des télécommunications 2009*, available at <http://www.bakom.admin.ch/dokumentation/zahlen/00744/00746/index.html?lang=fr>.

Indicator 16: Mobile-cellular numbers ported (i271pt)

Definition:

Mobile-cellular numbers ported refers to the number of mobile porting transactions that have been carried out during the reference year.

Clarifications and scope:

This indicator refers to the ability of mobile-cellular subscribers to keep their telephone number if they switch service providers. In other words, it refers to the number of transactions whereby mobile-cellular numbers have been transferred from one mobile-cellular operator to another mobile-cellular operator for users who change mobile-cellular operators and have requested to keep the same telephone number. The data should refer to actual porting transactions that have been completed, and not pending transactions. The data refer to the number of mobile-cellular telephone numbers that have been ported over the year, and not the cumulative number of porting transactions. The indicator includes porting within the mobile-cellular network. It excludes fixed-telephone number porting, fixed-telephone line to mobile-cellular network number porting and mobile-cellular network to fixed-telephone network number porting.

Method of collection:

The data can be collected from all licensed mobile-cellular operators in the country. Alternatively, where the operators or regulator have established a centralized number portability system, it should be possible to query the number of transactions or obtain it from the portability administrator. Data should refer to the sum of the incoming numbers ported to each operator or, alternatively, to the sum of the outgoing numbers ported from each operator. The total obtained should be the same as long as all operators report the same portability figures (either incoming or outgoing). Data should not refer to the sum of the net portability of each operator.

Relationship with other indicators:

Indicator 16 is not related to other indicators in the Handbook.

Methodological issues:

Mobile-number portability needs to be available in the country for this indicator to be relevant. The indicator is also only relevant for countries with more than one operator providing mobile-cellular telephone services. If operators or the regulator have established a centralized number portability system, it should be possible to query how many numbers have been ported or request this from the portability administrator.

Internet

57. This section identifies indicators related to Internet bandwidth, traffic and subscriptions. Internet subscriptions are categorized by fixed (wired) and wireless.

58. This group of indicators is based on annual (reference year) data in respect of the year ending 31 December. Where data are not available for the year ending 31 December, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year’s data). Where countries report data on the basis of a year not ending on 31 December, this should be specified in a note.

Internet bandwidth

59. Domestic and international backbones are important building blocks of Internet infrastructure. Backbone transmission networks typically revolve around satellite, fibre-optic and microwave infrastructure. Backbone transmission bandwidth affects the speed at which information is delivered to, and sent from, Internet users. It is measured in the number of bits that can be transferred per second. A common benchmark is bits per second per capita, obtained by dividing the Internet bandwidth by the population.

60. Data can be collected for both international and domestic Internet backbone connectivity. The data are obtained from Internet service providers (ISPs) with domestic and international connectivity infrastructure.

Indicator 17: International Internet bandwidth, in Mbit/s (i4214)

Definition:

International Internet bandwidth refers to the total used capacity of international Internet bandwidth, in megabits per second (Mbit/s). It is measured as the sum of used capacity of all Internet exchanges (locations where Internet traffic is exchanged) offering international bandwidth. If capacity is asymmetric (i.e. more incoming (downlink) than outgoing (uplink) capacity), then the incoming (downlink) capacity should be provided. This indicator includes:

Indicator 17a: International outgoing Internet bandwidth, in Mbit/s (i4214og)

Refers to the total outgoing used capacity of international Internet bandwidth, in Mbit/s. This is measured as the sum of outgoing (uplink) capacity of all Internet exchanges offering international bandwidth.

Indicator 17b: International incoming Internet bandwidth, in Mbit/s (i4214ic)

Refers to the total incoming used capacity of international Internet bandwidth, in Mbit/s. This is measured as the sum of incoming (downlink) capacity of all Internet exchanges offering international bandwidth.

Clarifications and scope:

This indicator refers to the *used* capacity of international connections between countries for transmitting Internet traffic. Out of the total international bandwidth available in the country (i.e. the *potential* capacity of the connections), there is a part that corresponds to the *contracted* or purchased capacity. This *contracted* capacity refers to bandwidth put into service, but not all of which is used; some is held in reserve for restoration or redundancy. This indicator thus refers to the portion of the *contracted* capacity that is actually *used* to carry traffic. If the bandwidth is asymmetric, the incoming (downlink) capacity should be provided.

This indicator can be multiplied by 1 million and divided by the population to derive international Internet bandwidth per inhabitant (bits/second/inhabitant), *Partnership* core ICT indicator A6.

Method of collection:

Data on bandwidth can be collected from all ISPs in the country that contract international Internet bandwidth, and then aggregated at the country level. Another alternative would be to collect the data from facilities-based carriers that provide wholesale international connectivity.

Relationship with other indicators:

Indicator 17 is not equal to the sum of values of Indicator 17a and Indicator 17b, which are each equivalent to Indicator 17 if international bandwidth is symmetric. If international bandwidth is asymmetric, then Indicator 17 is equal to the value of Indicator 17b. Indicator 17 complements Indicator 18.

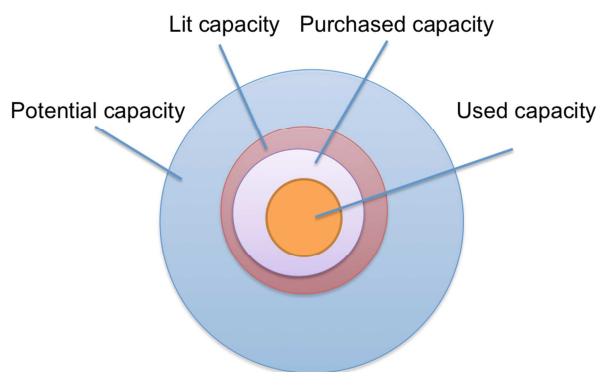
Methodological issues:

The definition of bandwidth indicators may differ between countries depending on how the asymmetric bandwidth is accounted for. For total international Internet bandwidth, countries should not add incoming (download) and outgoing (upload) bandwidth, but instead report just the total incoming capacity.

Example:

Example 11 illustrates the differences between *potential*, *lit*, *purchased* (or “contracted”) and *used* capacity in international fibre-optic networks. *Potential* capacity refers to the total theoretical bandwidth that is available. In the case of fibre systems, this includes *lit* (turned on) and *unlit* (*dark fibre* not available for use) capacity. *Lit* capacity thus refers to the bandwidth in fibre networks where the fibre has been turned on and is ready for use. “*Purchased*” (i.e. *contracted*) capacity covers bandwidth put into service but not all of which is used; some is held in reserve for restoration or redundancy. *Used* capacity covers bandwidth which is available to carry traffic. It is this *used* capacity that Indicator 17 refers to. See also Example 12.

Example 11. Capacity in international fibre-optic networks



Source: ITU, adapted from EQUINIX,

http://eu-ix.equinix.com/joomladev/images/repository/Equinix_TGMap_MTS_15.pdf.

Indicator 18: Domestic Internet bandwidth, in Mbit/s (i4214d)**Definition:**

Domestic Internet bandwidth refers to the total used capacity of domestic Internet bandwidth, in megabits per second (Mbit/s).

Clarifications and scope:

This indicator refers to the *used* capacity for exchanging national Internet traffic. Out of the total national bandwidth available in the country (i.e. the *potential* capacity of the connections), there is a part that corresponds to the *contracted* or purchased capacity. This *contracted* capacity refers to bandwidth put into service, but not all of which is used; some is held in reserve for restoration or redundancy. This indicator thus refers to the portion of the *contracted* capacity that is actually *used* to carry traffic. It refers to the capacity ISPs use to connect to Internet exchanges.

Method of collection:

Data can be collected from public Internet exchanges in the country, which should be able to supply the aggregated total for an exchange. If there is more than one exchange, the data can be aggregated to obtain country level data.

Relationship with other indicators:

Indicator 18 is not related to other indicators in the Handbook, but complements Indicator 17.

Methodological issues:

This indicator refers to the total domestic Internet bandwidth for exchanging national traffic. ISPs can have different bandwidth capacities depending on the route and topology of their backbone networks. Therefore, the methodology to use is to add up the bandwidth that is available to each ISP at locations where Internet traffic is exchanged, such as Internet exchanges or network access points.

Examples:

The Internet Information Research Network Technology Lab of the National Electronics and Computer Technology Center (NECTEC) compiles monthly data on domestic and international Internet bandwidth in Thailand (Example 12). The data are compiled by adding up the bandwidth available to each ISP.

Example 12. Total international and domestic Internet bandwidth, Thailand

Y-M-D	Total international bandwidth (Mbit/s)	Total domestic bandwidth (Mbit/s)
2010-08-18	158 680	721 217
2010-01-01	110 243	641 317
2009-08-07	70 561	272 427
2009-01-09	56 385	251 091
2008-08-05	30 071	226 060
2008-01-07	23 272	157 910

Source: Adapted from NECTEC, available at <http://internet.nectec.or.th/webstats/bandwidth.iir?Sec=bandwidth>.

Fixed (wired) Internet subscriptions

61. Indicators in this group deal with all fixed (wired) Internet subscriptions, whether broadband or narrowband. The next section (Fixed (wired)-broadband subscriptions) deals with the broadband component.

62. Both residential and business subscriptions should be included.

Indicator 19: Fixed (wired) Internet subscriptions (i4213)

Definition:

Fixed (wired) Internet subscriptions refers to the number of active fixed (wired) Internet subscriptions at speeds less than 256 kbit/s (such as dial-up and other fixed non-broadband subscriptions) and total fixed (wired)-broadband subscriptions. This indicator includes (but is not necessarily the sum of):

Indicator 19a: Dial-up Internet subscriptions (i4213d)

Refers to all active Internet subscriptions that use a modem and fixed-telephone line to connect to the Internet, and which require that the modem dial a phone number when Internet access is needed. If subscriptions for dial-up access are not required, then the indicator refers to the number of active users (those connecting to the Internet at least once in the last three months). It excludes users of Internet cafes or Wi-Fi hotspots.

Indicator 19b: Fixed (wired)-broadband subscriptions (i4213tfb)

Refers to 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 and other fixed (wired)-broadband subscriptions. 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 exclude technologies listed under the wireless-broadband category.

Clarifications and scope:

This indicator refers to the total number of active Internet subscriptions using fixed (wired) networks. This includes dial-up access over the PSTN, other fixed (wired) subscriptions at speeds less than 256 kbit/s, and fixed (wired)-broadband networks such as DSL, cable modem, fibre and fixed ethernet. It excludes Internet subscriptions using wireless such as Wi-Fi and WiMAX, and Internet subscriptions using mobile-cellular networks. Indicators 19a and 19b do not cover all fixed (wired) Internet access, as some services are considered narrowband but are not dial-up. The scope of the indicator is active subscriptions, i.e. if they do not include a recurring monthly payment, only those used to connect to the Internet at least once in the last three months should be counted. On the other hand, all subscriptions including a recurring monthly fee should be counted as active. Both residential and business subscriptions should be included.

Any deviations from the definitions above (such as the treatment of mobile broadband using data cards) should be specified in a note.

In respect of Indicator 19b, if countries use a different definition of broadband, this should be indicated in a note.

Method of collection:

Data for these indicators should be collected from ISPs in the country. The data from each ISP should be aggregated to obtain a country total. In some countries, the Internet market is outside the scope of regulatory treatment, and therefore it may be difficult to collect the statistics. There may also be duplication if facilities-based operators include their wholesale subscriptions. Countries can overcome this by asking facilities-based operators only for their subscriptions, including wholesale, and not requesting non-facilities based ISPs to provide data. Alternatively, countries can ask for retail subscriptions only from all ISPs.

This indicator can be divided by the population and multiplied by 100 to derive fixed Internet subscriptions per 100 inhabitants, *Partnership* core ICT indicator A3.

Relationship with other indicators:

Indicator 19 includes the values of Indicator 19a and Indicator 19b, but may not equal the sum of the two indicators. This is due to other fixed (wired) Internet subscriptions that are considered to be narrowband but are not dial-up. Indicator 19a is not related to other indicators in the Handbook. Indicator 19b (Fixed (wired)-broadband subscriptions) is split into Indicators 20 and 21 (by technology and speed, respectively).

Methodological issues:

The treatment of fixed wireless broadband and mobile broadband using data cards varies between countries – some countries include these under fixed broadband or total broadband.

Example:

The Swedish Post and Telecom Agency (PTS) publishes statistics every six months on the number of fixed (wired) Internet subscriptions (Example 13) under the category of Internet subscriptions.

Example 13. Fixed (wired) Internet subscriptions (thousands), Sweden, 2010

Total Internet subscriptions		3 231
A	PSTN [1] (Modems up to 56 kbit/s)	241
B	ISDN [2]	3
C	xDSL [3]	1 591
D	Cable modem	596
E	Fibre and fibre LAN [4]	787
F	Other broadband access	13
Total fixed-broadband subscriptions (C+D+E+F)		2 987

Notes:

[1] Public switched telephone network. [2] Integrated services digital network. [3] Digital subscriber line. The two most common are ADSL (asymmetrical digital subscriber line) and VDSL (very high-speed digital subscriber line).

[4] Internet access is reached via a property network, i.e. a LAN (local area network), usually based on ethernet technology. The LAN is linked to a public fibre network, for example a wide area network (WAN). The property network, which may comprise optical-fibre cable or copper-based cable, links the individual dwellings/operations with the property node, which in its turn is connected to the wide area networks.

Source: Adapted from PTS, <http://www.statistik.pts.se/pts2010e/index.html>.

Fixed (wired)-broadband subscriptions

63. Fixed broadband is an important part of Internet infrastructure. It is essential for supporting the increasing speeds required by bandwidth-intensive applications. *Broadband* is defined as a service providing download speeds of at least 256 kbit/s. Fixed (wired) broadband consists of technologies providing Internet access over wireline networks such as fixed-telephone lines, coaxial cable television networks, fibre-optic cable, in-building ethernet cable and electrical power lines. Wireless broadband (Indicator 22) is not included in this category, and is treated separately with a different set of indicators. Example 14 illustrates the various types of fixed (wired)-broadband subscriptions used in the Republic of Korea and how they align with the indicators in this category.

64. Both residential and business subscriptions should be included.

Indicator 20: Fixed (wired)-broadband subscriptions (i4213tfb), by technology

Definition:

Fixed (wired)-broadband subscriptions, by technology refers to the number of fixed (wired)-broadband subscriptions to the public Internet (Indicator 19b) split by technology used. The indicator can be broken down as follows:

Indicator 20a: Cable modem Internet subscriptions (i4213cab)

Refers to the number of Internet subscriptions using a cable modem service to access the Internet, at downstream speeds greater than, or equal to, 256 kbit/s. Cable modem is a modem attached to a cable television network.

Indicator 20b: DSL Internet subscriptions (i4213dsl)

Refers to the number of Internet subscriptions using digital subscriber line (DSL) services to access the Internet, at downstream speeds greater than or equal to 256 kbit/s. DSL is a technology for bringing high-bandwidth information to homes and small businesses over ordinary copper telephone lines. It should exclude very high-speed digital subscriber line (VDSL) subscriptions if these are provided using fibre directly to the premises.

Indicator 20c: Fibre-to-the-home/building Internet subscriptions (i4213ftth/b)

Refers to the number of Internet subscriptions using fibre-to-the-home or fibre-to-the-building, at downstream speeds equal to, or greater than, 256 kbit/s. This should include subscriptions where fibre goes directly to the subscriber's premises or fibre-to-the-building subscriptions that terminate no more than 2 metres from an external wall of the building. Fibre-to-the-cabinet and fibre-to-the-node are excluded.

Indicator 20d: Other fixed (wired)-broadband subscriptions (i4213ob)

Refers to Internet subscriptions using other fixed (wired)-broadband technologies to access the Internet (other than DSL, cable modem, and fibre), at downstream speeds equal to, or greater than, 256 kbit/s. This includes technologies such as ethernet LAN, and broadband-over-powerline (BPL) communications. Ethernet LAN subscriptions refer to subscriptions using IEEE 802.3 technology. BPL subscriptions refer to subscriptions using broadband-over-powerline services. Users of temporary broadband access (e.g. roaming between PWLAN hotspots), users of WiMAX and those with Internet access via mobile-cellular networks are excluded.

Clarifications and scope:

The indicator refers to the total number of subscriptions to fixed (wired)-broadband access to the public Internet. It excludes fixed Internet access at speeds less than 256 kbit/s, and fixed wireless broadband subscriptions (included in Indicator 24, Terrestrial fixed wireless subscriptions). If subscriptions to lower-speed services cannot be excluded, this should be indicated in a note. Both residential and business subscriptions should be included.

Any deviations from the definitions above (such as the treatment of mobile broadband using data cards) should be specified in a note.

Method of collection:

The data can be collected by asking all ISPs in the country to provide the number of their fixed (wired)-broadband subscriptions (by type – cable, DSL, fibre optic, other).

This indicator can be divided by the population and multiplied by 100 to obtain fixed (wired)-broadband subscriptions per 100 inhabitants.

Relationship with other indicators:

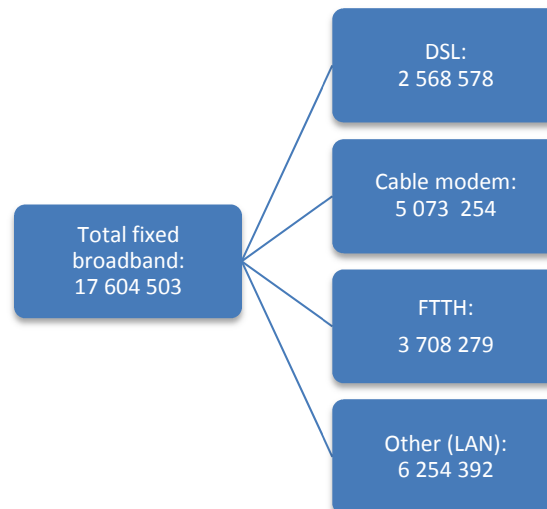
Indicator 20 is equal to the sum of the values of Indicators 20a to 20d. *Fixed (wired)-broadband subscriptions* is Indicator 19b, which is split into indicators 20 and 21 (by technology and speed, respectively). Indicator 20 complements Indicator 21.

Methodological issues:

Some countries may use a different definition of broadband. For example, some countries define broadband as less than 256 kbit/s or substantially more than 256 kbit/s. The other issue is the treatment of fixed wireless broadband – some countries include this under fixed broadband or total broadband.

Example:

Data compiled by the Korea Communications Commission (KCC) reveal a diverse range of fixed (wired)-broadband technologies in the Republic of Korea (Example 14). The largest share of subscriptions is for LAN using ethernet cable to distribute broadband access within apartments and office buildings in the densely populated country.

Example 14. Fixed (wired)-broadband subscriptions by technology, Republic of Korea, June 2011

Source: Adapted from KCC data published by the Korea Internet & Security Agency (KISA), available at <http://isis.nida.or.kr/eng/sub01/index.jsp?pagelId=010500#>.

Indicator 21: Fixed (wired)-broadband subscriptions (i4213tfb), by speed

Definition:

Fixed (wired)-broadband subscriptions, by speed refers to the number of fixed (wired)-broadband subscriptions to the public Internet (Indicator 19b), split by advertised download speed. The indicator can be broken down as follows:

Indicator 21a: 256 kbit/s to less than 2 Mbit/s subscriptions (4213_256to2)

Refers to all fixed (wired)-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 256 kbit/s and less than 2 Mbit/s.

Indicator 21b: 2 Mbit/s to less than 10 Mbit/s subscriptions (4213_2to10)

Refers to all fixed (wired)-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 2 Mbit/s and less than 10 Mbit/s.

Indicator 21c: Equal to or above 10 Mbit/s subscriptions (4213_G10)

Refers to all fixed (wired)-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than 10 Mbit/s.

Indicator 21d: 10 Mbit/s to less than 100 Mbit/s subscriptions (4213_10to100)

Refers to all fixed (wired)-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 10 Mbit/s and less than 100 Mbit/s.

Indicator 21e: 100 Mbit/s to less than 1 Gbit/s subscriptions (4213_100to1G)

Refers to all fixed (wired)-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 100 Mbit/s and less than 1 Gbit/s.

Indicator 21f: Above 1 Gbit/s subscriptions (4213_G1Gb)

Refers to all fixed (wired)-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 1 Gbit/s.

Clarifications and scope:

This group of indicators classifies fixed (wired) broadband Internet subscriptions by advertised speed. Advertised refers to the speed the ISP markets the subscription at, rather than the actual speed the user may experience. Speed is measured in megabits per second (Mbits/s). This indicator refers to fixed (wired)-broadband technologies, and excludes wireless-broadband technologies. Both residential and business subscriptions should be included.

Method of collection:

The data can be collected by asking each ISP in the country to provide the number of their fixed (wired)-broadband subscriptions by the speeds indicated for this group of indicators. The data can then be added up to obtain the country totals.

Relationship with other indicators:

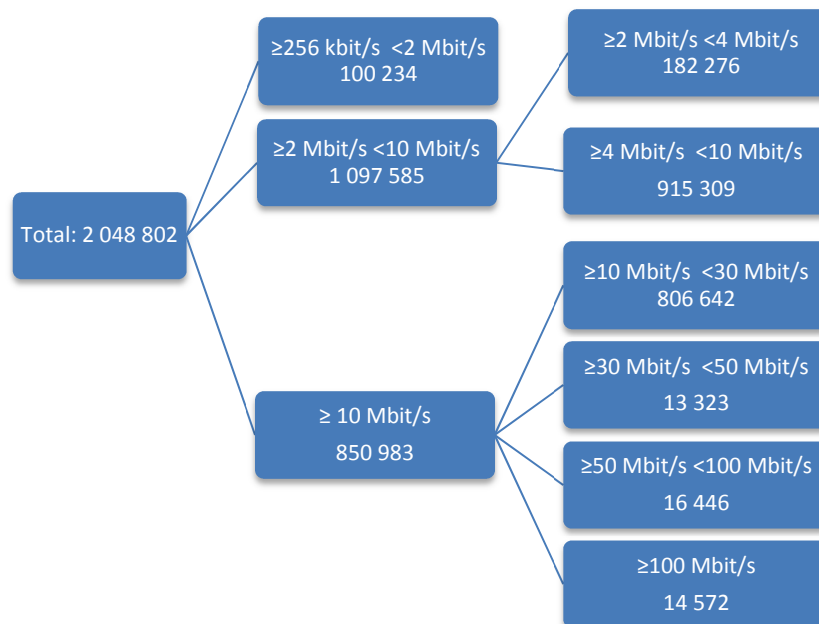
Indicator 21 is equal to the sum of the values of Indicators 21a to 21c, and Indicator 21c is the sum of the values of Indicators 21d to 21f. *Fixed (wired)-broadband subscriptions* is Indicator 19b, which is split into Indicators 20 and 21. Indicator 21 complements Indicator 20.

Methodological issues:

Fixed (wired)-broadband subscriptions can vary tremendously by speed, thus affecting the quality and functionality of Internet access. Since most ISPs offer plans linked to download speed, these indicators should be relatively straightforward to collect. Countries may use packages that do not align with the speeds used for this group of indicators. Countries are encouraged to collect the data in more speed categories so as to allow aggregation of the data according to the split shown above.

Example:

The National IT and Telecom Agency, Denmark, publishes data on fixed (wired)-broadband subscriptions by downstream capacity (Example 15). The figure below shows how the ranges used in Denmark correspond to those for this indicator. In the second quarter of 2010, the most popular speed was at least 4 Mbit/s and less than 10 Mbit/s.

Example 15. Fixed (wired)-broadband subscriptions by downstream capacity, Denmark, Q2 2010

Source: Adapted from National IT and Telecom Agency, Denmark (2010), *Telecom Statistics-Second Half of 2009*, available at <http://en.itst.dk/statistics/telestatistik/halvarsstatistik/2009/second-part-of-2009>.

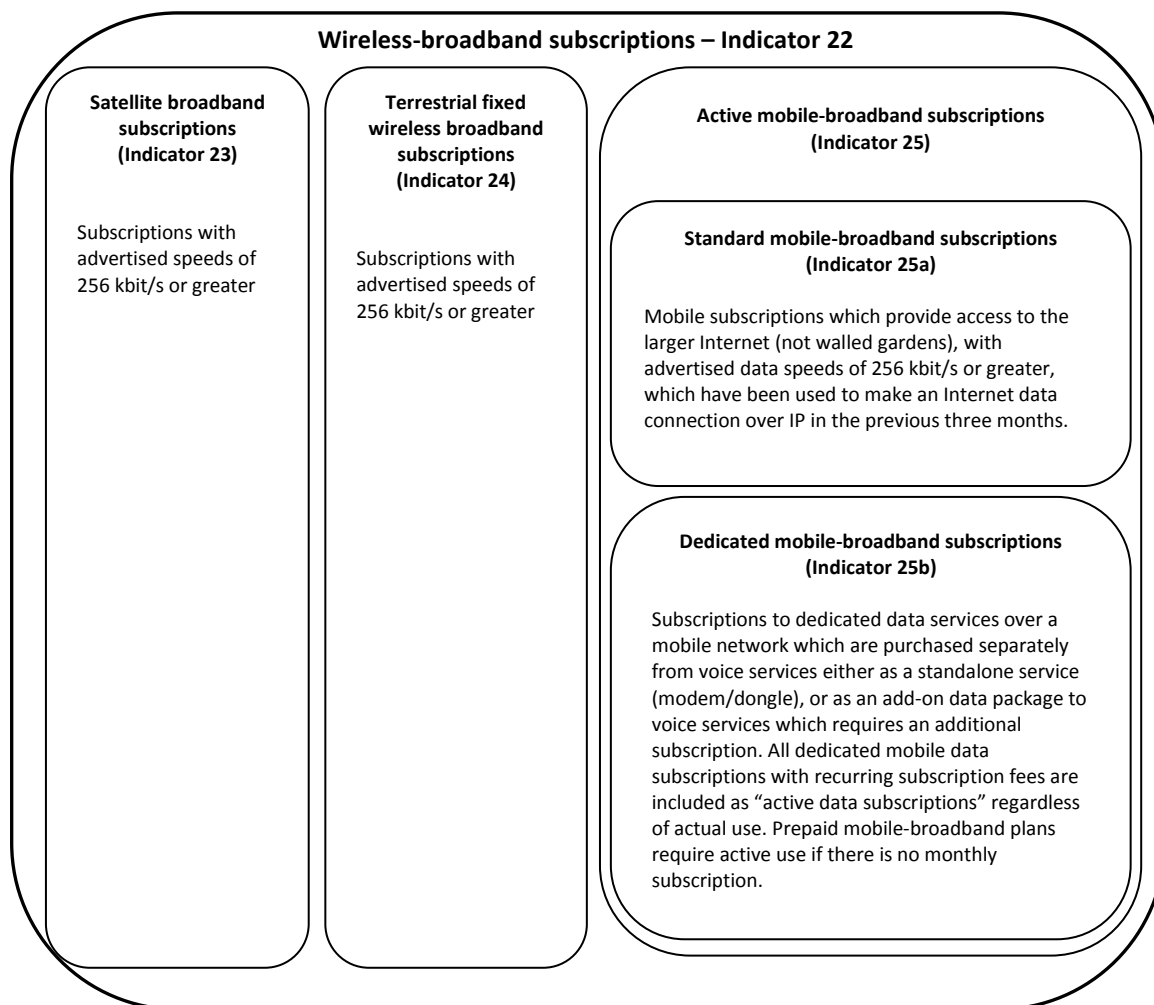
Wireless-broadband subscriptions

65. Indicators 22 to 25 capture information on wireless-broadband subscriptions to the public Internet and distinguish satellite broadband, terrestrial fixed wireless broadband and active mobile-broadband connections.

66. Subscriptions must include a recurring subscription fee or pass a usage requirement – users must have accessed the Internet in the last three months (Figure 4). This additional usage requirement for mobile-broadband subscriptions is imposed so as to exclude mobile-phone subscriptions that are capable of accessing the Internet at broadband speeds but have not been used for such access. Potential mobile-broadband access is measured in Indicator 12b, while Indicator 25 measures active mobile-broadband access. Both residential and business subscriptions should be included.

67. In order for subscriptions to be considered in this category, they need to provide access to the broader Internet and not just walled-garden or on-network content. For instance, users only downloading ringtones from their own provider's on-net application should not be counted as active. Neither should subscriptions providing access to e-mail services only, and not to the open Internet, be counted in the wireless-broadband indicators.

Figure 4. Wireless-broadband indicators



Source: ITU, adapted from OECD (2010), *Wireless Broadband Indicator Methodology*, at http://www.oecd-ilibrary.org/science-and-technology/wireless-broadband-indicator-methodology_5kmh7b6sw2d4-en.

Indicator 22: Wireless-broadband subscriptions (i271twb)**Definition:**

Wireless-broadband subscriptions refers to the sum of satellite broadband, terrestrial fixed wireless broadband and active mobile-broadband subscriptions to the public Internet.

Clarifications and scope:

The indicator refers to total active wireless-broadband Internet subscriptions using satellite, terrestrial fixed wireless or terrestrial mobile connections. Broadband subscriptions are those with an advertised download speed of at least 256 kbit/s. In the case of mobile-broadband, only active subscriptions are included (those with at least one access to the Internet in the last three months or with a dedicated data plan). The service can be standalone with a data card, or an add-on service to a voice plan. The indicator does not cover fixed (wired)-broadband or Wi-Fi subscriptions. Both residential and business subscriptions should be included.

Method of collection:

The data can be collected from all operators offering wireless-broadband services in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 22 is equal to the sum of the values of Indicators 23 (Satellite broadband subscriptions), 24 (Terrestrial fixed wireless broadband subscriptions) and 25 (Active mobile-broadband subscriptions).

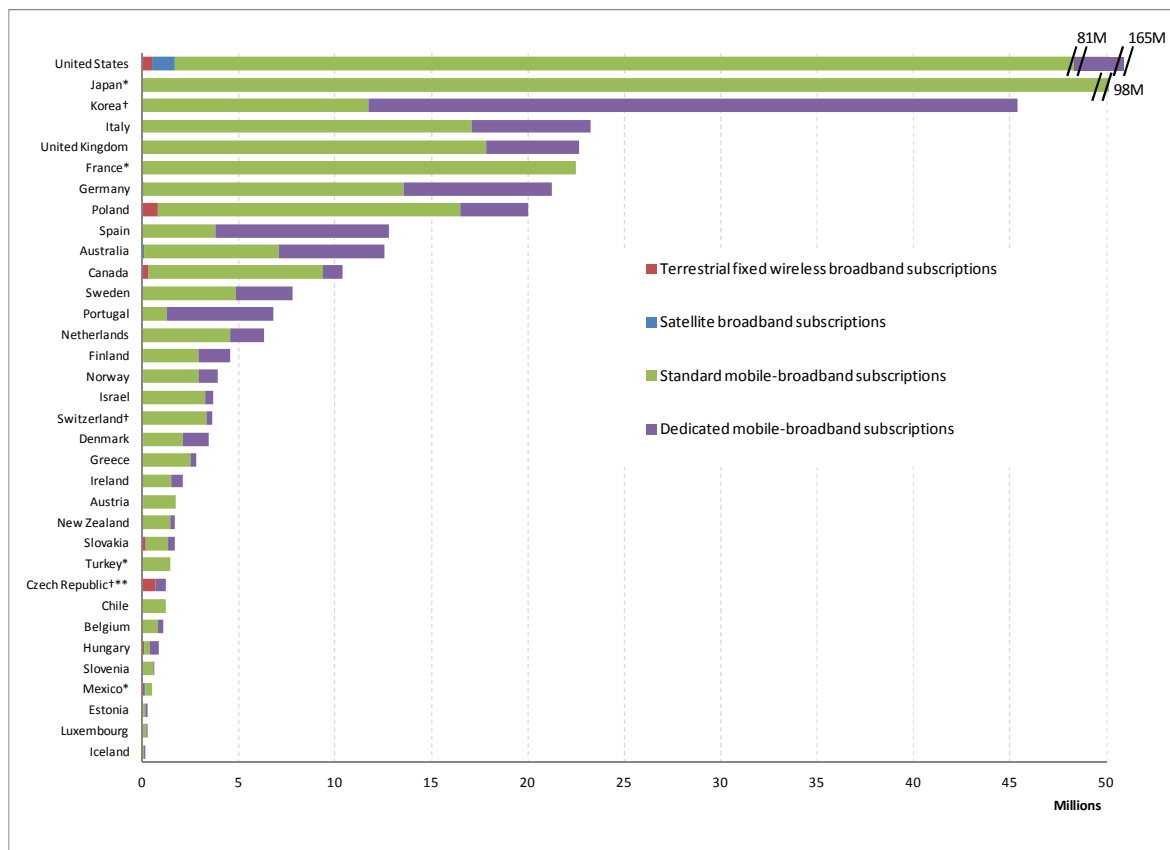
Methodological issues:

Comparability may be affected if countries do not adhere to the requirement that mobile-broadband subscriptions should be active through access to the Internet.

Example:

The Organisation for Economic Co-operation and Development (OECD) collects and publishes data on wireless-broadband subscriptions, including the breakdown into the different types of wireless-broadband subscriptions (Example 16).

Example 16. Wireless-broadband subscriptions, OECD countries, December 2010



Note: * Breakdown between standard and dedicated mobile-broadband subscriptions not available. † Terrestrial fixed wireless broadband subscriptions and/or satellite broadband subscriptions not available. ** Standard mobile-broadband subscriptions not available.

Source: ITU, adapted from OECD Broadband portal, at www.oecd.org/sti/ict/broadband.

Indicator 23: Satellite broadband subscriptions (i271s)**Definition:**

Satellite broadband subscriptions refers to the number of satellite Internet subscriptions with an advertised download speed of at least 256 kbit/s. It refers to the retail subscription technology and not the backbone technology.

Clarifications and scope:

This indicator refers to broadband Internet subscriptions using a satellite connection. The service should provide a two-way capability to both download and upload data. If the ISP provides dial-up or broadband access via a fixed connection but uses satellite for national or domestic backbone connectivity, these are not considered satellite broadband Internet subscriptions. Both residential and business subscriptions should be included.

Method of collection:

The data can be collected from all operators offering satellite broadband services in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 23 is a component of Indicator 22 (Wireless-broadband subscriptions).

Example:

See Example 16.

Indicator 24: Terrestrial fixed wireless broadband subscriptions (i271fw)**Definition:**

Terrestrial fixed wireless broadband subscriptions refers to the number of terrestrial fixed wireless Internet subscriptions with an advertised download speed of at least 256 kbit/s. This includes fixed WiMAX and fixed wireless subscriptions, but excludes occasional users at hotspots and Wi-Fi hotspot subscribers. It also excludes mobile-broadband subscriptions where users can access a service throughout the country wherever coverage is available.

Clarifications and scope:

This indicator refers to total wireless-broadband Internet subscriptions using a terrestrial fixed wireless connection. The subscriber utilizes an antenna (either provided by the operator or purchased) that allows connection to the ISP's network. Though users may have a certain degree of mobility, it is generally restricted to the range of one base station. Both residential and business subscriptions should be included.

Users of hotspots should be excluded when reporting the data for this indicator, since Wi-Fi does not in itself provide a direct connection to the Internet but redistributes a broadband connection (e.g. via DSL, cable modem, FTTH, WiMAX, broadband mobile cellular).

Any deviations from the definition above (especially distinguishing Indicator 24 from Indicator 25) should be indicated in a note.

Method of collection:

The data can be collected from all operators offering terrestrial fixed wireless-broadband services in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 24 is a component of Indicator 22 (Wireless-broadband subscriptions).

Methodological issues:

There may be difficulties in classifying terrestrial fixed wireless, particularly when data cards with a portable computer can be used to access the service and the service is widely available throughout the country. In this case, the distinction between this service and dedicated mobile-broadband subscriptions (Indicator 25b) is subtle.

Example:

See Example 16.

Indicator 25: Active mobile-broadband subscriptions (i271mw)

Definition:

Active mobile-broadband subscriptions refers to the sum of standard mobile-broadband and dedicated mobile-broadband subscriptions to the public Internet. It covers actual subscribers, not potential subscribers, even though the latter may have broadband enabled-handsets. Indicator 25 can be further broken down into:

Indicator 25a. Standard mobile-broadband subscriptions (i271mb_active)

Refers to active mobile-cellular subscriptions with an advertised data speed of 256 kbit/s or greater that allow access to the greater Internet via HTTP and have been used to make a data connection using Internet protocol (IP) in the previous three months. Standard SMS and MMS messaging do not count as active Internet data connections, even if they are delivered via IP.

This includes mobile subscriptions that use mobile-broadband services on a pay-per-use basis. It excludes mobile subscriptions with a separate monthly data plan for mobile-broadband access (see Indicator 25b, Dedicated mobile-broadband subscriptions).

Indicator 25b. Dedicated mobile-broadband subscriptions (i271md)

Refers to subscriptions to dedicated data services (over a mobile network) that allow access to the greater Internet and that are purchased separately from voice services, either as a standalone service (e.g. using a data card such as a USB modem/dongle) or as an add-on data package to voice services that requires an additional subscription. All dedicated mobile-broadband subscriptions with recurring subscription fees are included as 'active data subscriptions' regardless of actual use. Prepaid mobile-broadband plans require use in the last three months if there is no monthly subscription. This indicator could also include mobile WiMAX subscriptions, if there are any in the country.

Clarifications and scope:

The indicator refers to wireless-broadband Internet subscriptions using terrestrial mobile connections. Both residential and business subscriptions should be included.

Where it is difficult to assess the usage requirement for subscriptions not subject to a recurrent fee, and data are based on estimates, this should be specified in a note.

The distinction between dedicated and standard mobile-broadband subscriptions may be unclear, depending on the tariff structure of operators. If one or more operators are not able to provide this split, the aggregated figure should be reported, along with a note.

Any other deviations from the definition above (especially distinguishing Indicator 24 from Indicator 25) should be indicated in a note.

Method of collection:

The data can be collected from licensed mobile operators in the country that offer mobile-broadband services providing access to the Internet. These operators should have 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). Data are then aggregated at the country level.

Relationship with other indicators:

Indicator 25 is equal to the sum of the values of Indicator 25a and Indicator 25b. Indicator 25 is a component of Indicator 22 (Wireless-broadband subscriptions).

Methodological issues:

Comparability may be affected if countries do not adhere to the requirement that subscriptions should be active through access to the Internet. Some countries report the total number of mobile subscriptions with theoretical access to mobile-broadband services – this is Indicator 12b (Mobile-cellular telephone subscriptions with access to data communications at broadband speeds) – rather than the number of active subscriptions (i.e. those that have actually been used to access the Internet via the service).

The distinction between this service and terrestrial fixed wireless broadband can be subtle; see Indicator 24 for more information.

Example:

OECD has been a forerunner in the discussion of wireless-broadband indicators, and has developed a methodology for the collection of these indicators. The wireless-broadband indicators presented in this Handbook are harmonized with those proposed by OECD. The following table (Example 17) provides some illustrative examples on how to classify the most common mobile-broadband data plans:

Example 17. Examples of how to classify mobile-broadband data plans

Type of plan	Voice segment	Data segment	How counted
Standalone voice	Standard voice subscription	No subscription. Pay as you go data.	Must have active use. If active, counted in Indicator 25a.
3G dongle/modem subscription	None	Monthly subscription for data	Automatically counted as active in Indicator 25b.
Bundled voice and limited data	Standard voice subscription	Some data included in monthly subscription	Must have active use because the data plan is not purchased separately. If active, counted in Indicator 25a.
Bundled voice and unlimited data	Standard voice subscription	Advertised as “unlimited” data in the combined package but data caps are still common	Must have active use because the data plan is not purchased separately. If active, counted in Indicator 25a.
Standalone voice plan where the user subscribes to an add-on data plan	Standard voice subscription	Separate data plan	Automatically counted as active in Indicator 25b because the user purchased the data plan separately.
Standalone voice plan where the user buys data credits periodically to fill up the account	Standard voice subscription	No standalone data subscription. Only pay-as-you-go credits.	Must have active use because there is no data service purchased separately from voice. If active, counted in Indicator 25a.
Prepaid data-only plan using wireless modem	No subscription	No subscription	Must have active use. If active, counted in Indicator 25b.

Source: Adapted from OECD (2010), "Wireless Broadband Indicator Methodology", *OECD Digital Economy Papers*, No. 169, OECD Publishing, available at <http://dx.doi.org/10.1787/5kmh7b6sw2d4-en>.

Traffic

68. Measuring traffic reflects trends in the usage of telecommunication networks. This is becoming more critical as networks, particularly mobile networks, reach saturation and usage becomes more analytically interesting than penetration. Indicators in this category cover fixed-telephone, mobile-cellular networks and domestic Internet traffic. They can be used to derive indicators such as minutes of use per subscription and average number of SMS sent per subscription. This section also covers voice traffic and text messaging, which continue to account for a significant proportion of telecommunication sector revenue. Data traffic is growing in importance, but indicators to measure this are still unreliable on account of lack of harmonization in how countries report this.

69. This group of indicators is based on annual (reference year) data in respect of the year ending 31 December. Where data are not available for the year ending 31 December, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data). Where countries report data on the basis of a year not ending on 31 December, this should be specified in a note.

Fixed-telephone traffic

70. The indicators in this section refer to domestic and international traffic over fixed-telephone line networks.

Indicator 26: Domestic fixed-to-fixed telephone traffic, in minutes (i131m)

Definition:

Domestic fixed-to-fixed telephone traffic refers to completed local and domestic long-distance fixed-telephone voice traffic. The indicator should be reported as the number of minutes of traffic during the reference year. This should exclude minutes used for dial-up Internet access. The indicator can be broken down as follows:

Indicator 26a: Local fixed-to-fixed telephone traffic, in minutes (i1311m)

Refers to effective (completed) fixed-telephone line voice traffic exchanged within the local charging area in which the calling station is situated. This is the area within which one subscriber can call another on payment of the local charge (if applicable). This indicator should be reported in the number of minutes, which should exclude minutes used for dial-up Internet access.

Indicator 26b: Long-distance fixed-to-fixed telephone traffic, in minutes (i1312m)

Refers to effective (completed) fixed national long-distance telephone voice traffic exchanged with a station outside the local charging area in which the calling station is situated. The indicator should be reported as the number of minutes of traffic. It excludes local calls, calls to mobile networks, calls abroad, and calls to special service numbers such as ISPs for Internet dial-up.

Clarifications and scope:

This indicator refers to all fixed-to-fixed telephone traffic within the country. It excludes fixed-to-mobile traffic, fixed traffic to abroad and fixed traffic to special numbers.

Where some or all operators include unlimited (or a certain number of) calls or minutes in the monthly telephone subscription and do not account for this traffic, this should also be specified in a note.

Method of collection:

The data can be collected from all licensed fixed-telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 26 is equal to the sum of the values of Indicator 26a and Indicator 26b. Indicator 26 and its sub-indicators are not related to other indicators in the Handbook.

Methodological issues:

In some countries, for some operators, all domestic fixed-to-fixed telephone traffic is within one zone and priced at the same tariff. In this case, there is no distinction between local and national long-distance traffic. In addition, operators in some countries include unlimited (or a certain number of) calls or minutes in the monthly telephone subscription, and do not account for this traffic.

Indicator 27: Fixed-to-mobile telephone traffic, in minutes (i1313wm)**Definition:**

Fixed-to-mobile telephone traffic refers to total traffic from all fixed-telephone networks to all mobile-cellular networks within the country. The indicator should be reported as the number of minutes of traffic during the reference year.

Clarifications and scope:

This indicator refers to the effective (completed) volume of traffic in minutes sent from fixed-telephone lines to mobile networks within the country. The treatment of public payphone-to-mobile network traffic should be clarified in a note if it is not covered here.

Method of collection:

The data can be collected from licensed fixed-telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 27 is not related to other indicators in the Handbook.

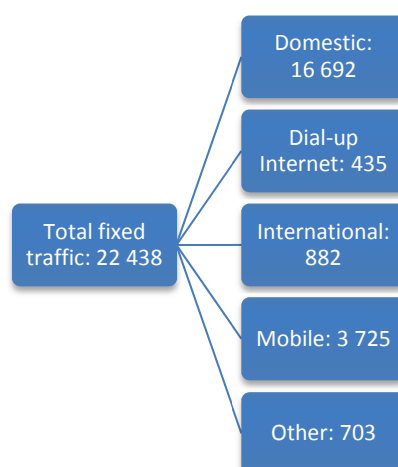
Methodological issues:

Data should refer to fixed-telephone line voice traffic to all national mobile networks, in minutes. Some operators may report minutes that are included in monthly plans, or may use different approaches for rounding traffic billed in seconds.

Example:

The Swedish telecommunication regulator, the Post and Telecom Agency (PTS), compiles data on domestic fixed-telephone traffic as shown in Example 18.

Example 18. Outgoing fixed traffic, Sweden, millions of minutes, 2010



Source: Adapted from PTS (2011), *The Swedish Telecommunications Market 2010*, available at <http://www.statistik.pts.se/pts2010e/>.

Indicator 28: International incoming and outgoing fixed-telephone traffic, in minutes (i132mb)

Definition:

International incoming and outgoing fixed-telephone traffic refers to the sum of international incoming and outgoing fixed-telephone voice traffic. The indicator should be reported as the number of minutes of traffic during the reference year. It can be broken down as follows:

Indicator 28a: International outgoing fixed-telephone traffic, in minutes (i132m)

Refers to effective (completed) fixed-telephone voice traffic originating in a given country to destinations outside that country. This should include traffic to mobile phones outside the country. The indicator should be reported in number of minutes of traffic. It excludes calls originating in other countries. It should include VoIP traffic.

Indicator 28b: International incoming fixed-telephone traffic, in minutes (i132mi)

Refers to effective (completed) fixed-telephone voice traffic originating outside the country with a destination inside the country, irrespective of whether the call was from a fixed or mobile subscriber. It excludes minutes of calls terminating in other countries, but should include VoIP traffic.

Clarifications and scope:

Indicator 28a may not reflect all outgoing international traffic, particularly if calls made using IP telephony are not included (see Methodological issues below). Indicator 28b may not reflect all incoming international traffic, particularly calls made using IP telephony that are re-routed to appear as local calls (see Methodological issues below).

Any such deviations from the definitions should be indicated in a note.

Method of collection:

The data can be collected from fixed-telephone operators in the country offering international telephone call services, and then aggregated at the country level.

Relationship with other indicators:

Indicator 28 is equal to the sum of the values of Indicator 28a and Indicator 28b. Indicator 28a is also a component of Indicator 38a (Total international outgoing telephone traffic). Indicator 28b is a component of Indicator 38b (Total international incoming telephone traffic).

Methodological issues:

Indicator 28a may not reflect all outgoing international traffic, particularly if calls made using IP telephony are not included. The treatment of call-back services may also affect how a call is accounted for. Call-back involves making an international call via a third country to take advantage of lower prices. For example, assume a user in Country A wants to call someone in Country B but finds that call-back is cheaper than directly calling Country B. Call-back works by the user in Country A calling a number in Country C, hanging up before the call is answered, waiting for the call-back and then dialling Country B. Even though the subscriber places the overseas call to Country B, the traffic is liable to be recorded as incoming traffic from Country C to Country A.

Indicator 28b may not reflect all incoming international traffic, particularly calls made using IP telephony that are re-routed to appear as local calls. This happens when the IP call enters the network of an ISP in the country, which then routes it over the local network. The treatment of call-back services may also affect how the call is accounted for (e.g. call-back may be considered outgoing).

Example:

International incoming traffic is generally handled differently in national regulatory agency reports. The Spanish NRA, the *Comisión del Mercado de las Telecomunicaciones* (CMT), reports minutes from incoming international traffic as a wholesale interconnection service (Example 19).

Example 19. Incoming international fixed-telephone minutes, Spain

Traffic of wholesale fixed interconnection services (millions of minutes)						
	2005	2006	2007	2008	2009	2010
Termination services	22 064.18	20 567.32	19 330.66	19 734.24	20 379.10	21 844.51
International	3 325.86	3 393.02	3 537.56	3 777.88	3 960.51	4 076.22

Source: Adapted from CMT (2011), *Informe Anual 2010*, available at:

<http://informeanual.cmt.es/docs/INFORME%20ANUAL%20CMT%202010.pdf>.

Mobile-telephone traffic

71. Traffic from mobile-telephone networks accounts for the majority of usage in many countries. The volume of mobile traffic is critical for monitoring usage and for deriving key performance indicators such as minutes of use, average revenue per minute and average number of SMS per user.

Indicator 29: Domestic mobile-telephone traffic, in minutes (i133wm)

Definition:

Domestic mobile-telephone traffic refers to the total number of minutes of calls made by mobile subscribers within a country (including minutes to fixed-telephone and minutes to mobile-phone subscribers). The indicator can be broken down as follows:

Indicator 29a: Outgoing mobile traffic to same mobile network, in minutes (i1331wm)

Refers to the number of minutes of calls made by mobile subscribers to the same mobile network (within the country). The indicator refers to the number of minutes originating on mobile networks and terminating on the same mobile network (on-net). It does not cover minutes of calls from mobile to fixed or mobile to other mobile networks.

Indicator 29b: Outgoing mobile traffic to other mobile networks, in minutes (i1332wm)

Refers to the number of minutes of calls made by mobile subscribers to other mobile networks (within the country). The indicator refers to the number of minutes originating on mobile networks and terminating on different domestic mobile networks (off-net). It does not cover minutes of calls from mobile to fixed or mobile to the same mobile networks.

Indicator 29c: Outgoing mobile traffic to fixed networks, in minutes (i1332wmf)

Refers to the number of minutes of calls made from mobile-cellular networks to fixed-line telephone networks within the country. The indicator refers to the number of minutes originating on mobile networks and terminating on fixed-line telephone networks within the country.

Clarifications and scope:

This indicator refers to the total amount of traffic (in minutes) originating on mobile phones with a destination to either fixed- or mobile-telephone subscriptions in the country.

Method of collection:

Data can be collected from mobile-telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 29 is equal to the sum of the values of Indicators 29a to 29c. Indicator 29 and its sub-indicators are not related to other indicators in the Handbook.

Methodological issues:

Countries may deal with the rounding of seconds to minutes or the inclusion of minutes in subscriptions differently.

Example:

Ofcom, the industry regulator in the United Kingdom, publishes quarterly data on mobile traffic showing the volume of each mobile operator (Example 20).

Example 20. Call volume by call type and operator, UK

Call volumes by call type and operator (millions of minutes)*					
	Vodafone	O2	Everything Everywhere	T-Mobile	Orange
UK calls					
2009 Q4	6 306	9 725		4 461	6 030
2010 Q1	6 502	9 712		4 473	6 181
2010 Q2	6 280	9 527	10 558		
2010 Q3	6 272	9 692	10 473		
2010 Q4	6 457	9 789	10 708		
Outgoing international					
2009 Q4	127	215		47	85
2010 Q1	114	197		45	82
2010 Q2	122	197	131		
2010 Q3	119	199	133		
2010 Q4	123	201	134		
While roaming abroad					
2009 Q4	143	149		34	62
2010 Q1	147	152		26	63
2010 Q2	177	193	116		
2010 Q3	190	225	104		
2010 Q4	151	146	64		
All calls					
2009 Q4	6 576	10 089		4 542	6 177
2010 Q1	6 763	10 061		4 544	6 326
2010 Q2	6 579	9 917	10 805		
2010 Q3	6 581	10 116	10 710		
2010 Q4	6 731	10 136	10 906		

Note: *Figures include estimates for resellers. Call volumes from MVNOs are not included.

Source: Adapted from Ofcom, *Telecommunications market data tables Q4 2010*, available at http://stakeholders.ofcom.org.uk/binaries/research/cmr/Q4_2010.pdf.

Indicator 30: Outgoing mobile traffic to international, in minutes (i1333wm)**Definition:**

Outgoing mobile traffic to international refers to the number of mobile minutes originating in a country to any destinations outside that country.

Clarifications and scope:

This indicator refers to minutes of calls originating on mobile-cellular networks with a destination abroad, irrespective of whether the call is to a fixed or mobile subscriber. It excludes minutes of calls originating in other countries and roaming minutes.

Any limitations with the indicator (e.g. if calls made using IP telephony are not included) should be specified in a note.

Method of collection:

The data can be collected from mobile operators in the country offering international telephone call services, and then aggregated at the country level.

Relationship with other indicators:

Indicator 30 is a component of Indicator 38a (Total international outgoing telephone traffic).

Methodological issues:

The indicator may not reflect all outgoing international traffic, particularly if calls made using IP telephony are not included. The treatment of call-back services may also affect how a call is accounted for. Call-back involves making an international call via a third country to take advantage of lower prices. For example, assume a user in Country A wants to call someone in Country B but finds that call-back is cheaper than directly calling Country B. Call-back works by the user in Country A calling a number in Country C, hanging up before the call is answered, waiting for the call-back and then dialing Country B. Even though the subscriber places the overseas call to Country B, the traffic is liable to be recorded as incoming traffic from Country C to Country A.

Example:

See Example 22.

Indicator 31: Incoming international traffic to mobile network, in minutes (i1335wm)**Definition:**

Incoming international traffic to mobile network refers to the number of incoming minutes (fixed and mobile) received by mobile networks originating in another country.

Clarifications and scope:

This indicator refers to minutes of calls terminating on mobile-cellular networks with an origination abroad, irrespective of whether the call is from a fixed or mobile subscriber. This should exclude roaming traffic.

Any limitations with the indicator (e.g. if calls made using IP telephony appear as local calls) should be specified in a note.

Method of collection:

The data can be collected from mobile operators in the country offering international telephone call services, and then aggregated at the country level.

Relationship with other indicators:

Indicator 31 is a component of Indicator 38b (Total international incoming telephone traffic).

Methodological issues:

The indicator may not reflect all incoming international traffic, particularly calls made using IP telephony that are re-routed to appear as local calls. This happens when the IP call enters the network of an ISP in the country which then routes it over the local network. The treatment of call-back services may also affect how the call is accounted for (e.g. call-back may be considered outgoing).

Example:

International incoming traffic is generally handled differently in national regulatory agency reports. The Spanish NRA, *Comisión del Mercado de las Telecomunicaciones* (CMT), reports minutes from incoming international traffic as a wholesale interconnection service (Example 21).

Example 21. Incoming international mobile minutes, Spain

Traffic of wholesale mobile interconnection services (millions of minutes)							
	2004	2005	2006	2007	2008	2009	2010
Mobile termination	20 641.62	24 135.60	26 914.31	27 831.09	29 083.16	29 554.41	31 551.21
National termination	19 170.21	22 609.7	25 365.45	26 227.19	27 352.94	27 928.79	29 875.18
International termination	1 471.41	1 525.9	1 548.86	1 603.90	1 730.22	1 625.61	1 676.03

Source: Adapted from CMT (2011), *Informe Anual 2010*, available at <http://informeanual.cmt.es/docs/INFORME%20ANUAL%20CMT%202010.pdf>.

Indicator 32: Roaming by home subscribers abroad (outbound roaming), in minutes (i1334wm)

Definition:

Roaming by home subscribers abroad (outbound roaming) refers to the total call minutes made and received by own customers in foreign networks (outbound roaming), i.e. retail international roaming minutes from own network subscribers roaming on foreign networks abroad. The indicator excludes minutes from users who are not subscribers to domestic mobile networks and are temporarily roaming on domestic mobile networks.

Clarifications and scope:

This indicator refers to the international roaming traffic of domestic mobile subscriptions, in minutes. It is the traffic that customers generate when they are using their mobile phones abroad. It does not refer to international traffic originating on mobile networks in the country, nor to foreign mobile subscribers generating roaming traffic in the country to which the data pertain.

Any deviations from the definition (e.g. a different treatment of roaming traffic) should be specified in a note.

Method of collection:

The data can be obtained from mobile-telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 32 is not related to other indicators in the Handbook.

Methodological issues:

Some countries may only report roaming traffic that is returned to the country, or calls placed within the country to mobile subscribers who are roaming abroad, or some other variation.

Example:

See Example 22.

Indicator 33: Roaming by foreign subscribers (inbound roaming), in minutes (i1336wm)

Definition:

Roaming by foreign subscribers (inbound roaming) refers to the total call minutes of visiting (foreign) subscribers making and receiving calls within a country (inbound roaming).

Clarifications and scope:

This indicator refers to the roaming traffic of foreign mobile subscribers, in minutes. It refers to the traffic they generate when they are roaming in the country to which the data refer. It does not refer to international traffic originating on mobile networks in the country, nor to domestic mobile subscribers generating roaming traffic abroad.

Any deviations from the definition (e.g. a different treatment of roaming traffic) should be specified in a note.

Method of collection:

The data can be obtained from mobile-telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 33 is not related to other indicators in the Handbook.

Methodological issues:

Some countries may only report incoming or outgoing roaming traffic that is generated by foreign subscribers.

Example:

See Example 22.

Indicator 34: SMS sent (i133sms)

Definition:

SMS sent refers to the total number of mobile short-message service (SMS) messages sent, both to national and international destinations. This should exclude messages sent from computers to mobile handsets or to other computers.

Clarifications and scope:

This indicator refers to text messages composed on, and sent from, a mobile handset to another mobile handset. It covers all SMS messages sent from mobile handsets to other mobile handsets (peer-to-peer), both to national and international destinations. It excludes SMS received, value-added SMS, premium SMS and SMS sent from web-based services.

Where the indicator includes both SMS sent and received, this should be indicated in a note.

Method of collection:

The indicator can be collected from all licensed mobile telephone operators in the country, and then aggregated at the country level. Some operators may only be able to report chargeable SMS, since they may not account for SMS sent as part of special add-on packages to mobile subscriptions.

Relationship with other indicators:

Indicator 34 includes the value for Indicator 35 (SMS international).

Methodological issues:

This indicator refers only to SMS messages sent from one mobile user, using their handset, to another mobile handset. Some operators may only be able to report chargeable SMS. Despite the definition, some countries, particularly those employing receiving party pays (RPP), report both SMS sent and received. In some countries, operators may only be able to report all SMS that pass through the SMS centre, thus including also machine-to-machine, machine-to-human and human-to-machine messages. If this is the case, it should be indicated in a note.

Example:

See Example 22.

Indicator 35: SMS international (i133smsi)

Definition:

SMS international refers to the total number of mobile short-message service (SMS) messages sent to international destinations. This should exclude messages sent from computers to mobile handsets or to other computers.

Clarifications and scope:

This indicator refers to SMS sent outside the country. It covers SMS composed on a mobile handset and sent to a mobile handset abroad. It excludes SMS received, SMS sent to users within the country, value-added SMS, premium SMS and SMS sent from web-based services.

Method of collection:

The indicator can be collected from all licensed mobile telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 35 is a component of Indicator 34 (SMS sent).

Methodological issues:

In some cases, it may be difficult to differentiate between value-added SMS, premium SMS and regular SMS, especially when definitions of SMS differ among countries. In some countries, operators may only be able to report all SMS that pass through the SMS centre, thus including also machine-to-machine, machine-to-human and human-to-machine messages. If this is the case, it should be indicated in a note.

Example:

See Example 22.

Indicator 36: MMS sent (i133mms)**Definition:**

MMS sent refers to the total number of mobile multimedia-messaging service (MMS) messages sent, both to national and international destinations. This should exclude messages sent from computers to mobile handsets or to other computers.

Clarifications and scope:

This indicator covers the number of MMS sent from mobile handsets to all destinations. An MMS is a message that can contain pictures or sound. It excludes SMS sent.

Only sent MMS should be recorded. If this is not possible, then it should be explained in a note.

Method of collection:

The indicator can be collected from all licensed mobile telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

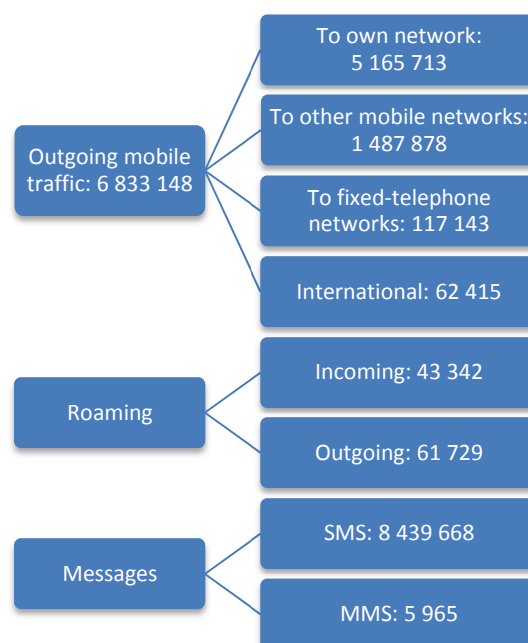
Indicator 36 is not related to other indicators in the Handbook.

Methodological issues:

Some countries may report both MMS sent and received (despite the definition). Some countries may report only chargeable MMS, on account of tariff options that include free MMS which operators do not record. In some countries, operators may only be able to report all MMS that pass through the MMS centre, thus including also machine-to-machine, machine-to-human and human-to-machine messages. If this is the case, it should be indicated in a note.

Example:

The Lithuanian Communications Regulatory Authority (RRT) publishes quarterly reports on the electronic communications sector, including mobile-traffic statistics (Example 22).

Example 22. Outgoing mobile traffic (thousands of minutes), Lithuania, 2010

Source: Adapted from RRT (2010), *Report on the electronic communications sector Quarter IV, 2010*, available at: http://www.rtt.lt/en/reviews-and-reports/reports-on-the-urpp/2010_617.html.

Indicator 37: VoIP traffic, in minutes (i131VoIP)
Definition:

VoIP traffic refers to the number of minutes of traffic using managed fixed voice-over-Internet protocol (VoIP) telephony. A managed VoIP service is a publicly available telephone service provided using VoIP for call origination, where the operator controls the quality of service provided. This variable specifies total VoIP traffic (national and international). It should exclude traffic exchanged using software-based VoIP, where the calls originate using computers that do not have an assigned telephone number.

Clarifications and scope:

This indicator refers to telephone traffic transmitted from broadband subscriptions using a voice-over-IP (VoIP) service, as defined in Indicator 4. This is typically part of a bundled service and works over the user's broadband connection with the telephone equipment plugged into the router. The traffic terminates at another telephone subscriber, and is expressed in minutes. It excludes VoIP traffic over applications that require a computer. It measures telephone-to-telephone traffic, and not computer-to-telephone or telephone-to-computer traffic.

Method of collection:

The data can be collected from licensed telephone operators and/or ISPs in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 37 is not related to other indicators in the Handbook.

Methodological issues:

This indicator shows the amount of telephone traffic generated from broadband networks using IP telephony. It reflects the transition from usage over conventional PSTN networks to next-generation networks (NGN). Note that it may not cover all VoIP traffic generated over fixed networks if the service is unlicensed or does not require regulatory reporting. It does not include traffic using VoIP mediated through a computer.

Example:

The French national regulatory authority, ARCEP, compiles data on VoB traffic (i.e. managed VoIP traffic) from fixed (wired)-broadband subscriptions, broken down by national, international and to mobile phones (Example 23).

Example 23. VoB minutes, France

Volumes of VoB communications (millions of minutes)	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	% change Q2 11/Q2 10
National communications	13 182	11 518	14 633	14 915	13 193	0.1%
International communications	1 948	1 684	2 141	2 275	2 314	18.8%
Communications to mobile	715	744	811	1 199	2 188	206.1%
Total VoB	15 845	13 945	17 585	18 389	17 695	11.7%

Source: Adapted from ARCEP, available at <http://www.arcep.fr/index.php?id=11054&L=0#c19655>.

Indicator 38: Total international incoming and outgoing telephone traffic, in minutes(i132tb)

Definition:

Total international incoming and outgoing telephone traffic refers to the sum of international incoming and outgoing fixed and mobile telephone traffic. The indicator can be broken down as follows:

Indicator 38a: Total international outgoing telephone traffic, in minutes (i132t)

Refers to effective (completed) international outgoing minutes of telephone traffic originating from national networks, fixed and mobile, including managed VoIP.

Indicator 38b: Total international incoming telephone traffic, in minutes (i132ti)

Refers to effective (completed) international incoming minutes of telephone traffic originating outside the country and terminating in national fixed and mobile networks without transit, including managed VoIP.

Clarifications and scope:

Indicator 38a may not reflect all outgoing international traffic, particularly if calls made using IP telephony are not included. Indicator 38b may not reflect all incoming international traffic, particularly calls made using IP telephony that are re-routed to appear as local calls. See Methodological issues below for more information.

Limitations with Indicator 38a or 38b, or both, should be explained in a note.

Method of collection:

The data can be collected from fixed and mobile operators in the country offering international telephone call services, and then aggregated at the country level.

Relationship with other indicators:

Indicator 38 is equal to the sum of the values of Indicator 38a and Indicator 38b. Indicator 38a is the sum of the values of Indicator 28a (International outgoing fixed-telephone traffic) and Indicator 30 (Outgoing mobile traffic to international). Indicator 38b is the sum of values of Indicators 28b (International incoming fixed-telephone traffic) and 31 (Incoming international traffic to mobile network).

Methodological issues:

The components of Indicator 38a (Indicator 28a and Indicator 30) may not reflect all outgoing international traffic, particularly if calls made using IP telephony are not included. The treatment of call-back services may also affect how a call is accounted for. See Indicator 28 for information on call-back.

The components of Indicator 38b (Indicator 28b and Indicator 31) may not reflect all incoming international traffic, particularly calls made using IP telephony that are re-routed to appear as local calls. This happens when the IP call enters the network of an ISP in the country, which then routes it over the local network. The treatment of call-back services may also affect how the call is accounted for.

Domestic Internet traffic

72. Indicator 39 is a measure of the volume of daily peak traffic exchanged over public Internet exchanges.

Indicator 39: Domestic Internet traffic

Definition:
Domestic Internet traffic refers to the average volume of traffic, expressed in gigabits per second (Gbit/s), exchanged over public Internet exchanges in a year.

Clarifications and scope:
 This indicator refers to the average volume of traffic exchanged over public Internet exchanges in a year. Exchanges typically report average incoming and outgoing traffic, which is generally the same figure. If it is not, then the incoming figure should be used. This indicator does not refer to the capacity of ISPs connected to the exchange.

Method of collection:
 The data can be collected from public Internet exchanges operating in the country. If there is more than one public Internet exchange, then the data can be aggregated to obtain a total for the country. Practically all public Internet exchanges compile data on the volume of traffic, and these are often reproduced in so-called multi-router traffic grapher (MRTG) charts from which data can be collected (see Example 24 below).

Relationship with other indicators:
 Indicator 39 is not related to other indicators in the Handbook.

Methodological issues:
 If a country does not have a public Internet exchange, then it will not be possible to obtain the data. It should be noted that not all Internet exchanges measure traffic using the same periodic average. If the period for which the data is reported does not correspond to a calendar year, this should be indicated in a note.

Example:
 Example 24 shows daily traffic statistics from the Budapest Internet exchange in Hungary. The average daily traffic on 6 October 2011 was 73.3 Gbit/s. The average traffic for the whole calendar year would be obtained by requesting the corresponding data covering the whole period.

Example 24. Daily traffic statistics, Hungary

Summary BIX-IPv4-Total				
Timerange from 2011.10.06 11:07:36 to 2011.10.07 11:07:36				
Traffic Statistics	Maximum	Average	Minimum	Current
Incoming:	139.4 Gbit/s	73.3 Gbit/s	16.5 Gbit/s	78.9 Gbit/s
Outgoing:	139.3 Gbit/s	73.3 Gbit/s	16.5 Gbit/s	78.9 Gbit/s
Daily timerange marker				

Graph generated at: 2011.10.07 11:07:37

Source: <http://www.bix.hu/index.php?lang=en&page=graph&swid=Summary&portid=BIX-IPv4-Total>. For an example of a report using this indicator, see: http://www.euro-ix.net/resources/reports/euro-ix_report_2010.pdf.

Tariffs

73. Data on the level and structure of tariffs (prices of ICT services) serve several analytical purposes. First, prices provide information about the affordability of ICT services. Second, the structure of prices illustrates the emphasis placed on fixed charges versus usage charges. This section includes indicators measuring the retail prices paid by consumers for fixed-telephone, mobile-cellular and fixed (wired)-broadband Internet services. Mobile-broadband tariffs are not included, but are currently under discussion for inclusion in a future version of this Handbook.

74. Given the large number of tariff plans and variations in countries, these tariff indicators aim for practicality in order to reduce the burden on data compilers and improve comparability of data across countries. The indicators included in this section reflect the scope of the tariff collection carried out by ITU, and the constraints of carrying out such comprehensive data collection. Countries may further expand the scope of the collection at the national level by collecting additional indicators to those proposed in this section or by extending the data collection to more operators.

75. The following guidelines should be applied when compiling the data for the indicators described in this section:

1. The tariffs of the operator with the largest market share (measured by the number of subscriptions) should be used.
2. The same tariff plan should be applied across all the indicators for the specific service. For example, given Plan A for local telephone service, the elements in Plan A should be used for the connection, subscription and local-call charges.
3. Tariffs that the majority of consumers pay should be used (for example, if most of the customers are in urban areas, use urban tariffs; if most fixed broadband is through DSL, use DSL broadband tariffs).
4. Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.
5. Tariffs should be reported in national currency. If this is not the case, it should be indicated, and the currency used should be specified in a note.
6. Tariffs should refer to a regular (non-promotional) plan and should not use promotional offers, limited discounts or options such as special prices to certain numbers (for example, “friends and family”).
7. Peak is the busiest time of the day, usually during working hours of weekdays. If there are different peak tariffs, the most expensive one during the daytime should be selected.
8. If there are different off-peak tariffs, then the one that is the cheapest before midnight is used. If the only off-peak period is after midnight, then this should not be used. Instead, the peak rate should be used.
9. If no distinction is made between peak and off-peak tariffs, then the same tariff should be applied for the peak and off-peak indicators.
10. With convergence, operators are increasingly providing multiple services such as voice telephony, Internet access and television reception over their networks. They often bundle these offers into a single subscription. This can present a challenge for data collection, since it may not be possible to isolate the tariffs for one service. It is preferable to use tariffs for a specific service; but if this is not possible, then the additional services that are included in the tariff should be specified in a note.

76. Tariffs for each service consist of a number of indicators. A single tariff indicator could be compared over time or with other countries. However, since users pay a range of tariffs to use a service (e.g. subscription charge, on-net/off-net calls) and the structure of these tariffs can vary between countries (e.g. lower subscription versus higher usage charges, lower broadband subscription charges but with low usage limits), it is useful to combine the various charges into a basket for comparative purposes. The family of indicators defined for each service allows users to construct such baskets. Two of the tariff baskets, fixed-broadband Internet tariffs per month and mobile-cellular telephone prepaid tariffs per month, are used to derive *Partnership* core ICT indicators A8 and A9, respectively.

77. In respect of periodicity, this group of indicators refers to point-in-time (reference date) data.

Fixed local telephone service tariffs

78. Fixed local telephone service tariffs refer to the consumer cost for subscribing to and using the PSTN. In some countries, installation and subscription charges vary according to category of user (residential and business). There are separate indicators that reflect this difference. Some countries also have a variety of fixed-line tariff plans with varying levels of free calls or minutes included. Prepaid options are also available in some countries. Some operators may offer VoIP plans using a broadband connection.

79. The tariff indicators in this section refer to postpaid, entry-level PSTN charges. The fixed-telephone tariff components (installation fee, monthly subscription and cost of a local call) should refer to the same tariff plan selected.

Indicator 40: Installation fee for residential telephone service (i151)

Definition:

Installation fee for residential telephone service refers to the one-off charge involved in applying for a basic residential fixed-telephone service.

Clarifications and scope:

This indicator refers to the one-time amount paid to have a residential fixed-telephone service connected. If there are multiple plans available, the preference is for the entry-level, fixed, PSTN, postpaid service. If this is not the case, it should be specified in a note. This indicator does not cover installation charges for business users, installation charges for a fixed-broadband service or installation charges for voice services provided over mobile-cellular networks. It excludes deposits, other refundable amounts, and transfer fees. Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Where there are different charges for different exchange areas, the charge for the largest urban area in terms of population should be used, and this should be specified in a note. If different prices apply to the installation of a fixed-telephone line – depending on whether an apartment/house was previously connected to a fixed line, or not – the connection fee of a new but previously existing fixed-telephone line should be provided. A note should specify the price for installing a completely new line.”

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator’s website in most countries.

Relationship with other indicators:

Indicator 40 should refer to the same operator and plan used for Indicator 41 (Monthly subscription for residential telephone service), Indicator 42 (Price of a three-minute local call to a fixed-telephone line) and Indicator 43 (Price of a three-minute local call to a mobile-cellular phone).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and the choice of service reported. In particular, there are often ranges of prices associated with acquiring residential fixed-telephone services that vary according to the circumstances. These can include refundable deposits, different charges depending on whether it is a new installation or a transfer, different charges depending on whether or not the internal wiring exists, and charges for equipment purchase. Although only one-off, non-refundable, required charges should be included, this may not always be possible.

Indicator 41: Monthly subscription for residential telephone service (i152)**Definition:**

Monthly subscription for residential telephone service refers to the recurring fixed charge for subscribing to a residential postpaid PSTN service. The charge should cover the rental of the line, but not the rental of the terminal (e.g. telephone set), where the terminal equipment market is liberalized. If the rental charge includes any allowance for free or reduced-rate call units, this should be indicated.

Clarifications and scope:

This indicator refers to entry-level monthly rental for a residential fixed-telephone line. The preference is for a plan without the inclusion of free minutes or calls. If all plans contain free minutes or calls, the number of such should be specified in a note. Rentals that are charged on some other periodicity should be converted to monthly equivalents. It does not include a business fixed-telephone line monthly subscription or a fixed (wired)-broadband Internet monthly subscription. Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Where there are different charges for different exchange areas, the charge for the largest urban area in terms of population should be used, and this should be specified in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 41 should refer to the same operator and plan used for Indicator 40 (Installation fee for residential telephone service), Indicator 42 (Price of a three-minute local call to a fixed-telephone line) and Indicator 43 (Price of a three-minute local call to a mobile-cellular phone).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and the choice of plan reported. In particular, some countries/operators may only offer plans that include a certain number of minutes. Higher subscription charges may result from the inclusion of usage charges or low usage charges.

Indicator 42: Price of a three-minute local call to a fixed-telephone line

Definition:

Price of a three-minute local call to a fixed-telephone line refers to the price of a three-minute local call from a residential fixed-telephone line, including any call set-up charges, within the same exchange area using the subscriber's own terminal (i.e. not from a public telephone). The indicator should be split as follows:

Indicator 42a: Price of a three-minute local call to a fixed-telephone line, peak rate (i153)

Indicator 42b: Price of a three-minute local call to a fixed-telephone line, off-peak rate (i153o)

Clarifications and scope:

This indicator refers to the price of a three-minute local call from a residential fixed-telephone line to another fixed-telephone line. It does not refer to a fixed-to-mobile call, nor to a fixed-to-fixed long-distance call.

If calls are charged on a flat-rate basis (e.g. one price for a call of unlimited length), this should be indicated in a note. If there is no charge for local calls (usage included in the subscription charge), then the value entered should be zero, and this should be indicated in a note. If other particular tariff structures apply (e.g. users are charged per call or per hour), this should be indicated in a note. If there is a different tariff for the telephone usage portion of dial-up Internet or if telephone usage charges are not applied to dial-up Internet, this should be indicated in a note. If there is no distinction between peak and off-peak, then for Indicator 42b, the peak rate should be entered.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Where there are different charges for different exchange areas, the charge for the largest urban area in terms of population should be used, and this should be specified in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicators 42a and 42b complement each other, and should refer to the same operator and plan used for Indicator 40 (Installation fee for residential telephone service), Indicator 41 (Monthly subscription for residential telephone service) and Indicator 43 (Price of a three-minute local call to a mobile-cellular phone).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes, charging basis (e.g. flat-rate basis) and method of charging for dial-up Internet.

Indicator 43: Price of a three-minute local call to a mobile-cellular phone (i153fm)**Definition:**

Price of a three-minute local call to a mobile-cellular phone refers to the price of a three-minute local call from a residential fixed-telephone line, including any call set-up charges, to a mobile-cellular number. The indicator should be split as follows:

Indicator 43a: Price of a three-minute local call to a mobile-cellular phone, peak rate

Indicator 43b: Price of a three-minute local call to a mobile-cellular phone, off-peak rate

Clarifications and scope:

This refers to the price of a three-minute local call from a residential fixed-telephone line to a mobile-cellular number. The definition applies to both peak and off-peak calls, according to the time of the day when the call is made.

If calls are charged on a flat-rate basis (e.g. one price for a call of unlimited length), this should be indicated in a note. If there is no charge for local calls (usage included in the subscription charge), then the value entered should be zero, and this should be indicated in a note. If other particular tariff structures apply (e.g. users are charged per call or per hour), this should be indicated in a note. If there is a different tariff for the telephone usage portion of dial-up Internet, or if telephone usage charges are not applied to dial-up Internet, this should be indicated in a note. For Indicator 43b, if there is no distinction between peak and off-peak, then the peak rate should be entered.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Where there are different charges for different exchange areas, the charge for the largest urban area in terms of population should be used, and this should be specified in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicators 43a and 43b complement each other, and should refer to the same operator and plan used for Indicator 40 (Installation fee for residential telephone service), Indicator 41 (Monthly subscription for residential telephone service) and Indicator 42 (Price of a three-minute local call to a fixed-telephone line).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes, charging basis (e.g. flat-rate basis) and method of charging for dial-up Internet.

Indicator 44: Installation fee for business telephone service (i151b)

Definition:

Installation fee for business telephone service refers to the one-off charge involved in applying for a business basic fixed-telephone service.

Clarifications and scope:

This indicator refers to the one-time amount paid to have a business fixed-telephone service connected. Deposits, other refundable amounts and transfer fees should be excluded. If there are multiple plans available, the preference is for the entry-level, fixed, PSTN, postpaid service. If this is not the case, it should be specified in a note. This indicator does not cover installation charges for residential users or installation charges for voice services provided over mobile-cellular networks. If there is no distinction between residential and business subscribers, the residential charge should be reported. Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Where there are different charges for different exchange areas, the charge for the largest urban area in terms of population should be used, and this should be specified in a note. If different prices apply to the installation of a fixed-telephone line – depending on whether the premises where the business is located were previously connected to a fixed line, or not – the connection fee of a new but previously existing fixed-telephone line should be provided. A note should specify the price for installing a completely new line.”

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator’s website in most countries.

Relationship with other indicators:

Indicator 44 should refer to the same operator and plan used for Indicator 45 (Monthly subscription for business telephone service).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and the choice of service reported.

Example:

See Examples 25 and 26.

Indicator 45: Monthly subscription for business telephone service (i152b)**Definition:**

Monthly subscription for business telephone service refers to the recurring fixed charge for subscribing to a postpaid fixed-telephone service for business use. The charge should cover the rental of the line but not the rental of the terminal (e.g. telephone set), where the terminal equipment market is liberalized. If the rental charge includes any allowance for free or reduced rate call units, this should be indicated.

Clarifications and scope:

This indicator refers to entry-level monthly rental for a business fixed-telephone line. The preference is for a plan without the inclusion of free minutes or calls. If all plans contain free minutes or calls, the least expensive plan should be used and the number of free included minutes or calls should be specified in a note. Rentals that are charged on some other frequency should be converted to monthly equivalents. The indicator does not include a residential fixed-telephone line monthly subscription (however, if there is no distinction between residential and business subscribers, the residential charge should be reported) or a fixed (wired)-broadband monthly subscription. Taxes should be included. If not included, this information, and the applicable tax rate, should be provided in a note.

Where there are different charges for different exchange areas, the charge for the largest urban area in terms of population should be used, and this should be specified in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 45 should refer to the same operator and plan used for Indicator 44 (Installation fee for business telephone service).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and the inclusion of free calls or minutes in the monthly rental. In particular, some countries/operators may only offer plans that include a certain number of minutes. This generally results in higher subscription charges (as do situations where there are low usage charges). Therefore, it is imperative to include both subscription and usage charges when making cross-country comparisons.

Example:

Fixed-telephone installation, rental and usage charges for Mauritius Telecom are shown in Example 25, while Example 26 shows the methodology for converting them to the appropriate indicator.

Example 25. Fixed-line telephone tariffs, Mauritius, October 2011

One-off fees (MUR)		Residential		Business	
New conventional telephone line					
Security deposit *		Mauritian citizen	1 000	2 000	
		Non-Mauritian citizen	5 000		
Installation fee **			1 000	2 000	
Cost of apparatus (optional) **			1 000	1 000	
Take-over of an active line (MUR)					
Security deposit *		Mauritian citizen	1 000	2 000	
		Foreign citizen	5 000		
Installation fee **			Free	Free	
Extension					
Cost per socket **			50		
Wiring fee per socket **			150	350	
* Fees not subject to VAT, ** Fees subject to VAT					
Local-call tariffs (MUR)		Price for residential customers		Price for businesses	
		1st indivisible minute	additional second	1st indivisible minute	additional second
Monthly rental		90		225	
Domestic calls	Normal hours	0.85	0.01	0.85	0.01
	Off-peak (20h30 to 06h30)	0.60	0.01	0.60	0.01

Source: Adapted from Mauritius Telecom, at http://www.mauritiustelecom.com/home_services/once_off_fees.htm.

Example 26. Fixed-line telephone tariffs, methodology for conversion to the appropriate indicator

Indicator	Value	Calculation
40. Installation fee for residential telephone service	1 150	1 000 + VAT (15%)
44. Installation fee for business telephone service	2 300	2 000 + VAT (15%)
41. Monthly subscription for residential telephone service	103.5	90 + VAT (15%)
45. Monthly subscription for residential telephone service	258.8	225 + VAT (15%)
42a. Price of a three-minute fixed-telephone local call (peak rate)	2.4	$(0.85 + (0.01 \times 60) \times 2) + \text{VAT (15\%)}$
42b. Price of a three-minute fixed-telephone local call (off-peak rate)	2.1	$(0.60 + (0.01 \times 60) \times 2) + \text{VAT (15\%)}$

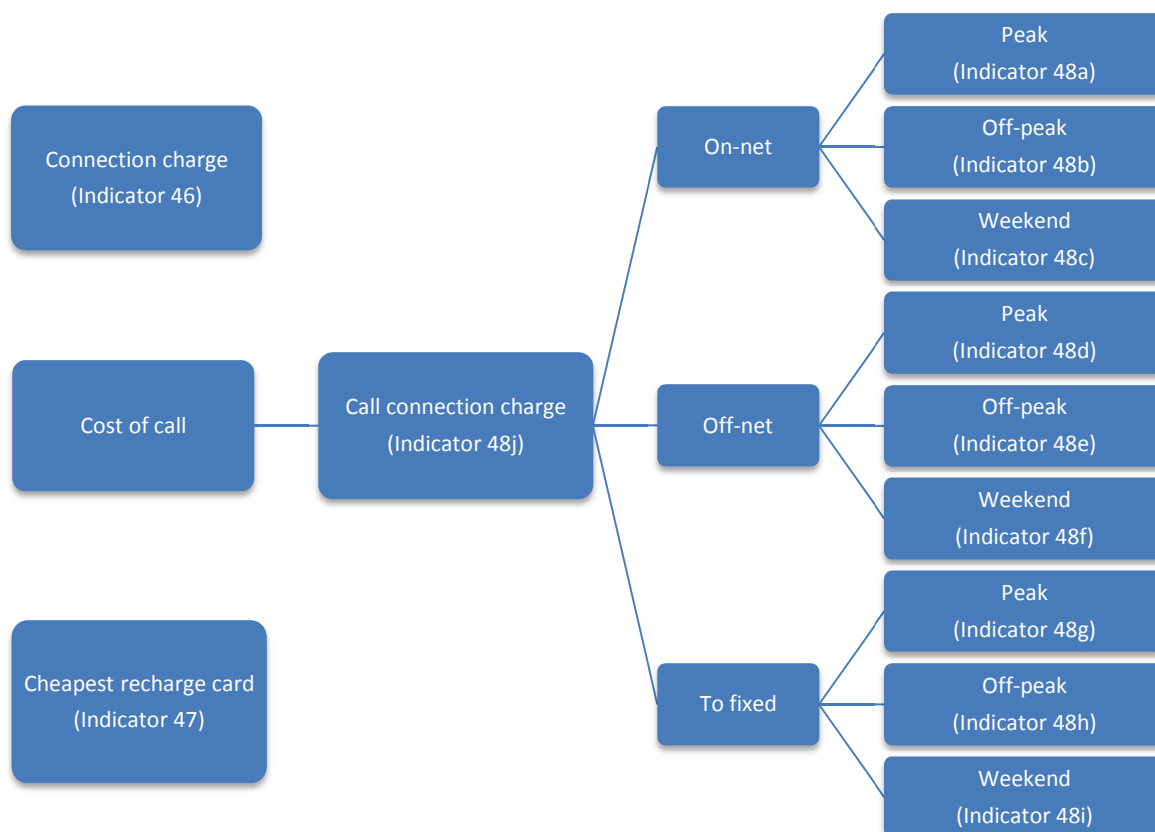
Mobile-cellular tariffs

80. In most countries, there is a wide variety of mobile tariffs provided by different operators. The mobile-cellular tariff indicators cover prepaid plans, as these are the most frequently used in most countries. The following overall rules and assumptions are applied to the mobile-cellular tariff indicators:

1. The tariffs refer to prepaid services.
2. The tariffs of the operator with the largest market share (measured by the total number of subscriptions) should be used.
3. Special offers and plans with limited availability (e.g. those reserved for a limited number of customers) shall not be used.
4. If subscribers can chose 'favourite' numbers (for family, friends, etc.) with a special tariff, this special tariff shall not be taken into consideration.
5. The tariffs refer to outgoing national calls. If different rates apply for local and national calls, then the local rate should be used.
6. Calls are often priced differently depending on the destination network. Descriptions of destination networks to which calls are made are as follows:
 - On-net (made to the same mobile network).
 - Off-net (made to another mobile network). If prices differ depending on the mobile network (i.e. there are more than two mobile networks in the country), then use the prices for calls to the second largest network in the country (measured by the number of subscriptions).
 - Fixed network (made to fixed-telephone networks). If prices differ depending on the fixed network (i.e. there is more than one fixed network in the country), then use the prices for calls to the largest fixed-line network (measured by the number of subscriptions).
7. Any connection costs per call are included in a separate sub-indicator.
8. If free minutes/calls/SMS are included in the connection fee, then details should be provided in a note.
9. Mobile operators often charge different rates depending on when the call is made. The exact times and days vary from country to country, but follow these general patterns:
 - Peak is the busiest time of the day, usually during working hours of weekdays. If there are different peak tariffs, the most expensive one during the daytime should be selected.
 - Off-peak. If there are different off-peak tariffs, then the one that is the cheapest before midnight is used. If the only off-peak period is after midnight, then this should not be used. Instead, the peak price should be used.
 - Weekend tariffs are typically applied on non-weekdays or holidays. If there are different weekend tariffs, the price that applies to Sundays during the daytime should be selected (or the equivalent day in countries where weekends are not on Sundays). If there is no weekend price, the average peak and off-peak price that is valid during the week should be used.
 - If calls are charged by the call (and not by the minute), then the price of the call should be used.
10. Relevant taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.
11. Tariffs should be reported in national currency. If this is not the case, it should be indicated, and the currency used should be specified in a note.
12. Some countries use the receiving party pays (RPP) system, whereby subscribers are charged to receive calls. If this is the case, it should be specified in a note.

81. Figure 5 provides an overview of the different mobile-cellular tariffs included in this section.

Figure 5. Mobile-cellular tariffs



Indicator 46: Mobile-cellular prepaid connection charge (i151p)**Definition:**

Mobile-cellular prepaid connection charge is the initial, one-time charge for a new prepaid mobile-cellular subscription. Refundable deposits should not be counted. The connection fee corresponds usually to the price charged for the subscriber identity module (SIM) card, but may include other fees. It should be noted if free minutes, free SMS or other free services are included in the connection charge.

Clarifications and scope:

This indicator refers to the one-time amount paid to have a prepaid mobile-telephone service. Cost of the handset, deposits, other refundable amounts, transfer fees and equipment charges should be excluded. This indicator does not cover the connection charge for a postpaid mobile service, a fixed-telephone service or a mobile data service.

If the connection charge includes an initial communications credit, this should be specified in a note.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of mobile-cellular subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 46 should refer to the same operator and plan used for Indicator 47 (Mobile-cellular – cheapest recharge card value), Indicator 48 (Mobile-cellular prepaid – price of a one-minute local call) and Indicator 49 (Mobile-cellular prepaid – price of SMS).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and inclusion of an initial credit in the connection charge. In some countries, the connection charge refers to the price of the SIM card needed to access the network. Many operators include free calls or text messages in the connection charge in order to attract customers to their network. This can affect the comparability of the indicator, because it makes the connection charge effectively zero or of significantly low value.

Example:

See Examples 27 and 28.

Indicator 47: Mobile-cellular – cheapest recharge card value (i151pcard)

Definition:

Mobile-cellular – cheapest recharge card value refers to the cheapest available prepaid recharge card.

Clarifications and scope:

This indicator refers to the least expensive recharge card for prepaid mobile services. It should refer to cards that are purchasable at outlets, and not to electronic or online recharges. The validity period should be specified in a note. If the data do not refer to the cheapest physical recharge value, or if the value of the card includes free usage, this should be specified in a note.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of mobile-cellular subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator’s website in most countries.

Relationship with other indicators:

Indicator 47 should refer to the same operator and plan used for Indicator 46 (Mobile-cellular prepaid connection charge), Indicator 48 (Mobile-cellular prepaid – price of a one-minute local call) and Indicator 49 (Mobile-cellular prepaid – price of SMS).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes, if the indicator does not refer to the cheapest physical recharge value, or if the value of the card includes free usage.

Example:

See Examples 27 and 28.

Indicator 48: Mobile-cellular prepaid – price of a one-minute local call

Definition:

Mobile-cellular prepaid – price of a one-minute local call refers to the price per minute of a prepaid call from a mobile-cellular telephone with a prepaid subscription. Indicator 48 should be split into the following indicators:

Indicator 48a: Mobile-cellular prepaid – price of a one-minute local call (peak, on-net) (153pn)

Indicator 48b: Mobile-cellular prepaid – price of a one-minute local call (off-peak, on-net) (153pon)

Indicator 48c: Mobile-cellular prepaid – price of a one-minute local call (weekend, on-net) (153pwn)

Indicator 48d: Mobile-cellular prepaid – price of a one-minute local call (peak, off-net) (153po)

Indicator 48e: Mobile-cellular prepaid – price of a one-minute local call (off-peak, off-net) (153poo)

Indicator 48f: Mobile-cellular prepaid – price of a one-minute local call (weekend, off-net) (153pwo)

Indicator 48g: Mobile-cellular prepaid – price of a one-minute local call (peak, to fixed) (153pf)

Indicator 48h: Mobile-cellular prepaid – price of one-minute local call (off-peak, to fixed) (153pof)

Indicator 48i: Mobile-cellular prepaid – price of a one-minute local call (weekend, to fixed) (153pwf)

Indicator 48j: Mobile-cellular prepaid – call connection charge (153pc)

Refers to any call charge required to establish a connection.

Clarifications and scope:

This indicator refers to the price of a one-minute prepaid call made to the same mobile-cellular network (on-net), a competing network (off-net) or a fixed-telephone line. If calls are charged in seconds or other intervals, they should be converted to one-minute equivalents. If the same price applies across all networks (on-net, off-net, to fixed), then that price should be used.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note. For Indicators 48a, 48b and 48c, if there are different peak tariffs, use the one that is the most expensive during the daytime. The peak-rate time period should be included in a note. It does not cover other time periods (e.g. off-peak, evening, weekend).

For Indicators 48d, 48e and 48f, if there are several off-peak times on weekdays, the cheapest time before midnight should be used. The off-peak rate time period should be included in a note.

For Indicators 48g, 48h and 48i, if there are different weekend tariffs, use the price for Sunday (or equivalent day in countries where weekends are on different days) during the daytime. The weekend-rate time period should be included in a note.

For Indicator 48j, if the charge differs according to whether the call is on-net/off-net or peak/off-peak, this should be specified in a note. Note that Indicator 48j differs from the other sub-indicators; it is not a per-minute charge, but a one-off fee applying to each call.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of mobile-cellular subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicators 48a to 48j complement each other, and should refer to the same operator and plan used for Indicator 46 (Mobile-cellular prepaid connection charge), Indicator 47 (Mobile cellular – cheapest recharge card value) and Indicator 49 (Mobile-cellular prepaid – price of SMS).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and different tariffs (for instance, use of most expensive rate if there is more than one peak rate).

Example:

See Examples 27 and 28.

Indicator 49: Mobile-cellular prepaid – price of SMS

Definition:

Mobile-cellular prepaid – price of SMS refers to the price of sending a short-message service (SMS) message from a mobile-cellular telephone with a prepaid subscription to a mobile-cellular number. Indicator 49 should be split into the following indicators:

Indicator 49a: Mobile-cellular prepaid – price of SMS (on-net) (153psms)

Indicator 49b: Mobile-cellular prepaid – price of SMS (off-net) (153sms_po)

Clarifications and scope:

These refer to the price of a national text message and not an international message. If there are different peak and off-peak rates, they should be averaged. The indicator refers to the default price a prepaid user pays to send an SMS. Therefore, it should refer to the price paid without consideration of special SMS packages, “buckets”, discounts of free SMS for recharging, etc. It does not cover the price of an international SMS or the price of SMS sent from computers. If there is no distinction between on-net and off-net SMS pricing, then the price of a sending a normal SMS should be used.

In countries applying receiving party pays (RPP), users may be charged to receive a text message. If this is the case, it should be specified in a note.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Method of collection:

Data should be collected from the operator with the largest market share (measured by the number of mobile-cellular subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator’s website in most countries.

Relationship with other indicators:

Indicators 49a and 49b complement each other, and should refer to the same operator and plan used for Indicator 46 (Mobile-cellular prepaid connection charge), Indicator 47 (Mobile cellular – cheapest recharge card value) and Indicator 48 (Mobile-cellular prepaid – price of a one-minute local call).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes and on-net/off-net rates (e.g. where there is no distinction between them).

Example:

Prepaid mobile-cellular tariffs for Orange, the largest mobile operator in Senegal (by number of subscriptions), are shown below (Example 27). The data are then mapped to the corresponding prepaid tariff indicator (Example 28).

Example 27. Prepaid mobile tariffs, Orange Senegal, October 2011

You pay XOF 2 000 for the Prepay Starter Pack and get XOF 2 000 worth of initial communications credit. Scratch cards are available in XOF 1 000, 2 500, 5 000, 10 000 or 25 000 denominations (VAT included).

Destination	Tariffs/minute
Calls to Orange mobiles – Peak (0600 – 0000 hours)	XOF 85
Calls to Orange mobile – Off-peak (0000 – 0600 hours)	XOF 50
Calls to fixed lines	XOF 85
Calls to other mobile operators	XOF 85
SMS on-net	XOF 20
SMS off-net	XOF 30

Source: Adapted from Orange Senegal. Extracted in October 2011 from <http://www.orange.sn/>.

Example 28. Prepaid mobile tariffs, methodology for conversion to the appropriate indicator

Indicator	Peak	Off-peak	Weekend	Note
Mobile-cellular prepaid connection charge	2 000			Including VAT. XOF 2 000 worth of credit
Mobile cellular – cheapest recharge card value	1 000			VAT already included.
Mobile-cellular prepaid – price of a local call per minute (on-net)	85	85	85	VAT already included.
Mobile-cellular prepaid – price of a local call per minute (off-net)	85	85	85	VAT already included
Mobile-cellular prepaid – price of a local call per minute (to fixed)	85	85	85	VAT already included
Mobile-cellular prepaid – price of SMS (on-net)	20			VAT already included
Mobile-cellular prepaid – price of SMS (off-net)	30			VAT already included

Note: Since the off-peak period is after midnight, it is not used. Instead, the peak rate is taken. Since there is no weekend tariff, the normal (peak) tariff is also used for the weekend.

Fixed (wired)-broadband Internet tariffs

82. Preference should be given to the most widely employed fixed (wired)-broadband technology, using the tariffs of the operator with the largest number of subscriptions. These tariff indicators are all interrelated, so the values should refer to the same offer. In other words, the connection charge, subscription charge, download speed, cap and tariff for usage beyond the cap should all relate to the same offer. The tariffs refer to the subscription services discussed in the earlier section *Fixed (wired)-broadband subscriptions*, where additional details about services can be found.

83. Some operators offer bundled plans that may include voice and video services with the broadband service. If there are no plans that feature only broadband Internet access, then the other services that are included should be specified in a note.

84. The offer should relate to entry-level plans with a download speed of at least 256 kbit/s. If there is a price distinction between home and business tariffs, the home tariff should be used. The indicators in this category should refer to the same operator and tariff plan.

85. Indicators 52 and 53 refer to speed and monthly cap. While not tariff indicators, they complement the tariff indicators by providing information on aspects of service quality apart from cost.

Indicator 50: Fixed (wired)-broadband connection charge (i4213bc)

Definition:

Fixed (wired)-broadband connection charge refers to the initial, one-time charge for a new fixed (wired)-broadband Internet connection. The tariffs should represent the cheapest fixed (wired)-broadband plan on the basis of a 1 gigabyte (GB) monthly usage. Refundable deposits should not be counted.

Clarifications and scope:

The indicator refers to the initial, one-time charge for a new fixed (wired)-broadband Internet connection. The tariffs should represent the cheapest fixed-broadband plan on the basis of a 1 GB monthly usage. The indicator should exclude refundable deposits, optional charges for installation that can generally be performed by most users (such as connecting the modem to the computer), installation charges for a fixed-telephone line or cable television connection, equipment rentals and any charges that are not required.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Method of collection:

Data should be collected from the tariff schedules of the ISP with the largest market share (measured by the number of fixed (wired)-broadband subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 50 should refer to the same operator and plan used for Indicator 51 (Fixed (wired)-broadband monthly subscription), Indicator 52 (Fixed (wired)-broadband speed), Indicator 53 (Fixed (wired)-broadband cap) and Indicator 54 (Fixed (wired)-broadband - price of excess usage).

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes.

Example:

See Example 29.

Indicator 51: Fixed (wired)-broadband monthly subscription charge (i4213bs)**Definition:**

Fixed (wired)-broadband monthly subscription charge refers to the monthly subscription charge for fixed (wired)-broadband Internet service. Fixed (wired) broadband is considered to be any dedicated connection to the Internet at downstream speeds equal to, or greater than, 256 kbit/s. If several offers are available, preference should be given to the 256 kbit/s connection.

Clarifications and scope:

This should include all associated monthly charges for fixed-broadband access. If the ISP charge (the price of accessing Internet content and applications) is separate from the network charge (the price of establishing the physical connection to the Internet), they should be added together. The indicator should refer to the entry-level broadband plan (the cheapest plan with a download speed of at least 256 kbit/s). It should exclude the cost of the fixed-telephone line subscription, if it can be used for other services. However, if a monthly rental for the physical line is not required (e.g. naked DSL, which does not require a telephone-line rental), this should be mentioned in a note. If a monthly rental of a fixed-telephone line is required, even though telephone service will not be used, this should be explained in a note. Equipment rentals should also be excluded (e.g. modem).

Where plans include other features such as free telephone calls, inclusion of the telephone-line rental or free video programming, it may not be possible to identify the price of broadband Internet access. In that case, it is important to explain in a note what other services are included with the broadband subscription.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Method of collection:

Data should be collected from the tariff schedules of the ISP with the largest market share (measured by the number of fixed (wired)-broadband subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 51 should refer to the same operator and plan used for Indicator 50 (Fixed (wired)-broadband connection charge), Indicator 52 (Fixed (wired)-broadband speed), Indicator 53 (Fixed (wired)-broadband cap) and Indicator 54 (Fixed (wired)-broadband - price of excess usage). Indicators 52 and 53, while not tariff indicators, complement Indicator 51 by providing information on aspects of service quality apart from cost.

Methodological issues:

Lack of comparability may arise because of differences in treatment of taxes, other charges (such as rental for a fixed-telephone line) and the inclusion of other features (such as free telephone calls). In addition, the indicator is not always comparable because the speed of the minimum broadband entry-level plan (the cheapest plan with a download speed of at least 256 kbit/s) varies between countries. For that reason, it may be useful to supplement this indicator with a measurement of the price per Mbit/s (dividing the monthly subscription charge by the download speed to which it refers). Another factor that may affect comparability is the practice in some countries or operators of separating the broadband access charge from the Internet access charge. The data should refer only to the price of broadband Internet access.

Example:

See Example 29.

Indicator 52: Fixed (wired)-broadband speed, in Mbit/s (i4213bs_s)

Definition:

Fixed (wired)-broadband speed, in Mbit/s refers to the advertised maximum theoretical download speed, and not speeds guaranteed to users associated with a fixed (wired)-broadband Internet monthly subscription.

Clarifications and scope:

The indicator refers to the published download speed of the fixed (wired)-broadband monthly subscription. It does not refer to the actual speed delivered. It refers to fixed broadband, and not to speeds less than broadband or to wireless broadband. The upload speed should be mentioned in a note.

Method of collection:

Data should be collected from the tariff schedules of the ISP with the largest market share (measured by the number of fixed (wired)-broadband subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's web-site in most countries.

Relationship with other indicators:

Indicator 52 should refer to the same operator and plan used for Indicator 50 (Fixed (wired)-broadband connection charge), Indicator 51 (Fixed (wired)-broadband monthly subscription), Indicator 53 (Fixed (wired)-broadband cap) and Indicator 54 (Fixed (wired)-broadband - price of excess usage).

Methodological issues:

The speed refers to the advertised download speed, not the actual speed that is delivered.

Example:

See Example 29.

Indicator 53: Fixed (wired)-broadband cap, in GB (i4213bs_c)**Definition:**

Fixed (wired)-broadband cap refers to the maximum amount of Internet data, in gigabytes (GB), that can be transferred within a month, included in the fixed (wired)-broadband monthly subscription.

Clarifications and scope:

This indicator refers to any usage cap imposed on the fixed-broadband Internet monthly subscription (expressed in GB). If there is no cap, then the value of zero should be entered. If there are separate caps for domestic and international traffic, then the international cap should be entered and explained in a note.

If the cap is expressed in hours, or there are other actions when the cap is exceeded (e.g. no more service for the month, reduction of speed), then this should be explained in a note.

Method of collection:

Data should be collected from the tariff schedules of the ISP with the largest market share (measured by the number of fixed (wired)-broadband subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 53 should refer to the same operator and plan used for Indicator 50 (Fixed (wired)-broadband connection charge), Indicator 51 (Fixed (wired)-broadband monthly subscription), Indicator 52 (Fixed (wired)-broadband speed) and Indicator 54 (Fixed (wired)-broadband - price of excess usage).

Methodological issues:

This indicator is not applicable when there is no cap on the monthly broadband subscription. Lack of comparability may arise because of differences in treatment, for instance, a reduction in speed when a monthly limit is exceeded.

Example:

See Example 29.

Indicator 54: Fixed (wired)-broadband - price of excess usage (i4213bs_cp)**Definition:**

Fixed (wired)-broadband - price of excess usage refers to the price per additional gigabyte (GB) of Internet data downloaded once the monthly allotted limit of the fixed (wired)-broadband subscription is used.

Clarifications and scope:

The indicator refers to the additional charges the fixed (wired)-broadband subscriber has to pay once the Internet data cap is exceeded. This refers to the excess charge per GB that subscribers pay when they exceed the monthly usage allotment. It is applicable to fixed-broadband subscriptions, and not wireless broadband or non-broadband fixed.

Where the unit is not gigabytes (e.g. if it is hours), this should be specified in a note.

Cases where there is no excess charge but service is interrupted, a new monthly subscription is required or the speed is reduced should be specified in a note.

Taxes should be included. If taxes are not included, this information, and the applicable tax rate, should be provided in a note.

Method of collection:

Data should be collected from the tariff schedules of the ISP with the largest market share (measured by the number of fixed (wired)-broadband subscriptions). If the operator has been sold or merged, then the data should be collected from the successor business. Tariff data are generally available on the operator's website in most countries.

Relationship with other indicators:

Indicator 54 should refer to the same operator and plan used for Indicator 50 (Fixed (wired)-broadband connection charge), Indicator 51 (Fixed (wired)-broadband monthly subscription), Indicator 52 (Fixed (wired)-broadband speed) and Indicator 53 (Fixed (wired)-broadband cap).

Methodological issues:

This is not applicable when there is no cap on the monthly broadband subscription. Lack of comparability may arise because of differences in units (e.g. hours instead of GB) and treatment of limits (for instance, a reduction in speed when a monthly limit is exceeded instead of the application of a charge for excess usage).

Example:

Batelco is the dominant fixed-broadband provider in Bahrain, and ADSL is the main fixed-broadband technology in the country. Fixed-broadband tariff information from Batelco (for October 2011) is shown in Example 29, along with the corresponding indicator and the value that should be used. The 640 kbit/s package is the entry-level offer. There is a monthly cap of 2 GB; any amount after that is charged at the rate of BHD 0.001 per MB. Note that the installation charges ("Registration fees") are free. Taxes are already included.

Example 29. ADSL monthly charges, Batelco, October 2011

	Residential package - Light	Indicator
Monthly tariffs (VAT included)	BHD 10	51. Fixed-broadband monthly subscription
Monthly data usage allowance (GB)	2	53. Fixed-broadband cap (GB)
Excess usage charge (VAT included)	BHD 0.001/MB	54. Fixed broadband, price of excess usage (per GB)
Download speed (kbit/s)	640	52. Fixed-broadband speed (Mbit/s)
Registration fees	0	50. Fixed-broadband connection charge

Source: Adapted from Batelco, extracted March 2011 from http://www.batelco.com/portal/broadband/broadband_packages.asp.

Quality of service

86. It is important to measure the quality of telecommunication networks in order to monitor their reliability and compare their performance with technical guidelines listed in licence conditions. Quality-of-service (QoS) indicators also inform consumers about the reliability of different operators. The QoS indicators covered in this section relate to the fixed-telephone line network. QoS indicators for other networks, including fixed-broadband and mobile-cellular networks, are under development and will be included in future updates of the Handbook.

87. The indicators refer to faults in the reference year, which is presumed to be the year ending 31 December for the previous year, unless specified otherwise. Where the calendar year is not the reference year, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data).

Indicator 55: Faults per 100 fixed-telephone lines per year (i143)

Definition:

Faults per 100 fixed-telephone lines per year refers to the total number of reported faults for fixed-telephone lines. Faults that are not the direct responsibility of the public telecommunication operator should be excluded. The number of faults per 100 fixed lines per year should reflect the total reported by all fixed-telephone operators in the country.

Clarifications and scope:

The indicator refers to technical faults on the fixed-telephone line network that render a customer's service unusable (i.e. the customer cannot make or receive calls). Faults that are not technical in nature or not under the control of the telephone operator should be excluded. This would include things such as the customer not plugging their phone in, or extreme weather conditions.

Method of collection:

The data can be collected from all licensed fixed-telephone operators in the country. It is preferable to ask operators for the number of faults rather than the faults per 100 fixed lines. Data for each operator should be aggregated at the country level, and then divided by the total number of analogue fixed-telephone lines and multiplied by 100 to obtain the resulting indicator for the country.

Relationship with other indicators:

Indicator 55 should refer to faults reported for analogue fixed-telephone lines (Indicator 3).

Methodological issues:

This indicator refers to technical faults on the fixed-telephone network. It does not reflect faults on other networks, such as mobile-cellular networks. For some countries, the indicator will include faults that are not technical in nature, where operators reporting the data do not have information on causes of faults.

Example:

See Example 30.

Indicator 56: Percentage of fixed-telephone faults cleared by next working day (i141)
Definition:

Percentage of fixed-telephone faults cleared by next working day refers to the number of reported faults for fixed-telephone lines that have been repaired by the end of the next working day (i.e. not including non-working days such as weekends and holidays). The indicator should reflect the total number of faults cleared across all fixed-telephone operators in the country.

Clarifications and scope:

This indicator refers to the percentage of fixed-telephone line faults repaired by the next working day. See the previous indicator for the definition of a fault. It does not refer to faults on the mobile-cellular network.

Method of collection:

The data can be collected from all licensed fixed-telephone operators. Operators should be asked for the total number of faults cleared by the next working day as well as the total number of faults. These data should then be aggregated at the country level, by dividing the total number of faults cleared by the next working day by the total number of faults and multiplying by 100.

Relationship with other indicators:

Indicator 56 should refer to faults reported for analogue fixed-telephone lines (Indicator 3).

Methodological issues:

This indicator refers to technical faults on the fixed-telephone network. It does not reflect faults on other networks, such as mobile-cellular networks. For some countries, the indicator will include faults that are not technical in nature, where operators reporting the data do not have information on causes of faults. It is possible that not all operators will report the fault-clearance rate on the basis of the same period.

Example:

The Telecommunications Regulatory Authority of India (TRAI) publishes a number of QoS statistics, which include data relating to the fixed-telephone network. The fixed-telephone network quality parameters compare the performance of operators in the country against benchmarks TRAI has established (Example 30).

Example 30. Fixed-telephone network quality of service, India, Q1 2011

Parameters	Benchmark	Service providers not meeting the benchmarks
Fault incidences per 100 subs/month	≤ 5	BSNL – Chhattisgarh (5.56), HP (6.77), MH (6.28), UP-W (5.08), Uttaranchal (5.37), WB (5.19) MTNL – Delhi (6.06), Mumbai (6.05) Bharti Airtel – MP (6.00) HFCL – Punjab (5.29)
% fault repaired by next working day	$\geq 90\%$	BSNL – A&N (84.85%), HP (87.86%), J&K (61.87%), Kolkata (88.80%), KR (79.37%), MH (82.00%), NE-II (87.81%), WB (89.19%) MTNL – Delhi (87.29%) HFCL – Punjab (88.53%)
% fault repaired within 3 days	$\geq 100\%$	BSNL – AP (96.79%), Assam (98.39%), Bihar (95.15%), CHN (98.55%), Chhatisgarh (98.90%), GJ (98.19%), HP (97.74%), HR(99.98%), J&K (72.45%), Kolkata (97.54%), Kerala (92.58%), KTK (97.63%), MH (86.50%), NE-I (99.37%), OR (99.78%), PB(99.50%), Raj(98.86%), TN(98.77%), UP E(99.39%), UP-W(99.07%), Uttaranchal (97.02%), WB(92.02%) Bharti Airtel – MP(99.23%) MTNL – Delhi (93.85%), Mumbai (97.51%) HFCL – Punjab(98.36%)

Source: Adapted from TRAI (2011), *The Indian Telecom Services Performance Indicators, January-March 2011*, available at: http://www.trai.gov.in/WriteReadData/trai/upload/Reports/55/Indicator_Report-Mar-11.pdf.

Persons employed

88. The two indicators included in this section refer to persons employed by operating entities in the telecommunication services sector, and exclude persons employed by entities engaged in broadcasting activities only. The businesses covered by these two indicators are entities as defined in ISIC Revision 4, Division 61 (Telecommunications).³⁴ Division 61 includes wired telecommunication activities, wireless telecommunication activities, satellite telecommunication activities and other telecommunication activities (such as the provision of specialized telecommunication applications, operation of telecommunication facilities, provision of telecommunication access in facilities open to the public and telecommunication resellers, i.e. purchasing and reselling network capacity without providing additional services). The level and structure of employment within the telecommunication sector is important for various analytical purposes. Indicators covered in this area provide information about employment trends and gender distribution. The indicators can also be used to derive productivity ratios, such as the number of fixed-telephone lines per employee and revenue per employee.

89. The data can typically be obtained from telecommunication operators and ISPs. Another option is to use business data from the national statistical agency if it can be disaggregated to show the telecommunication sector.

90. These indicators refer to point-in-time (reference date) data, which should be provided in respect of the end of the calendar year (31 December). Where the calendar year is not the reference year, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data). Where countries report data on the basis of a different date, this should be specified in a note.

³⁴ See Annex 4, Table 5.

Indicator 57: Full-time equivalent telecommunication employees (i51), by operator type

Definition:

Full-time equivalent telecommunication employees 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). The indicator is broken down as follows:

Indicator 57a: Persons employed by fixed-telecommunication operators

Indicator 57b: Persons employed by mobile-telecommunication operators (i51w)

Refers to FTE persons employed by mobile-cellular network operators. This includes mobile operators' employees only.

Indicator 57c: Persons employed by Internet service providers (i51_ISP)

Refers to FTE persons employed by ISPs. In cases where it is difficult to separate the exact number of staff working on Internet services, an estimate should be provided. Both wired and wireless ISPs should be included.

Clarifications and scope:

The indicator refers to all FTE telecommunication service staff employed by operators, regardless of occupation, in the telecommunication services (fixed and mobile) and Internet service provision industries. Entities covered by the indicator are defined according to ISIC Revision 4, Division 61 (Telecommunications), which excludes broadcasting and ICT equipment manufacturing. Resellers (businesses that purchase and resell network capacity without providing additional services) are included in Division 61, and are therefore within the scope of this indicator. 'Outsource' businesses that specialize in telecommunication services are also included. However, outsource businesses classified in other divisions in ISIC (e.g. Activities of call centres, see Division 8220) are excluded from the scope of this indicator.

Most operators that provide multiple services generally account separately for these activities, through the establishment of subsidiaries or accounting separation, and are therefore able to allocate staff to each service. In situations where operators provide multiple services and do not have an employee breakdown by type of service, they can estimate values for Indicators 57a to 57c. This should be specified in a note.

The preferred method for converting part-time to full-time employees is to use an eight-hour workday.

Method of collection:

The data can be collected from all licensed telecommunication operators and other telecommunication service entities whose activities are included in ISIC Revision 4, Division 61 (Telecommunications) in the country, and then aggregated at the country level. An alternative source for employment data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 57 is equal to the sum of the values of Indicators 57a to 57c. Indicator 57 complements Indicator 58, which is a breakdown of FTE telecommunication employees by gender.

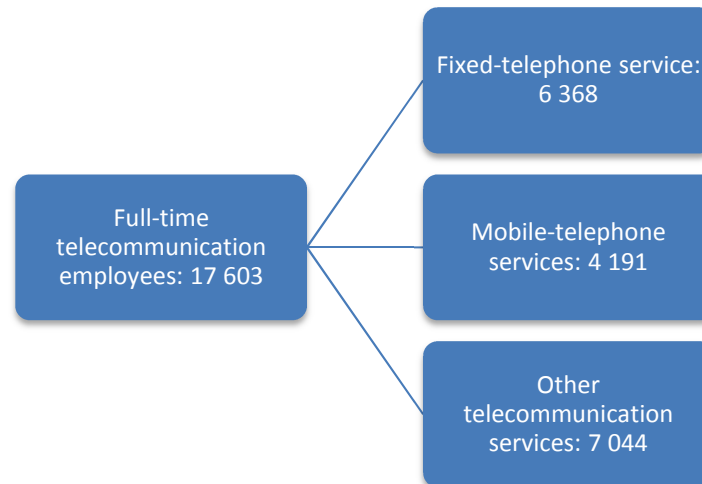
Methodological issues:

Lack of comparability may arise where the identification of telecommunication employees and the conversion of part-time to full-time equivalent employees differ among countries. For example, some operators may elect to outsource a significant portion of their operations; while the staff working in an outsource business are not included as employees of the 'principal' entity (because they are not directly employed), they may be included in the aggregation as employees of the outsource business if that business specializes in telecommunication services.

Operators in some countries may provide estimates for Indicators 57a to 57c.

Example:

The Census and Statistics Department in Hong Kong (China) publishes data on employment in the telecommunication sector, including a breakdown by type of service (Example 31). The data are obtained through an annual business survey, and are based on the Hong Kong Standard Industrial Classification, a locally adapted version of the International Standard Industrial Classification of All Economic Activities (ISIC).³⁵

Example 31. Telecommunication employees by sector, Hong Kong (China), 2007

Note: Other telecommunication services include Internet services.

Source: Adapted from Census and Statistics Department (2009), *Hong Kong as an Information Society*, available at http://www.censtatd.gov.hk/products_and_services/products/publications/statistical_report/commerce_and_industry/index_cd_B1110006_dt_detail.jsp.

³⁵ The ISIC code for telecommunications is Division 61. See Annex 4, Table 5 and: <http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=27&Lg=1&Co=61>.

Indicator 58: Full-time equivalent telecommunication employees (i51), by gender

Definition:

Full-time equivalent telecommunication employees 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, mobile and Internet 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).

The indicator is broken down as follows:

Indicator 58a: Persons employed by all telecommunication operators, female (i51f)

Indicator 58b: Persons employed by all telecommunication operators, male

Clarifications and scope:

The indicator refers to all FTE telecommunication service staff directly employed by operators, regardless of occupation, in the telecommunication services (fixed and mobile) and Internet service provision industries. Entities covered by the indicator are defined according to ISIC Revision 4, Division 61 (Telecommunications), which excludes broadcasting and ICT equipment manufacturing. Resellers (businesses that purchase and resell network capacity without providing additional services) are included in Division 61 and are therefore within the scope of this indicator. 'Outsource' businesses that specialize in telecommunication services are also included. However, outsource businesses classified in other divisions in ISIC (e.g. Activities of call centres) are excluded from the scope of this indicator.

The preferred method for converting part-time to full-time employees is to use an eight-hour workday.

Method of collection:

The data can be collected from all licensed telecommunication operators and other telecommunication service entities whose activities are included in ISIC Revision 4, Division 61 (Telecommunications) in the country, and then aggregated at the country level. An alternative source for employment data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 58 is the sum of values of Indicator 58a and Indicator 58b. Indicator 58 complements Indicator 57, which is a breakdown of FTE telecommunication employees by type of operator.

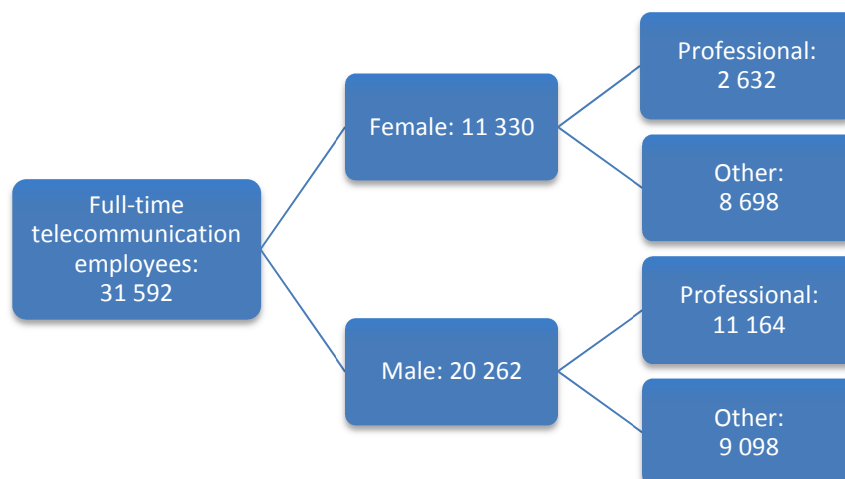
Methodological issues:

Lack of comparability may arise where the identification of telecommunication employees and the conversion of part-time to full-time equivalent employees differ among countries. For example, some operators may elect to outsource a significant portion of their operations; while the staff working in an outsource business are not included as employees of the 'principal' entity (because they are not directly employed), they may be included in the aggregation as employees of the outsource business if that business specializes in telecommunication services.

Example:

The Chilean *Subsecretaría de Telecomunicaciones* (SUBTEL) publishes annual data on telecommunication sector employment, including a breakdown by gender (Example 32). The data are obtained from businesses operating in the telecommunication sector.

Example 32. Telecommunication employees by gender, Chile, 2009



Note: Includes outsourced employees.

Source: Adapted from SUBTEL (2010), *Estadísticas sobre Inversión y Empleo (Período de Información 2004 – 2009)* (Excel file), available at: http://www.subtel.cl/prontus_subtel/site/artic/20070212/pags/20070212182348.html.

Revenue

91. Revenue³⁶ is defined as the income received by telecommunication operators from the sale of telecommunication services. This includes revenue from fixed-telephone, mobile-cellular, Internet and data services relating to the subscription and traffic indicators defined in the earlier sections of the Handbook. Revenue should be provided in national currency and in current prices (i.e. not adjusted for inflation). If available, revenue indicators should be provided based on consolidated financial data.

92. With the exception of Indicator 70 (Revenue from international inbound roaming), the revenue indicators refer only to revenue from retailing activities, and should exclude wholesale revenue.

93. The indicators refer to revenue earned during the reference year, which is presumed to be the financial year ending 31 December for the previous year, unless specified otherwise. Where the calendar year is not the reference year, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data).

³⁶ The income generated from sale of goods or services, or any other use of capital or assets, associated with the main operations of a business before any costs or expenses are deducted. Revenue is shown usually as the top item in an income (profit and loss) statement from which all charges, costs and expenses are subtracted to arrive at net income. Revenue may also be called sales or turnover.

94. Businesses covered by the revenue indicators are operating entities in the telecommunication services sector as defined by ISIC Revision 4, Division 61 (Telecommunications).³⁷

Indicator 59: Revenue from all telecommunication services (i75)

Definition:

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) offering services within the country. Revenue (turnover) consists of retail telecommunication service earnings (therefore excluding revenue from wholesaling activities) during the financial year under review.

Clarifications and scope:

The indicator should exclude monies received in respect of revenue earned during previous financial years, monies received by way of loans from governments or investors, monies received from repayable subscribers' contributions or deposits, revenue from non-telecommunication services, revenue generated from traditional broadcasting and revenue earned from provision of content services. Royalties are also excluded.

Entities covered by the indicator are defined according to ISIC Revision 4, Division 61 (Telecommunications). Resellers (businesses that purchase and resell network capacity without providing additional services) are included in Division 61, and are therefore within the scope of this indicator. 'Outsource' businesses that specialize in telecommunication services are also included. However, outsource businesses classified in other divisions in ISIC (e.g. Activities of call centres, see Division 8220) are excluded from the scope of this indicator.

Method of collection:

The data can be collected from all licensed telecommunication operators and other telecommunication service entities whose activities are included in ISIC Revision 4, Division 61 (Telecommunications) and operating at the retail level in the country, and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 59 is the sum of the values of Indicator 60 (Revenue from fixed-telephone services), Indicator 64 (Revenue from mobile networks), Indicator 65 (Revenue from fixed (wired) Internet services), Indicator 66 (Revenue from other wireless-broadband services), Indicator 67 (Revenue from leased lines), Indicator 68 (Revenue from fixed value-added telecommunication services) and Indicator 69 (Other telecommunication revenue).

Methodological issues:

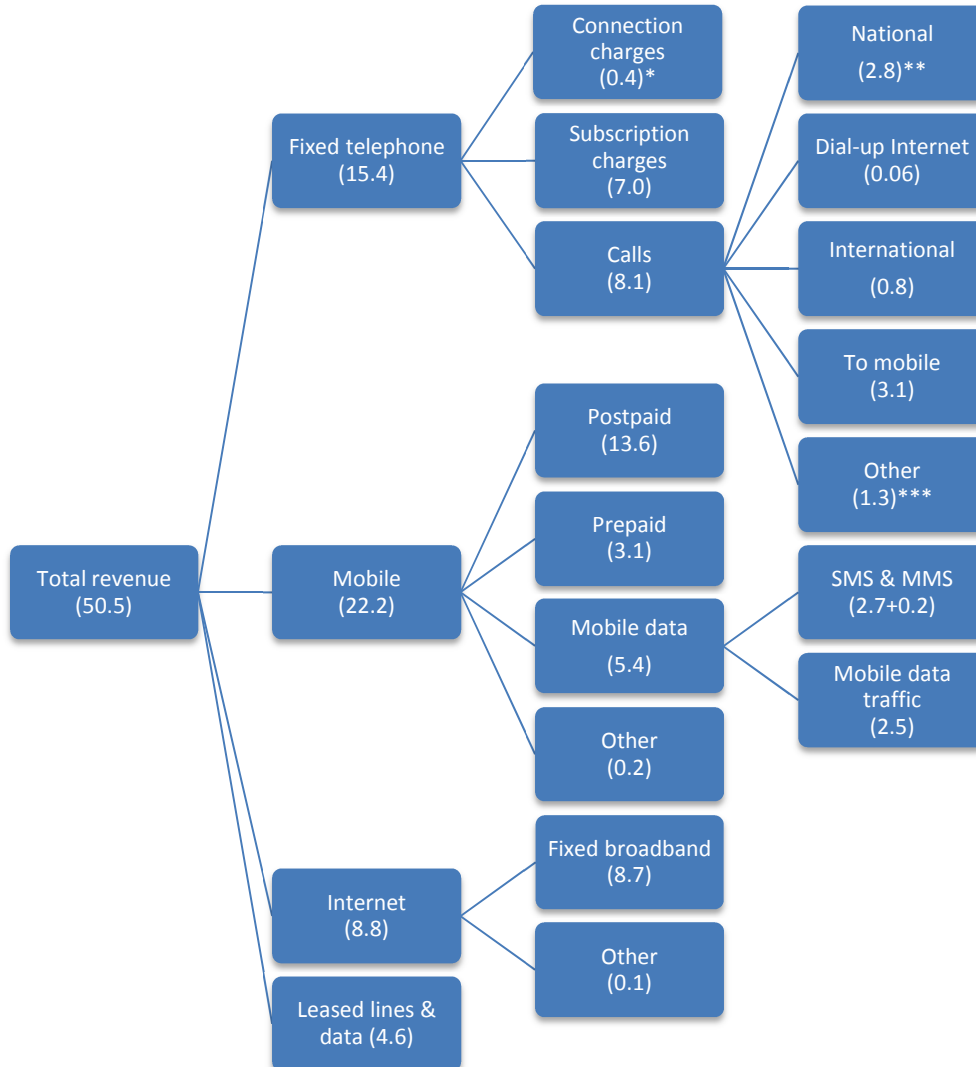
This indicator refers to telecommunication service retail revenue earned by telecommunication service entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it includes neither telecommunication service revenue from businesses that are not classified in ISIC Rev. 4, Division 61, nor wholesale revenues from business classified in ISIC Rev. 4, Division 61. It does not include non-telecommunication service revenue earned by telecommunication operators. Also, as the indicator measures revenue rather than value-added, it is not a national accounts component, even though the indicator is often divided by gross domestic income (GDI) to derive a measure of the intensity of telecommunication services in the economy. The indicator is important as a numerator for various other derivations, such as revenue per employee or revenue per subscription.

³⁷ See Annex 4, Table 5.

Example:

The Swedish Post and Telecom Agency (PTS) compiles detailed semi-annual statistics on the telecommunication sector, including telecommunication revenue (Example 33).

Example 33. Retail telecommunication services revenue (SEK billion), Sweden, 2009



Note: * Including transfers and number portability. ** All domestic fixed-to-fixed calls charged at same rate (i.e. no domestic long-distance). *** Calls from public phones and calls to toll-free and premium services.

Source: Adapted from PTS http://www.statistics.pts.se/start_en.

Indicator 60: Revenue from fixed-telephone services (i71)

Definition:

Revenue from fixed-telephone services refers to revenue received for the connection (installation) of fixed-telephone services, revenue from recurring charges for subscription to the PSTN and revenue from fixed-telephone calls.

Clarifications and scope:

Revenue from fixed-telephone services represents retail revenue from the provision of fixed-telephone services. It excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Method of collection:

The data can be collected from licensed telecommunication operators and other telecommunication service entities providing fixed-telephone services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 60 is a component of Indicator 59 (Revenue from all telecommunication services). It is the sum of Indicator 61 (Revenue from fixed-telephone connection charges), Indicator 62 (Revenue from fixed-telephone subscription charges) and Indicator 63 (Revenue from fixed-telephone calls).

Methodological issues:

This indicator refers to fixed-telephone service revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include fixed-telephone service revenue from businesses that are not classified in ISIC Rev. 4, Division 61. In those cases where fixed-telephone services are bundled with other telecommunication services (e.g. double-play subscriptions including fixed telephony and Internet), service providers may have different methods for allocating the total revenue from bundled services to individual services.

Example:

See Example 33.

Indicator 61: Revenue from fixed-telephone connection charges (i711)**Definition:**

Revenue from fixed-telephone connection charges refers to retail revenue received for connection (installation) of fixed-telephone services. This may include charges for transfer or cessation of services.

Clarifications and scope:

The indicator refers to retail revenue from fixed-telephone connection charges. This includes amounts paid for the installation, disconnection or transfer of fixed-telephone lines. The indicator should exclude refundable charges, connection charges for fixed (wired)-broadband services and revenue from sales of equipment. For other scope issues, see the explanation provided for Indicator 59.

Method of collection:

The data can be collected from licensed telecommunication operators and other telecommunication service entities providing fixed-telephone services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 61 is a component of Indicator 60 (Revenue from fixed-telephone services).

Methodological issues:

This indicator refers to fixed-telephone service revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include fixed-telephone service revenue from businesses that are not classified in ISIC Rev. 4, Division 61. In those cases where fixed-telephone services are bundled with other telecommunication services (e.g. double-play subscriptions including fixed telephony and Internet), service providers may have different methods for allocating the total revenue from bundled services to individual services.

Example:

See Example 33.

Indicator 62: Revenue from fixed-telephone subscription charges (i712)

Definition:

Revenue from fixed-telephone subscription charges refers to revenue from recurring charges for subscriptions to the PSTN, including Internet access if it cannot be separated from fixed-telephone.

Clarifications and scope:

This indicator ideally refers only to retail revenue from fixed-telephone line subscriptions. Monthly equipment rentals should be excluded. For example, some countries might include connection charges; these should be included in Indicator 61 (Revenue from fixed-telephone connection charges) and not here. In some countries, free call minutes may be included with the subscription. If this is the case, it should be mentioned in a note. The indicator should exclude subscription charges for fixed (wired)-broadband services. For other scope issues, see the explanation provided for Indicator 59.

Method of collection:

The data can be collected from licensed telecommunication operators and other telecommunication service entities providing fixed-telephone services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 62 is a component of Indicator 60 (Revenue from fixed-telephone services).

Methodological issues:

This indicator refers to fixed-telephone service revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include fixed-telephone service revenue from businesses that are not classified in ISIC Rev. 4, Division 61. In those cases where fixed-telephone services are bundled with other telecommunication services (e.g. double-play subscriptions including fixed telephony and Internet), service providers may have different methods for allocating the total revenue from bundled services to individual services. Some operators may only have aggregated data on equipment rental, and may include it with the revenue from fixed-telephone subscriptions.

Example:

See Example 33.

Indicator 63: Revenue from fixed-telephone calls (i713)

Definition:

Revenue from fixed-telephone calls refers to retail fixed-telephone revenue received from charges for local, national long-distance and international calls. Indicator 63 can be split into the following indicators:

Indicator 63a: Revenue from fixed local calls (i7131)

Refers to fixed-telephone retail revenue from local call charges, excluding interconnection charges.

Indicator 63b: Revenue from fixed national long-distance calls (i7132)

Refers to fixed-telephone retail revenue from domestic long-distance call charges. If all calls are considered local (e.g. all fixed line calls with a domestic termination on another fixed-line network are charged at the same rate), then this item should be reported under revenue from local calls. It should exclude interconnection charges.

Indicator 63c: Revenue from fixed-to-mobile national calls

Refers to fixed-telephone retail revenue from national calls to mobile-cellular phones, excluding interconnection charges.

Indicator 63d: Revenue from fixed international calls (i7133)

Refers to fixed-telephone retail revenue from international calls, excluding interconnection charges.

Clarifications and scope:

The indicator should exclude revenue from interconnection charges. Indicator 63b may not be relevant in countries where all calls are considered local. Some countries may treat calls to neighbouring countries as domestic long-distance rather than international calls. For other scope issues, see the explanation provided for Indicator 59.

Method of collection:

The data can be collected from licensed telecommunication operators and other telecommunication service entities providing fixed-telephone services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 63 is equal to the sum of the values of Indicators 63a to 63d. Indicator 63 and its sub-indicators are components of Indicator 60 (Revenue from fixed-telephone services).

Methodological issues:

This indicator refers to fixed-telephone service revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include fixed-telephone service revenue from businesses that are not classified in ISIC Rev. 4, Division 61. In those cases where fixed-telephone minutes are bundled together with other telecommunication services, service providers may have different methods for allocating the total revenue from bundled services to individual services. In the case of flat-rate tariffs, it may be difficult to differentiate between revenue from subscription charges and revenue from telephone calls.

Example:

See Example 33.

Indicator 64: Revenue from mobile networks (i741)

Definition:

Revenue from mobile networks refers to retail revenue received from the provision of mobile-cellular communication services, including all voice, SMS and data (narrowband and broadband) services. Indicator 64 includes:

Indicator 64a. Revenue from voice services

Refers to all mobile-cellular retail revenue from the provision of voice services. It includes voice revenues from national and international calls, but excludes revenues from roaming services.

Indicator 64b. Revenue from outbound roaming (i76ro)

Refers to all mobile-cellular retail roaming revenue from own subscribers roaming abroad. It does not cover foreign mobile subscribers roaming into the country and international calls originating or terminating on the country's mobile networks.

Indicator 64c. Revenue from mobile data services (i741d)

Refers to revenue from the provision of non-voice services including messaging, data and Internet services. It excludes other mobile-cellular services and wireless Internet access services not relating to mobile networks (e.g. satellite or terrestrial fixed wireless technologies).

Indicator 64d. Revenue from text and multimedia messaging services (i741m)

Refers to revenue from text messaging and multimedia messaging (SMS and MMS). Some countries may account for this in different ways. For example, some mobile plans include free SMS or MMS that are liable to be classified as voice revenue rather than mobile-messaging revenue. The treatment of premium messages – where users pay an additional amount over the regular messaging rate – can vary among operators, since they typically share the revenue with a premium-service provider. Operators may also include revenue from international messaging in other categories. The preference is to include all revenue earned by the operator from the provision of messaging services to retail customers. Any deviation from this definition should be explained in a note.

Clarifications and scope:

The indicator refers to retail mobile-telephone revenue earned by telecommunication service providers. It includes the revenues described in Indicators 64a to 64d. It excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). The indicator includes revenue from connection, subscription, call usage, messaging and data, but excludes interconnection charges and other sources of income such as those related to handsets. For entities covered by this indicator, see the explanation provided for Indicator 59. Any deviations from the definitions above (e.g. the inclusion of handset revenue) should be explained in a note.

Method of collection:

The data can be collected from telecommunication service operators providing mobile-telephone services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. Data for small providers (e.g. resellers and mobile virtual network operators) may be collected directly from their host network operators. Data are aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 64 includes the values of Indicators 64a to 64d. Indicator 64 and its sub-indicators are components of Indicator 59 (Revenue from all telecommunication services).

Methodological issues:

This indicator refers to retail mobile-telephone service revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include mobile-telephone service revenue from businesses that are not classified in ISIC Rev. 4, Division 61.

Example:

See Example 33.

Indicator 65: Revenue from fixed (wired) Internet services (i7311)

Definition:

Revenue from fixed (wired) Internet services refers to retail revenue received from the provision of fixed (wired) Internet services such as subscriptions, traffic and data communication. It excludes the provision of access lines used to connect to fixed (wired) Internet (such as fixed-telephone lines used to access DSL connections). Indicator 65 includes:

Indicator 65a: Revenue from fixed (wired)-broadband services (i7311_fb)

Refers to retail revenue from the provision of high-speed (at least 256 kbit/s) data connectivity and related services over fixed (wired) infrastructure. It includes services such as DSL, cable modem and FTTH (see Indicator 20 for a list of services). It should exclude revenue from narrowband Internet services (e.g. dial-up access) and wireless-broadband services (e.g. fixed wireless broadband, such as WiMax).

Clarifications and scope:

The indicator refers to retail revenue from the provision of fixed (wired) Internet services by telecommunication service providers. It excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Any deviations from the definition (for example fixed (wired) Internet services revenue classified as fixed-telephone line revenue) should be explained in a note.

Method of collection:

The data can be collected from ISPs and other telecommunication service operators providing fixed (wired) Internet services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications). This could include telephone companies providing DSL services, cable television companies providing cable broadband services and operators providing FTTH broadband access. Data are aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 65a is a component of Indicator 65. Indicator 65 is a component of Indicator 59 (Revenue from all telecommunication services).

Methodological issues:

This indicator refers to retail revenue from fixed (wired) Internet services earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include revenue from businesses that are not classified in ISIC Rev. 4, Division 61. Some countries may classify fixed (wired) Internet services revenue as fixed-telephone line revenue or include wireless Internet services.

Example:

See Example 33.

Indicator 66: Revenue from other wireless-broadband services

Definition:

Revenue from other wireless-broadband services refers to the retail revenue received from the provision of high-speed (at least 256 kbit/s) data connectivity and related services over a wireless infrastructure other than mobile cellular, such as satellite or terrestrial fixed wireless broadband infrastructures.

Clarifications and scope:

The indicator refers to all retail revenue received from the provision of wireless-broadband services by non-mobile-cellular telecommunication service providers. It excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Method of collection:

The data can be collected from satellite and terrestrial fixed wireless operators and ISPs providing wireless-broadband Internet services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 66 is a component of Indicator 59 (Revenue from all telecommunication services).

Methodological issues:

This indicator refers to retail revenue from wireless-broadband services earned by entities whose activities are included in ISIC Revision 4, Division 61, excluding the revenue from wireless-broadband services earned by mobile-cellular operators. It does not include revenue from businesses that are not classified in ISIC Rev. 4, Division 61.

Example:

See Example 33.

Indicator 67: Revenue from leased lines (i732)**Definition:**

Revenue from leased lines refers to retail revenue received from the provision of leased lines. See Indicator 81 (Leased-line subscriptions) for a definition of leased lines.

Clarifications and scope:

The indicator refers to retail revenue from the provision of leased-line services by telecommunication service providers. It excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Countries should provide a note on the scope of this indicator, in particular whether reported revenue includes just domestic leased-line services or also covers international private leased lines.

Method of collection:

The data can be collected from operators that provide retail leased-line services in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 67 is a component of Indicator 59 (Revenue from all telecommunication services).

Methodological issues:

Countries may differ in how they interpret this indicator. In particular, reported revenue may include both domestic leased-line services and international private leased lines. This indicator refers to retail revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include revenue from businesses that are not classified in ISIC Rev. 4, Division 61.

Example:

See Example 33.

Indicator 68: Revenue from fixed value-added telecommunication services (i733)

Definition:

Revenue from fixed value-added telecommunication services refers to the retail revenue generated by the telecommunication service sector for fixed value-added telecommunication services, such as call forwarding, itemized billing, conference calls and voice-message services. Value-added means additional services beyond the basic telephone service line rental and calls.

Clarifications and scope:

The indicator refers to retail fixed-telephone revenue from the provision of value-added services as described above. It excludes interconnection charges and any other items already identified in other fixed-line revenue indicators. It excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Countries should specify the items included in this indicator, in a note.

Method of collection:

The data can be collected from fixed-line telephone operators operating in the country whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 68 is a component of Indicator 59 (Revenue from all telecommunication services).

Methodological issues:

This indicator refers to value-added fixed-line telephone retail revenue, and countries will differ in what items they include. It refers to retail revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include revenue from businesses that are not classified in ISIC Rev. 4, Division 61.

Example:

See Example 33.

Indicator 69: Other telecommunication revenue (i74)**Definition:**

Other telecommunication revenue refers to any other retail telecommunication revenue received but not accounted for elsewhere.

Clarifications and scope:

The indicator refers to all other retail telecommunication service revenue not identified in one of the other revenue indicators in this group. It should exclude interconnection charges. Respondents should indicate in a note what the main items of other telecommunication revenue are. The indicator excludes wholesale revenue and other monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Countries should specify the items included in this indicator, in a note.

Method of collection:

The data can be collected from fixed-telephone line and mobile-cellular operators and ISPs operating in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for revenue data could be industry surveys carried out by the national statistical office, or other reputable organization

Relationship with other indicators:

Indicator 69 is a component of Indicator 59 (Revenue from all telecommunication services).

Methodological issues:

This indicator refers to other telecommunication service retail revenue; items included will vary widely among countries.

Example:

See Example 33.

Indicator 70: Revenue from international inbound roaming (i76ri)

Definition:

Revenue from international inbound roaming refers to revenue received from visiting (foreign) subscribers making and receiving calls within the country. Network operators within the country obtain these revenues from network operators of visiting subscribers. The indicator refers to mobile-cellular roaming revenue from foreign subscribers roaming on the country’s mobile networks. It does not cover domestic mobile subscribers roaming abroad, nor international calls originating or terminating on the country’s mobile networks. It does not refer to the gross revenue generated by mobile roamers, since some portion will be shared with foreign operators.

Clarifications and scope:

Indicator 70 is the only revenue indicator that deals with wholesale revenue. It corresponds to the wholesale revenue obtained by domestic mobile-network operators from foreign mobile operators for the usage of their network for the purpose of providing international roaming services. It should include revenue from all roaming services, including voice, SMS and data. Like the other revenue indicators, it excludes monies received that are not of a revenue nature (see Indicator 59). For entities covered by this indicator, see the explanation provided for Indicator 59.

Method of collection:

Data for Indicator 70 can be collected from licensed mobile-network operators operating in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for the data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 70 is not related to other Indicators in this Handbook, because it refers to wholesale revenue.

Methodological issues:

This indicator refers to revenue earned by entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include mobile-telephone service revenue from businesses that are not classified in ISIC Rev. 4, Division 61.

Investment

95. Investment is vital to the roll-out, expansion and upgrade of telecommunication networks. Investment, often referred to as capital expenditure in the financial statements of business entities, refers to expenditure on acquiring property and equipment. The investment indicators described below cover fixed, mobile and Internet networks and related service provision. The indicators can be used to derive various ratios, such as telecommunication investment as a percentage of gross fixed capital formation, which measures the share of telecommunication investment in total investment in the economy.

96. The indicators refer to investment made during the reference year, which is presumed to be the financial year ending 31 December for the previous year, unless specified otherwise. Where the calendar year is not the reference year, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year’s data).

97. The investment indicators should include data from all operators (facilities and non-facilities based³⁸) providing telecommunication services in the country. Like the indicators on employment and revenue, the businesses covered by the investment indicators are operating

³⁸ ‘Facilities-based’ means an operator that owns its own infrastructure, whereas ‘non-facilities-based’ refers to an operator that leases infrastructure from another operator.

entities in the telecommunication services sector, as defined by ISIC Revision 4, Division 61 (Telecommunications).³⁹

Indicator 71: Annual investment in telecommunication services (i81)

Definition:

Annual investment in telecommunication services, also referred to as annual capital expenditure, refers to the investment during the financial year in telecommunication services (including fixed, mobile and Internet services) for acquiring or upgrading property and networks. Property includes tangible assets such as plant, intellectual and non-tangible assets such as computer software. The indicator is a measure of investment in telecommunication infrastructure in the country, and includes expenditure on initial installations and additions to existing installations where the usage is expected to be over an extended period of time. It excludes expenditure on research and development (R&D), annual fees for operating licences and the use of radio spectrum, and investment in telecommunication software or equipment for internal use.

The indicator can be broken down as follows:

Indicator 71a: Annual investment in fixed-telephone services (i83)

Refers to investment in fixed-telephone services for acquiring and upgrading property and networks within the country. This indicator refers to annual investment in assets related to fixed-telephone networks and the provision of services.

Indicator 71b: Annual investment in fixed (wired)-broadband services (i87)

Refers to investment in fixed (wired)-broadband services for acquiring and upgrading property and networks within the country. This indicator refers to annual investment in assets related to fixed (wired)-broadband networks and the provision of services.

Indicator 71c: Annual investment in mobile communication services (i841m)

Refers to investment in mobile services for acquiring and upgrading property and networks within the country. It should include investments made for mobile-broadband services. This indicator refers to annual investment in assets related to mobile communication networks and the provision of services. It should include investment in mobile-broadband networks.

Indicator 71d: Other annual investment in telecommunication services

Refers to investment in other telecommunication services, such as fixed wireless-broadband, satellite and leased lines.

Clarifications and scope:

This indicator refers to the total capital expenditure on acquiring or upgrading property and plant for all telecommunication (including Internet) services that are provided to the public by entities classified in ISIC Revision 4, Division 61 (Telecommunications). Non-tangible capital expenditure should be included, except for annual licence fees. It refers to investment in assets related to the provision of telecommunication networks and services in the country, and therefore should not include capital expenditure made by domestic operators for networks and property they own in other countries. The indicator excludes investments made by operators in other entities. Where data are only available on a different definitional basis, this should be explained in a note.

It may be difficult to distinguish capital expenditure on fixed-telephone networks and fixed-broadband networks. Where this is the case, estimates should be made and explained in a note.

Method of collection:

The data can be collected from all licensed telecommunication operators and other telecommunication service entities operating in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for investment data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 71 is equal to the sum of the values of Indicators 71a to 71d. Indicator 71 includes the value of Indicator 72 (Annual investment in non-tangible assets).

³⁹ See Annex 4, Table 5.

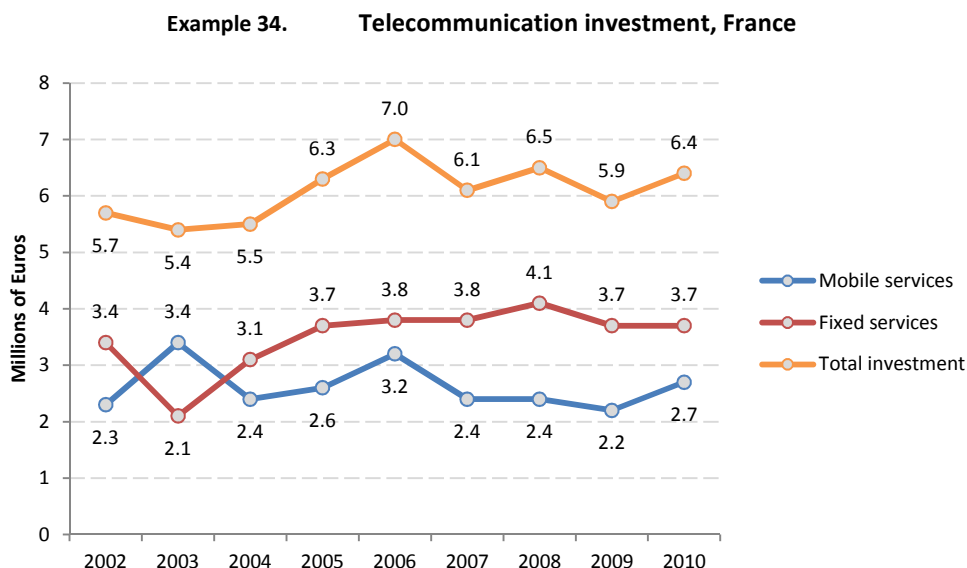
Methodological issues:

This indicator refers to annual investment by telecommunication service entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include investment by businesses that are not classified in ISIC Rev. 4, Division 61. Comparability issues may arise because of country differences in the interpretation and reporting of annual capital expenditure in the telecommunication industry. Particular issues are the treatment of licence fees, and distinguishing capital expenditure on fixed-telephone and fixed-broadband networks. In respect of the latter, operators usually report data in terms of investment in fixed networks and mobile networks. Given the move to NGN and IP-based networks, the distinction between fixed-telephone, broadband and mobile networks is narrowing, especially for core networks. Another issue is ‘triple play’ – if an operator invests in deploying fibre-to-the-home (FTTH), it may be difficult to distinguish the investment as telephone or broadband if it is providing fixed telephony (VoIP), Internet and TV (IPTV) services over the same infrastructure.

Some countries include licence fees in capital expenditure on mobile. This can create significant distortion, since these fees tend to be relatively high compared to investment in plant and property.

Example:

The French telecommunication and posts regulator (*Autorité de Régulation des Communications Electroniques et des Postes*, ARCEP) publishes data on investment in the telecommunication sector, disaggregated by fixed and mobile services (Example 34). Total investment was EUR 6.4 million in 2010, comprising EUR 3.7 million for fixed services and EUR 2.7 million for mobile services.



Source: ARCEP (2011), *Les chiffres clé des communications électroniques en France. Chiffres 2010*, available at <http://www.arcep.fr/fileadmin/reprise/publications/chiffres-cle/chiffres-cle-2010-juillet2011.pdf>.

Indicator 72: Annual investment in non-tangible assets (i81t)**Definition:**

Annual investment in non-tangible assets refers to the investment during the financial year associated with acquiring non-tangible property such as intellectual property and computer software. Note that this applies to telecommunication services that are available to the public, and excludes investment for internal use. It also excludes expenditure on annual licence fees.

Clarifications and scope:

The indicator refers to the total investment in non-tangible assets for all telecommunication (including Internet) services that are provided to the public by entities whose activities are classified in ISIC Revision 4, Division 61 (Telecommunications). It refers to the investment in non-tangible assets related to the provision of telecommunication networks and services in the country, and therefore should not include expenditure made by domestic operators in relation to other countries. The nature of such assets can make them hard to evaluate, and any divergence from the definition should be explained in a note.

Method of collection:

The data can be collected from all licensed telecommunication operators and other telecommunication service entities operating in the country and whose activities are included in ISIC Revision 4, Division 61 (Telecommunications), and then aggregated at the country level. An alternative source for investment data could be industry surveys carried out by the national statistical office, or other reputable organization.

Relationship with other indicators:

Indicator 72 is a component of Indicator 71 (Annual investment in telecommunication services).

Methodological issues:

This indicator refers to annual investment by telecommunication service entities whose activities are included in ISIC Revision 4, Division 61. Therefore, it does not include investment by businesses that are not classified in ISIC Rev. 4, Division 61. Comparability issues may arise because of country differences in the treatment of non-tangible investment.

Indicator 73: Annual foreign investment in telecommunications (i841f)**Definition:**

Annual foreign investment in telecommunications refers to investment during the financial year in telecommunication services (including fixed, mobile and Internet services) coming from foreign sources, also referred to as foreign direct investment (FDI).

Clarifications and scope:

This indicator refers to the investment made by foreign-owned entities in the country. It refers to an entity in one country ("direct investor") acquiring a direct investment in a telecommunication service provider in another country. The shareholding should be at least ten per cent. Direct investment is measured for the initial transaction as well as subsequent transactions.

Method of collection:

This indicator should be collected from the national authority responsible for compiling balance-of-payments statistics rather than from operators. This is generally either the central bank or the national statistical office. The national authority responsible for balance-of-payments statistics collects the information by means of questionnaires sent to businesses operating in the country. One drawback is that the data are not always disaggregated by sector so, while total FDI data are generally available for most countries, the breakdown for telecommunication may not be available. The responsible telecommunication authority could ask the national authority concerned to provide for this breakdown in the questionnaire sent to businesses, or pre-identify telecommunication businesses, whose FDI data could then be aggregated. Any difficulties splitting telecommunication FDI or any deviations from standard concepts for measuring FDI should be explained in a note.

Relationship with other indicators:

Indicator 73 is not related to other indicators in the Handbook.

Methodological issues:

As the concept of foreign investment differs from the other investment indicators in this category, they are not directly comparable. Concepts used for measuring FDI and for identifying telecommunication-related FDI may vary between countries, leading to lack of comparability.

Example:

Many nations seek to attract foreign investment in their telecommunication sector in order to help fund infrastructure roll-out and upgrades. The Pakistan Telecommunications Authority (PTA) regularly publishes data on FDI in the telecommunication sector (Example 35).

Example 35. FDI in Pakistan's telecommunication sector

	2005-06	2006-07	2007-08	2008-09	2009-10
FDI in telecom	1 905.1	1 824.2	1 438.6	815.0	373.62
Total FDI	3 521.0	5 140.0	5 410.0	3 720.0	2 199.44
Telecom (%) share	54.1	35.5	26.6	21.9	17.0

Source: Adapted from PTA (2010), *Annual Report 2009-2010*, available at http://www.pta.gov.pk/index.php?option=com_content&view=article&id=361&Itemid=590.

Public access

98. Indicators 74 to 76 measure accessibility of services. They cover availability of telephone services and Internet access through Wi-Fi ‘hotspots’.

99. This group of indicators is based on annual (reference year) data, which should be provided in respect of the end of the calendar year (31 December). Where the calendar year is not the reference year, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year’s data). Where countries report data on a different date basis, this should be specified in a note.

Indicator 74: Percentage of localities with telephone service (i1163%)

Definition:

Percentage of localities with telephone service refers to the percentage of localities that have a fixed-telephone or mobile-telephone service, or both. To enhance usefulness, the total number of localities should be provided as well as the population of localities covered by a telephone service.

Having a telephone service means that inhabitants of that locality have the ability to place and receive telephone calls from that locality. Telephone services include public facilities and/or subscription services available on demand.

A locality is defined as a distinct population cluster, i.e. population living in neighbouring buildings that: (a) form a continuous built-up area with a clearly recognizable street formation; or (b) though not part of such a built-up area, form a group to which a locally recognized place name is uniquely attached; or (c) though not falling within either of the above two requirements, constitute a group of buildings none of which is separated from its nearest neighbour by more than 200 metres.

Clarifications and scope:

This indicator refers to the number of localities (e.g. city, town, village) with any telephone service (fixed or mobile) divided by the total number of localities in the country and multiplied by 100. It does not refer to the percentage of the population or land area covered by telephone services.

Telephone availability is a fundamental goal of universal access. This indicator thus provides a measure for tracking the achievement of universal access targets. In some countries, locality coverage obligations are included in telecommunication operator licences.

Method of collection:

Information from all licensed telephone operators about the localities for which they offer telephone service will provide the necessary data for this indicator. This might be separated into fixed-telephone services and mobile-cellular services. Duplicate entries should be removed (where telephone operators provide service to the same locality). This resulting aggregate can be divided by the total number of localities to derive the number of localities with telephone service. The number of localities should be available from the national statistical office. If the definition of locality differs from the one specified in this indicator, it should be mentioned in a note.

Relationship with other indicators:

Indicator 74 is not related to other indicators in the Handbook.

Methodological issues:

This indicator is a measure of availability. However, it reflects the proportion of localities with telephone service and not the coverage of the population. Given that a small proportion of the population tends to live in a large number of localities, this indicator alone could give a misleading impression of telephone accessibility.

Example:

The Mexican Secretary of Communications and Transport (SCT) compiles data on localities with a telephone service. The SCT also provides a breakdown of locality data by urban and rural, so that the percentage of localities with a telephone service can be calculated as shown in Example 36.

Example 36. Localities with telephone service, Mexico, 2010

	Total	Urban	Rural
Number of localities with telephone service	55 353	3 963	51 390
Number of localities	192 556	3 963	188 593
Percentage of localities with telephone service	29%	100%	27%
Percentage of population by urban or rural	100%	71%	29%

Note: Rural refers to localities with a population of fewer than 2 500 inhabitants.

Source: Adapted from Gobierno de los Estados Unidos Mexicanos (2011), *Anexo Estadístico del Quinto Informe de Gobierno de Presidencia de la República*. Available at: <http://www.sct.gob.mx/estadistica-y-cartografia/estadistica-del-sector/anuario-estadistico-sct/>.

Indicator 75: Public payphones (i1112)

Definition:

Public payphones refers to the total number of all types of public telephones, including coin- and card-operated phones and public telephones in call offices. Publicly available phones installed in private places should also be included, as should mobile public payphones. All public telephones, regardless of capability (e.g. local calls or national only), should be counted. Public payphones should be broken down as:

Indicator 75a: Fixed public payphones

Fixed public payphones refers to payphones that are available to the public using the fixed network.

Indicator 75b. Mobile public payphones

Mobile public payphones refers to payphones that are available to the public using the mobile-cellular network.

Clarifications and scope:

A payphone is a telephone where payment is made upon use. Payphones may be located in telecentres. This indicator covers all public telephones. Only physical payphones should be reported. If the national definition of payphone differs from that above (e.g. by excluding payphones in private places or payphones where no licensing is required, or including informal calling arrangements through resellers), then respondents should provide their definition in a note.

Method of collection:

The data could be collected from all licensed public telephone operators in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 75 is equal to the sum of the values of Indicator 75a and 75b. Indicator 75a is also a component of Indicator 2 (Fixed-telephone subscriptions).

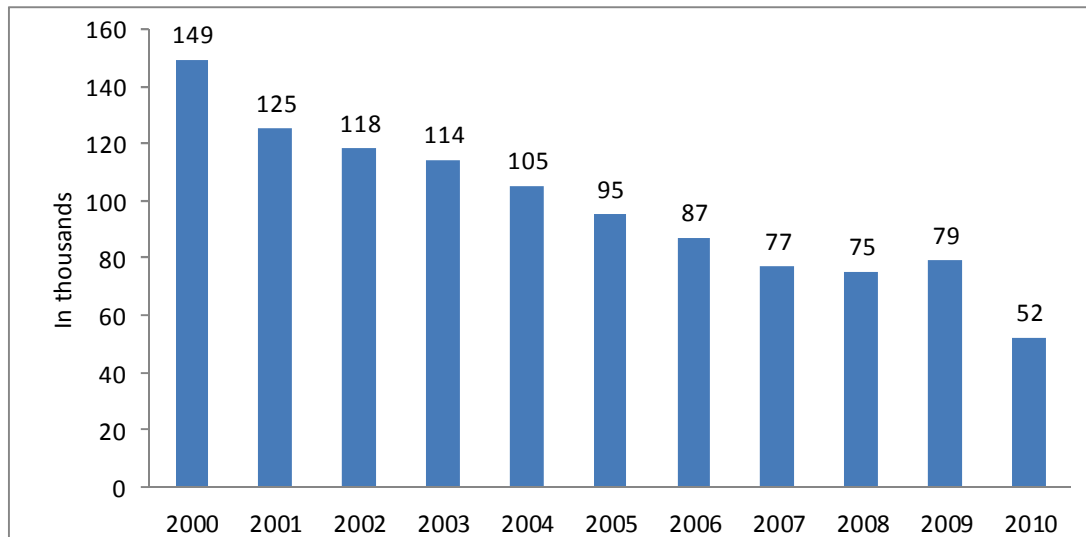
Methodological issues:

Depending on the licensing framework in the country, data on the number of public payphones may not cover unlicensed provision of public telephone services. Some countries report broader coverage, including informal calling arrangements - typically through resellers, while others report only physical payphones. Lack of comparability may arise through such variations. Public telephones are an important facility for users who do not have access to a telephone at home or who wish to use public telephones because tariffs are cheaper. This indicator is often divided by a country's population and multiplied by 1 000 to derive the number of payphones per thousand inhabitants.

Example:

The Malaysian Communications and Multimedia Commission (MCMC) reports data on public payphones and payphone penetration (Example 37).

Example 37. Fixed public payphones, Malaysia



Note: Payphones refers to the total number of all types of public telephones, including coin- and card-operated phones and combos. No distinction is made between operational and non-operational payphones.

Source: MCMC (2011), Communications & Multimedia – Selected Facts & Figures Q4 2010, available at http://www.skmm.gov.my/link_file/facts_figures/stats/pdf/Q4%202010%20Text.pdf.

Indicator 76: PWLAN access points (i424)**Definition:**

PWLAN access points refers to the number of public wireless local area network (PWLAN) access points (also called hotspots) in a country. PWLANs are based on the IEEE 802.11 standard, commonly referred to as Wi-Fi.

Clarifications and scope:

This indicator refers to the number of public points in the country where users can access the Internet using IEEE 802.11-based wireless technology. These are commonly referred to as Wi-Fi hotspots, which are locations where anyone can access the Internet for free or a for a charge using their access device. If the provider has multiple routers within a location because of high demand, the location should be counted only once. The indicator does not cover Wi-Fi installations in homes, offices or other locations, even if they are not secured and thus theoretically accessible by anyone. It also does not cover other public Internet access points (e.g. Internet cafés) if they do not provide Wi-Fi access for users with their own computers or other Wi-Fi enabled devices.

Method of collection:

The data can be collected from licensed Wi-Fi hotspot operators operating in the country, and then aggregated at the country level. If no licence is required to provide public Wi-Fi services, then the data might be derived from business surveys carried out by the national statistical office.

Relationship with other indicators:

Indicator 76 is not related to other indicators in the Handbook.

Methodological issues:

Given that many countries have liberalized the provision of public Internet services, it may be difficult to obtain the data if there is no registry of providers.

Example:

A number of regulators publish data on the number of PWLAN access points. An example from Macao, China, where the Bureau of Telecommunications Regulation (*Direcção dos Serviços de Regulação de Telecomunicações*, DSRT) collects such data on a monthly basis, is shown in Example 38.

Example 38. Wi-Fi hotspots, Macao, China

	01/2011	02/2011	03/2011	04/2011	05/2011	06/2011
Commercial Wi-Fi hotspots *	222	222	233	229	230	227
Wi-Fi GO Hot Spots **	34	60	60	60	60	60

Note: *Wi-Fi hotspots provided by local telecom operators. ** Free Wi-Fi hotspots provided by Macao Government.

Source: Adapted from DSRT, available at <http://www.dsrt.gov.mo/eng/Facts/stats/MainService2011a.html>.

Broadcasting and other indicators

100. This group of indicators includes a set of multichannel television indicators, an indicator on the number of homes passed by cable and an indicator on the number of leased-line subscriptions.

101. In ISIC Revision 4, broadcast indicators relate to entities whose activities are classified in either Division 61 (Telecommunications) or Division 60 (Programming and broadcasting activities). Division 61 includes "The distribution of the complete television programme by third parties, i.e. without any alteration of the content ... This distribution can be done through broadcasting, satellite or cable systems."⁴⁰

102. This group of indicators refers to annual (reference year) data, which should be provided in respect of the end of the calendar year (31 December). Where the calendar year is not the

⁴⁰ ISIC Revision 4, available at <http://unstats.un.org/unsd/cr/registry/isic-4.asp>.

reference year, data should be provided closest to the end of the year to which they refer (e.g. financial year data ending 31 March in the current year should be provided as the previous year's data). Where countries report data on a different date basis, this should be specified in a note.

Indicator 77: Multichannel TV subscriptions (i965m)

Definition:

Multichannel TV subscriptions refers to services that provide additional TV programming beyond free-to-air terrestrial channels. Multichannel TV services are cable TV, direct-to-home satellite services, Internet-protocol TV and digital terrestrial TV.

Multichannel TV services are categorized and defined as follows:

- *Cable television (CATV) service* – Multichannel programming delivered over a coaxial cable for viewing on television sets.
- *Direct-to-home (DTH) satellite services* – Received via a satellite dish capable of receiving satellite television broadcasts.
- *Internet-protocol TV (IPTV)* – Multimedia services such as television/video/audio/text/graphics/data 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. IPTV services are also generally aimed at viewing over a television set rather than a personal computer.
- *Digital terrestrial television (DTT)* – The technological evolution from analogue terrestrial television, providing capability for significantly more channels.
- *Other terrestrial television* – Such as microwave multipoint distribution systems (MMDS) and satellite master antenna television (SMATV).

Clarifications and scope:

Cable television operators (including IPTV providers) provide multichannel services, as do satellite operators through small reception antennas (DTH). The term *subscription* is used loosely, since free DTH services are available in many parts of the world and should be included in this indicator. Therefore, if a consumer has a DTH multichannel service, regardless of whether they are paying for it or not, they should be counted as a subscriber. In countries where the digital switchover has already taken place, only DTT subscriptions offering more channels than the free-to-air terrestrial ones should be counted (i.e. only paid DTT subscriptions). The indicator does not cover households with only a television. Deviations from the definition should be explained in a note.

Method of collection:

The data can be collected from licensed pay television operators in the country, and then aggregated at the country level. Alternatively, the information may be available from industry associations (in the case of DTH, they may estimate the number of DTH homes based on antenna sales, in the absence of paid subscriptions). Another option is to derive estimates based on data collected from national household ICT surveys.

Relationship with other indicators:

Indicator 77 is the sum of the values for indicators 78 (Terrestrial multichannel TV subscriptions) and 79 (Direct-to-home (DTH) satellite antenna subscriptions).

Methodological issues:

This indicator refers to all multichannel television service subscriptions. In some countries, only paying subscribers may be included, even though free multichannel programming might be available through cable television or DTH satellite. Conversely, some countries include any DTT, cable television or SMATV household, even though they may only receive retransmissions of free-to-air channels. Such problems can be eliminated where the data are collected by national statistical offices via household ICT surveys.

Examples:

The Broadcasters' Audience Research Board (BARB) is the official source of television statistics for the United Kingdom. It publishes annual data on the number of multichannel homes, broken down by cable and satellite (Example 39). These data can be used for the multichannel broadcasting indicators.

Example 39. Multichannel television homes (thousands), United Kingdom

	Satellite	Cable	DTT	Total
2000	3 963	3 352	303	7 618
2001	4 991	3 490	529	9 010
2002	5 732	3 794	794	10 320
2003	6 409	3 440	873	10 600
2004	6 946	3 277	2 075	12 036
2005	7 277	3 363	4 216	14 327
2006	7 932	3 297	6 363	16 815
2007	8 437	3 301	8 831	18 637
2008	8 860	3 405	12 017	21 276
2009	9 332	3 442	14 008	22 294
2010	10 262	3 664	16 882	23 831
2011	11 012	3 997	18 376	24 574

Note: January of each year.

Source: Adapted from BARB, available at <http://www.barb.co.uk/facts/multiChannelDevelopment?s=4>.

Indicator 78: Terrestrial multichannel TV subscriptions (i965c)**Definition:**

Terrestrial multichannel TV subscriptions refers to the number of subscriptions to terrestrial multichannel TV such as cable TV, Internet protocol television (IPTV), digital terrestrial TV (DTT), microwave multipoint distribution systems (MMDS).

Clarifications and scope:

This indicator refers to the number of terrestrial multichannel television subscriptions, as defined above. In some countries, SMATV is counted as satellite subscription, as the programming is received via satellite. However, since it is retransmitted to subscribers through cable, it has been included as a terrestrial multichannel subscription. Terrestrial multichannel TV subscriptions should only be included if additional channels are available through payment of a fee. Deviations from the definition should be explained in a note.

Method of collection:

The data can be collected from terrestrial pay television operators in the country, and then aggregated at the country level. Alternatively, the information may be available from industry associations for some countries. Another option is to derive estimates based on data collected from national household ICT surveys.

Relationship with other indicators:

Indicator 78 is a component of Indicator 77 (Multichannel TV subscriptions).

Methodological issues:

Comparability across countries may be affected by the inclusion of all users of cable television, SMATV or DTT, even though in some cases they are simply retransmitting free-to-air programmes. Some countries may exclude SMATV subscriptions from this indicator.

Example:

See Example 39.

Indicator 79: Direct-to-home (DTH) satellite antenna subscriptions (i965s)**Definition:**

Direct-to-home (DTH) satellite antenna subscriptions refers to the number of subscriptions that can receive television broadcasting directly from satellites.

Clarifications and scope:

The indicator refers to the number of subscriptions for multichannel television programming received via a satellite dish. Referred to as direct-to-home (DTH), the service enables those with appropriate antenna dishes and set-top boxes to receive satellite television broadcasting programming. Note that establishments – households or businesses – do not necessarily need to subscribe to a service through a paid subscription, since some DTH services provide free programming. Satellite master antenna television (SMATV) subscriptions should be included under Indicator 78. If SMATV subscriptions are included in this indicator, this should be specified in a note. Other deviations from the definition should also be explained.

Method of collection:

The data can be collected from DTH operators in the country, and then aggregated at the country level. Difficulties may arise if free multichannel programmes are available for which no subscription is required. Some DTH operators require the use of a special card installed in the set-top box to receive programming, so the number of such active cards could be used as a proxy. Another issue is that a DTH operator may not be legally allowed to provide service in a country even though its signals can be received and there are users. Alternative sources for the data include industry associations or household ICT surveys carried out by the national statistical agency.

Relationship with other indicators:

Indicator 79 is a component of Indicator 77 (Multichannel TV subscriptions).

Methodological issues:

It may be difficult to obtain the total number of DTH subscriptions, particularly if no subscription is required. This can affect comparability of data.

Example:

See Example 39.

Indicator 80: Homes passed by cable TV

Definition:

Homes passed by cable TV refers to the number of households that have a cable television connection, whether they are subscribing to the service or not.

Clarifications and scope:

This indicator refers to the number of homes that have the technical ability for cable television through the availability of a coaxial cable television outlet. They may or may not be actually subscribing to the service. The indicator does not refer to the number of subscribers to cable TV.

Method of collection:

This indicator can be collected from cable television operators in the country, and then aggregated at the country level. An alternative source could be industry associations.

Relationship with other indicators:

Indicator 80 is not related to other indicators in the Handbook.

Methodological issues:

This indicator measures the *potential* ability of households in the country to have cable television service.

Example:

The National Cable and Telecommunications Association of the United States (NCTA) reports the number of households passed by cable television for that country (Example 40).

Example 40. Homes passed by cable television, United States

	June 2010	June 2011
Homes passed by cable video service (millions)	127.8	129.3

Source: Adapted from NCTA, available at <http://www.ncta.com/statistics.aspx>.

Indicator 81: Leased-line subscriptions (i42131)**Definition:**

Leased-line subscriptions refers to the number of dedicated private connections. A leased line connects two locations for the provision of a private voice and/or data telecommunication service. The leased line could either be a dedicated physical cable or a virtual connection that reserves a circuit between two points. It maintains a single open circuit at all times, as opposed to traditional telephone services that re-use the same lines for many different conversations through a process called switching. Leased lines most commonly are rented by businesses to connect branch offices, because the lines guarantee bandwidth for network traffic.

Clarifications and scope:

This indicator refers to private telecommunication connections for the exclusive use of the subscriber. The line connects two of the subscriber's locations via a continuously available connection. The data refer to the number of leased lines provided to retail customers (e.g. non-telecommunication businesses) and wholesale customers (e.g. telecommunication operators, either facilities or non-facilities based). The indicator does not refer to the number of fixed-telephone lines, nor fixed-broadband subscriptions. The data refer to national leased lines and not to international private leased circuits.

Method of collection:

The data can be collected from telecommunication operators that provide leased-line services in the country, and then aggregated at the country level.

Relationship with other indicators:

Indicator 81 is not related to other indicators in the Handbook.

Methodological issues:

Operators may use different methods for counting or measuring the number of leased lines over data communication networks, typically based on how they charge for the service. Some operators may report the number of leased lines as speed equivalents (e.g. 64 kbit/s equivalent leased lines), while others report only the total number of physical lines. Some countries may report only retail leased lines. Others may report both domestic and international leased lines, in which case the figures should be provided separately.

Example:**Example 41. Leased lines, Sweden**

Data communication services to end user [1] – number of national installed ports/leased lines	2008	2009	2010
Frame [2]	1 039	679	553
IP-VPN [3]	70 114	75 212	82 279
Line capacity for end user [4]	207 377	239 730	234 558
of which analogue	107 899		
of which digital <2 Mbit/s	27 853		
of which digital >2 Mbit/s	71 625		
Number of ports for other refined network services to end users	42 516	44 615	47 674
Total number of connections/ports for data communication services to end user	321 046	360 236	365 064

Notes:

[1] Relates to the retail market, i.e. sales made to end users such as enterprises and state, municipal and other public operations. Wholesale sales, i.e. sales made to operators (relates to both operators within a group and external operators) for onward sale – even after further refinement – are not included. However, services that are sold to own operations for own use are included in the retail market.

[2] Relates to, among others, frame relay and ATM.

[3] IP-VPN means the following standards: IPsec VPN, IP MPLS VPN (not yet standardized by IETF) and IP SSL VPN. Access to IP-VPN services can take place via either leased lines or dial-up connections. Leased lines, when these are used in IP-VPN services, shall be included in the number of connections, but not connections for dial-up access (ISDN/PSTN). Only ports with a termination point with an end user are included.

[4] Excludes those leased lines that are included as part of IP-VPN services. Only ports with a termination point with an end user are included.

Source: Adapted from PTS (2011), *The Swedish Telecommunications Market 2010*, available at <http://www.statistik.pts.se/pts2010e/>.

Annex 1: Summary of indicators and their relationships

Indicator group and number	ITU code	Indicator name	Sub-indicators	Indicator relationships
Fixed-telephone networks				
1	i117	Total capacity of local public switching exchanges		1=3+9+unsubscribed lines
2	i112	Fixed-telephone subscriptions		2=3+4+5+9+75a
3	i112a	Analogue fixed-telephone lines		3 is a component of 2
4	i112IP	VoIP subscriptions		4 is a component of 2
5	i112w	Fixed wireless local loop subscriptions		5 is a component of 2
6	i116	Percentage of fixed-telephone subscriptions that are residential		Denominator of 6=2
7	i1162	Percentage of fixed-telephone subscriptions in urban areas		Denominator of 7=2
8	i28	ISDN subscriptions	8a and 8b	8=8a+8b
9	i28c	ISDN voice-channel equivalents		9 is a component of 2; $9=(8a*2)+(8b*(23 \text{ or } 30))$
10	i112pt	Fixed-telephone numbers ported		
Mobile-cellular networks				
11	i271	Mobile-cellular telephone subscriptions, by postpaid/prepaid	11a and 11b	11=11a+11b; 11 complements 12
12	i271	Mobile-cellular telephone subscriptions, by speed of data access	12a and 12b	12=12a+12b; 12 complements 11
13	i271Land	Percentage of the land area covered by mobile-cellular network		13 complements 14
14	i271pop	Percentage of the population covered by a mobile-cellular network		14 includes 15; 14 complements 13
15	i271G	Percentage of the population covered by at least a 3G mobile network		15 is a component of 14
16	i271pt	Mobile-cellular numbers ported		
Internet				
17	i4214	International Internet bandwidth, in Mbit/s	17a and 17b	17=17b if bandwidth is asymmetric; $17=17a=17b$ if bandwidth is symmetric; 17 complements 18
18	i4214d	Domestic Internet bandwidth, in Mbit/s		18 complements 17
<i>Fixed (wired) Internet subscriptions</i>				
19	i4213	Fixed (wired) Internet subscriptions	19a and 19b	19=19a+19b; 19b is split in 20 and 21
20	i4213tfb	Fixed (wired)-broadband subscriptions, by technology	20a to 20d	20=20a+20b+20c+20d; 20 complements 21

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Indicator group and number	ITU code	Indicator name	Sub-indicators	Indicator relationships
21	i4213tfb	Fixed (wired)-broadband subscriptions, by speed	21a to 21f	21=21a+21b+21c; 21c=21d+21e+21f; 21 complements 20
<i>Wireless-broadband subscriptions</i>				
22	i271twb	Wireless-broadband subscriptions		22=23+24+25
23	i271s	Satellite broadband subscriptions		23 is a component of 22
24	i271fw	Terrestrial fixed wireless broadband subscriptions		24 is a component of 22
25	i271mw	Active mobile-broadband subscriptions	25a and 25b	25=25a+25b; 25 is a component of 22
Traffic				
<i>Fixed-telephone traffic</i>				
26	i131m	Domestic fixed-to-fixed telephone traffic, in minutes	26a and 26b	26=26a+26b
27	i1313wm	Fixed-to-mobile telephone traffic, in minutes		
28	i132mb	International incoming and outgoing fixed-telephone traffic, in minutes	28a and 28b	28=28a+28b; 28a is a component of 38a; 28b is a component of 38b
<i>Mobile-telephone traffic</i>				
29	i133wm	Domestic mobile-telephone traffic, in minutes	29a and 29b	29=29a+29b+29c
30	i1333wm	Outgoing mobile traffic to international, in minutes		30 is a component of 38a
31	i1335wm	Incoming international traffic to mobile network, in minutes		31 is a component of 38b
32	i1334wm	Roaming by home subscribers abroad (outbound roaming), in minutes		
33	i1336wm	Roaming by foreign subscribers (inbound roaming), in minutes		
34	i133sms	SMS sent		34 includes 35
35	i133smsi	SMS international		35 is a component of 34
36	i133mms	MMS sent		
<i>Other</i>				
37	i131VoIP	VoIP traffic, in minutes		
38	i132tb	Total international incoming and outgoing telephone traffic, in minutes	38a and 38b	38=38a+38b; 38a=28a+30; 38b=28b+31
<i>Domestic Internet traffic</i>				
39		Domestic Internet traffic		

Indicator group and number	ITU code	Indicator name	Sub-indicators	Indicator relationships
Tariffs				
<i>Fixed local telephone service tariffs</i>				
40	i151	Installation fee for residential telephone service		
41	i152	Monthly subscription for residential telephone service		
42		Price of a three-minute local call to a fixed-telephone line	42a and 42b	42a complements 42b
43	i153fm	Price of a three-minute local call to mobile-cellular phone	43a and 43b	43a complements 43b
44	i151b	Installation fee for business telephone service		
45	i152b	Monthly subscription for business telephone service		
<i>Mobile-cellular tariffs</i>				
46	i151p	Mobile-cellular prepaid connection charge		
47	i151pcard	Mobile-cellular – cheapest recharge card value		
48		Mobile-cellular prepaid – price of a one-minute local call	48a to 48j	48a-48i complement each other
49		Mobile-cellular prepaid – price of SMS	49a and 49b	49a complements 49b
<i>Fixed (wired)-broadband Internet tariffs</i>				
50	i4213bc	Fixed (wired)-broadband connection charge		
51	i4213bs	Fixed (wired)-broadband monthly subscription charge	51a and 51b	
52	i4213bs_s	Fixed (wired)-broadband speed, in Mbit/s		52=51a
53	i4213bs_c	Fixed (wired)-broadband cap, in GB		53=51b
54	i4213bs_cp	Fixed (wired)-broadband - price of excess usage		
Quality of service				
55	i143	Faults per 100 fixed-telephone lines per year		
56	i141	Percentage of fixed-telephone faults cleared by next working day		
Persons employed				
57	i51	Full-time equivalent telecommunication employees, by operator type	57a to 57c	57=57a+57b+57c; 57 complements 58
58	i51	Full-time equivalent telecommunication employees, by gender	58a and 58b	58=58a+58b; 58 complements 57

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Revenue				
59	i75	Revenue from all telecommunication services		59=60+64+65+66+67+68+69
60	i71	Revenue from fixed-telephone services		60=61+62+63; 60 is a component of 59
61	i711	Revenue from fixed-telephone connection charges		61 is a component of 60
62	i712	Revenue from fixed-telephone subscription charges		62 is a component of 60
63	i713	Revenue from fixed-telephone calls	63a to 63d	63=63a+63b+63c+63d; 63 is a component of 60
64	i741	Revenue from mobile networks	64a to 64d	64=64a+64b+64c+64d; 64 is a component of 59
65	i7311	Revenue from fixed (wired) Internet services	65a	65a is a component of 65; 65 is a component of 59
66		Revenue from other wireless-broadband services		66 is a component of 59
67	i732	Revenue from leased lines		67 is a component of 59
68	i733	Revenue from fixed value-added telecommunication services		68 is a component of 59
69	i74	Other telecommunication revenue		69 is a component of 59
70	i76ri	Revenue from international inbound roaming		
Investment				
71	i81	Annual investment in telecommunication services	71a to 71d	71=71a+71b+71c+71d; 72 is included in 71
71	181	Annual investment in telecommunication services	71a to 71d	71 = 71a + 71b + 71c + 71d
72	i81t	Annual investment in non-tangible assets		72 is a component of 71
73	i841f	Annual foreign investment in telecommunications		
Public access				
74	i1163%	Percentage of localities with telephone service		
75	i1112	Public payphones	75a and 75b	75=75a+75b; 75a is a component of 2
76	i424	PWLAN access points		
Broadcasting and other indicators				
77	i965m	Multichannel TV subscriptions		77=78+79
78	i965c	Terrestrial multichannel TV subscriptions		78 is a component of 77
79	i965s	Direct-to-home (DTH) satellite antenna subscriptions		79 is a component of 77
80		Homes passed by cable TV		
81	i4213l	Leased-line subscriptions		

Annex 2: Indicators previously collected by ITU not included in this Handbook*

ITU code	Name of indicator
1142	Percentage of fixed-telephone lines connected to digital exchanges
123	Waiting list for fixed-telephone lines
1311im	Internet dial-up traffic (minutes)
133rm	Number of countries with which there is a roaming agreement
151c	Mobile-cellular postpaid connection charge
152c	Mobile-cellular monthly subscription charge
153c	Mobile-cellular prepaid – price of a three-minute local call (peak, on-net)
153co	Mobile-cellular prepaid – price of a three-minute local call (off-peak, on-net)
153tm	International telephone call prices
2712	Digital mobile-cellular subscriptions
311	Telex subscription lines
4213c	Dial-up Internet connection charge
4213p	Dial-up Internet – price per minute (peak)
4213po	Dial-up Internet – price per minute (off-peak)
4213s	Dial-up Internet monthly subscription
422	Number of computers
51fp	Female professional telecommunication staff
51wf	Female mobile telecommunication staff
51wfp	Female professional mobile telecommunication staff
731	Revenue from data services
955	Number of radio sets
965	Number of TV sets

* For definitions of these indicators, see ITU, *Definitions of World Telecommunication/ICT Indicators*, March 2010, available at: <http://www.itu.int/ITU-D/ict/handbook.html>.

Annex 3: Terms and abbreviations

2G mobile-cellular network	Second generation of mobile communications technology. It differs from its predecessor technologies in that it is a digital cellular technology. It includes standards such as Global system for mobile communications (GSM) and CdmaOne.
2.5G mobile-cellular network	Used to refer to General packet radio service (GPRS) mobile communications technology. GPRS is a packet-data technology that allows GSM operators to offer wireless data services at throughput rates of up to 115 kbit/s.
3G mobile-cellular network	Third generation of mobile communications technology, a group of mobile technologies that have been approved by ITU as IMT-2000. These technologies allow voice, data and video communications. Currently, five standards have been specified as IMT-2000, based on various combinations of mobile technologies: CDMA direct spread (WCDMA), CDMA multicarrier (CDMA2000), CDMA time division (TD-CDMA), TDMA single carrier and FDMA/TDMA and OFDMA TDD WMAN (IEEE 802.16).
active subscription	A subscription where the system was used at least once during the last three months.
ADSL	Asymmetric digital subscriber line: A modem technology that converts twisted-pair telephone lines into access paths for multimedia and high-speed data communications. The bit rates transmitted in both directions are different.
bandwidth	A bit-rate measure of available or consumed data communication resources, expressed in bits/second or multiples thereof (kilobits/s, megabits/s, etc.).
bit	The basic information unit in binary systems.
BPL	Broadband over powerline: A technology that allows Internet data to be transmitted over utility power lines. To use BPL, the subscriber needs to use a special broadband modem (phone, cable or satellite) that plugs into an electrical outlet.
broadband access	Access to the public Internet (through a TCP/IP connection) at downstream speeds greater than, or equal to, 256 kbit/s.
byte	8 bits.
cable modem	A cable modem is a modulator-demodulator device at subscriber locations intended for use in conveying data communications on a cable-television system.
CATV	Cable-television service: Multichannel programming delivered over a coaxial cable for viewing on television sets.
CDMA	Code division multiple access: A digital cellular technology that does not assign a specific frequency to each user; instead, every channel uses the full available spectrum.
CDMA2000	CDMA multicarrier; see 3G mobile-cellular network.
coaxial cable	A type of wire that consists of a centre wire surrounded by insulation and then a grounded shield of braided wire. The shield minimizes electrical and radio-frequency interference. Coaxial cabling is the primary type of cabling used by the cable-television industry, and is also widely used for computer networks, such as ethernet.
contracted capacity	Bandwidth put into service but not all of which is used; some is held in reserve for restoration or redundancy.
dark fibre	Unlit transmission capacity, not in use, in a fibre-optic system.
DEL	Direct exchange line: Equivalent to an analogue fixed-telephone line.
dial-up Internet	Type of narrowband Internet access that uses a modem to connect to the Internet through a fixed-telephone line; it requires the modem to dial a phone number when Internet access is needed.
DTT	Digital terrestrial television: The technological evolution from analogue to digital terrestrial television, providing capability for significantly more channels.
DTH satellite	Direct-to-home satellite services: Satellite television broadcast services received via a satellite dish.

DSL	Digital subscriber line: A technology for bringing high-bandwidth information to homes and small businesses over ordinary copper telephone lines.
EDGE	Enhanced data rates for GSM evolution: A faster version of GSM wireless service enabling data to be delivered at faster rates.
EGTI	ITU Expert Group on Telecommunication/ICT indicators.
ethernet (LAN)	Family of computer networking technologies for local area networks (LANs) commercially introduced in 1980. Standardized in IEEE 802.3, ethernet has largely replaced competing wired LAN technologies.
Eurostat	The statistical office of the European Union.
EV-DO	Evolution data optimized: A telecommunication standard for the wireless transmission of data through radio signals, typically for broadband Internet access; it is part of the CDMA2000 family of standards.
FDI	Foreign direct investment.
fibre optic	A flexible, transparent fibre made of very pure glass not much wider than a human hair that acts as a "light pipe" to transmit light between the two ends of the fibre.
FTE	Full-time equivalent: The unit representing the conversion of part-time work to full-time. The preferred method is to convert part-time workers on the basis of hours worked, using an 8-hour workday as full-time.
FTTH	Fibre-to-the-home: Fibre goes directly to the subscriber's premises.
FTTB	Fibre-to-the-building: Fibre connection that terminates no more than 2 metres from an external wall of the subscriber's building, but does not reach the premises.
GB	Gigabyte (one thousand million bytes).
Gbit/s	Gigabits per second (1 000 Mbit/s).
GPRS	General packet radio service mobile communications technology: A packet-data technology that allows GSM operators to offer wireless data services at throughput rates of up to 115 kbit/s.
gross fixed capital formation	Consists of resident producers' acquisitions of fixed assets during a given period, less disposals, plus certain additions to the value of non-produced assets realized by the productive activity of producer or institutional units.
GSM	Global system for mobile communications: A standard set to describe technologies for second-generation (or "2G") digital cellular networks.
HHI	Herfindhal-Hirschmann index: An index of market concentration, which consists of the sum of the squares of the market share of the competitors in the relevant market. The index can take the values ranging from 0 to 10 000. A value of 10 000 corresponds to a market entirely controlled by a single firm, and the value decreases as concentration reduces.
HSPA	High speed packet access: An amalgamation of two mobile-telephony protocols that extend and improve the performance of existing WCDMA protocols.
HTTP	Hypertext transfer protocol: The underlying protocol used by the World Wide Web.
ICT	Information and communication technology.
IMT-2000	International Mobile Telecommunications 2000: ITU Recommendations and Radio Regulations for 3G technologies. See also 3G mobile-cellular network.
incumbent	A telecommunication entity first established as a regulated monopoly with special and exclusive rights granted by government or a public operator, which enjoyed a <i>de facto</i> monopoly before liberalization.
intellectual property/asset	Refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images and designs used in commerce.

international calls	Calls originating in a country and terminating abroad. They also include calls from fixed geographic numbers to foreign fixed and mobile numbers.
IPTV	Internet-protocol television: Multimedia services such as television/video/audio/text/graphics/data delivered over an IP-based network managed to support the required level of quality of service, quality of experience, security, interactivity and reliability; it does not include video accessed over the public Internet, for example, by streaming. IPTV services are also generally aimed at viewing over a television set rather than a personal computer.
IP	Internet protocol: The most commonly-used set of rules for dispatching data across a large computer network.
IP telephony	Service that enables the exchange of voice information, primarily in the form of packets, using IP protocols.
ISDN	Integrated services digital network: A network that provides digital connections between user-network interfaces.
ISP	Internet service provider.
ITU	International Telecommunication Union.
KB	Kilobyte.
kbit/s	Kilobits per second (1 kilobit per second = one thousand bits per second).
LAN	Local area network: A wired or wireless computer network that interconnects computers in a limited area such as an office building.
leased line	A leased line connects two locations for private voice and/or data telecommunication service, either through a dedicated physical cable or a virtual connection.
lit capacity	Turned on bandwidth in a fibre-optic system – capacity that is ready for use.
LTE	Long-term evolution: A 4G wireless-broadband technology developed by the Third Generation Partnership Project (3GPP), an industry trade group.
managed VoIP	A publicly available telephone service provided using voice over Internet protocol (VoIP) for call origination whereby the operator controls the quality of service provided.
Mbit/s (or Mbps)	Megabits per second (1 000 kbit/s).
MDGs	Millennium development goals (United Nations).
MMDS	Microwave multipoint distribution systems.
MMS	Multimedia messaging service. An MMS may convey text, graphic and audio content.
Modem	Short for modulator-demodulator, a modem is a device that enables a computer to transmit data over, for example, telephone or cable lines.
MRTG	Multi-router traffic grapher: A software for monitoring and measuring the traffic load on network links. It allows the user to see traffic load on a network over time in graphical form.
MVNO	Mobile virtual network operator, an organisation which provides mobile cellular services to its customers, but does not have allocation of spectrum.
naked DSL	DSL service that does not require a telephone-line rental.
narrowband Internet access	Access to the public Internet (through a TCP/IP connection) at downstream speeds below 256 kbit/s.
national calls	All national public voice-telephony calls, including local calls, dial-up calls to the Internet and long-distance calls.
NGN	Next-generation network: A packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies.
NRA	National regulatory authority.
NSO	National statistical office.

number portability	Mechanism that allows a user to retain the same directory number, regardless of the service provider subscribed to. Number portability may be limited to specific geographical areas.
OECD	Organisation for Economic Co-operation and Development.
off-net	Refers to a call originating in one mobile network and terminating in a different mobile network.
off-peak rate	Refers to the discount tariffs offered in some tariff plans for voice and SMS services during certain hours of weekdays. Only off-peak periods before midnight are considered.
on-net	Refers to a call originating and terminating in the same mobile network.
operator	Service provider in the telecommunication/ICT sector, including fixed- and mobile-telephone operators and Internet service providers.
<i>Partnership</i>	Partnership on Measuring ICT for Development.
PBX	Private branch exchange: A telephone switching entity forming part of a private telephone installation that has access to the PSTN.
peak rate	As opposed to off-peak rate, refers to tariffs in busy hours, usually during weekdays.
postpaid subscription	A subscription where the subscriber is billed after their use of services, typically at the end of each month.
potential capacity	Total theoretical available bandwidth.
prepaid subscription	A subscription where, instead of paying an ongoing monthly fee, users purchase blocks of usage time in advance of using the service.
private trunked mobile radio	A private mobile radio system .
PSTN	Public switched telephone network: A telecommunication network established to provide telephone services for public subscribers, not restricted to a specific user group.
Public Internet exchange	Also referred as Internet exchange point (IXP), public Internet exchange is a physical infrastructure where ISPs connect to exchange traffic directly between their networks.
public payphone	A telephone where payment is made upon use, may be coin or card operated, and includes phones installed in private places.
PWLAN	Public wireless local area network, also called Wi-Fi hotspot: PWLANs are based on IEEE standard 802.11 (commonly referred to as Wi-Fi).
radio paging	A pager (often called a beeper) is a simple personal telecommunication device for short messages.
RPP	Receiving party pays: A retail billing mechanism whereby the receiving party pays part of the call.
roaming	The ability of users to access wireless telecommunication services from a serving network different from the network they have subscribed.
satellite broadband	Broadband Internet access via a satellite connection.
SIM card	Subscriber Identity module card: An integrated circuit that securely stores the service-subscriber key (IMSI) used to identify a subscriber on mobile-telephony devices (such as mobile phones and computers).
SMATV	Satellite master antenna television.
SMP	Significant market power: A single or joint dominant position in a given market.
SMS	Short message service: A text messaging service component of phone, web or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed-line or mobile-phone devices.
TCP/IP	Transmission control protocol/Internet protocol.
telemetry service	A type of telecommunication service that uses short messages, requiring a very low transmission rate, between the user and the network, such as for example telealarm or telecommand.
UMTS	Universal mobile telecommunications system: See 3G mobile-cellular network.
unlit capacity	Dark fibre - capacity not in use in a fibre-optic system.

USB modem	Universal serial bus modem: A modem that can be connected to a computer through a universal serial bus, an external bus standard that supports high data transfer rates.
used capacity	Bandwidth in a fibre-optic system which is available to carry traffic.
VDSL	Very high-speed digital subscriber line: A modem technology that enables twisted-pair telephone lines to be used as access paths for multimedia and high-speed data communications. VDSL enables higher bit rates than ADSL in short local loops. These bit rates may or may not be different in both directions.
VoB	Voice over broadband: VoB is the same as managed VoIP.
VoIP	Voice over Internet protocol: refers to managed VoIP and is the same as IP telephony.
WCDMA (or W-CDMA)	Wideband code division multiple access: See 3G mobile-cellular network.
Wi-Fi	Wireless fidelity: A wireless local area network based on the IEEE standard 802.11.
WiMAX	Worldwide interoperability for microwave access: A family of telecommunication protocols that provide fixed and mobile Internet access based on IEEE standard 802.16.
WLAN	Wireless local area network.
WLL	Wireless local loop: The use of a wireless communications link as the "last-mile / first-mile" connection between the subscriber and the telephone exchange.
WSIS	World Summit on the Information Society.
WTIM	World Telecommunication/ICT Indicators meeting.
xDSL	Any of the various types of digital subscriber line technologies.

Source: The definitions of the terms and abbreviations included in this Annex were adapted from definitions retrieved from BEREC, European Commission, GSMA, ITU, OECD and OFCOM.

Annex 4: Classification of information economy activities, ISIC Revision 4

This Annex places the ICT indicators in an industry classification context. The use of an industry classification for defining the scope of indicators is particularly relevant to the employment, revenue and investment indicators, which may be collected in industry surveys conducted by national statistical offices. An industry context may also be relevant to other indicators, especially if the data are collected using an industry-based frame (or list).

Most of the indicators in the Handbook apply to telecommunication service operators, which fall within ISIC Division 61, Telecommunications. However, the television broadcasting indicators (77 to 80) may be collected in respect of entities whose activities place them in either Division 60, Programming and broadcasting activities, or Division 61. Division 60 includes "... the activities of creating content or acquiring the right to distribute content and subsequently broadcasting that content ..." Broadcasting can be of TV, radio or data and "... can be performed using different technologies, over-the-air, via satellite, via a cable network or via Internet." Division 61 includes activities relating to the "The distribution of the complete television programme by third parties, i.e. without any alteration of the content ... This distribution can be done through broadcasting, satellite or cable systems."⁴¹

ISIC, the International Standard Industrial Classification of All Economic Activities, is the global standard for classifying businesses to industries according to their activities. The content of this Annex comes from the United Nations "Alternative aggregation of for the information economy", released as part of ISIC Revision 4.⁴²

The Organisation for Economic Co-operation and Development (OECD) took a leading role in standardizing the definition of the ICT and 'content' sectors. Previously used definitions were reviewed by the Working Party on Indicators for the Information Society (WPIIS) and new recommendations developed using the updated detail available in ISIC, Revision 4. The tables set out below follow the recommendations made by WPIIS.

ICT sector definition

The following general principle is used to identify ICT economic industries:

"The production (goods and services) of a candidate industry must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display."

The industries in the ICT sector can be grouped into ICT manufacturing, ICT trade and ICT services. The ISIC Revision 4 industries that comply with the above general principle are provided in Table 5. Additionally, Table 5 shows the definition of the Telecommunications division and the four groups it includes: Wired telecommunication activities; Wireless telecommunication activities; Satellite telecommunication activities; and Other telecommunication activities.

⁴¹ UNSD (2008), 'International Standard Industrial Classification of All Economic Activities Revision 4', Statistical Papers, Series M No. 4/Rev.4, UN, New York. Available at <http://unstats.un.org/unsd/cr/registry/isic-4.asp>.

⁴² Ibid.

Table 5. Definition of ICT sector based on ISIC Revision 4

ISIC code	Industry
ICT manufacturing industries	
2610	Manufacture of electronic components and boards
2620	Manufacture of computers and peripheral equipment
2630	Manufacture of communication equipment
2640	Manufacture of consumer electronics
2680	Manufacture of magnetic and optical media
ICT trade industries	
4651	Wholesale of computers, computer peripheral equipment and software
4652	Wholesale of electronic and telecommunications equipment and parts
ICT services industries	
5820	Software publishing
61	Telecommunications
<p>This division includes the activities of providing telecommunications and related service activities, i.e. transmitting voice, data, text, sound and video. The transmission facilities that carry out these activities may be based on a single technology or a combination of technologies. The commonality of activities classified in this division is the transmission of content, without being involved in its creation. The breakdown in this division is based on the type of infrastructure operated.</p> <p>In the case of transmission of television signals this may include the bundling of complete programming channels (produced in division 60, <i>Programming and broadcasting activities</i>) in to programme packages for distribution.</p>	
6110	Wired telecommunications activities
<p>This class includes:</p> <ul style="list-style-type: none"> - operating, maintaining or providing access to facilities for the transmission of voice, data, text, sound and video using a wired telecommunications infrastructure, including: <ul style="list-style-type: none"> · operating and maintaining switching and transmission facilities to provide point-to-point communications via landlines, microwave or a combination of landlines and satellite linkups · operating of cable distribution systems (e.g. for distribution of data and television signals) · furnishing telegraph and other non-vocal communications using own facilities <p>The transmission facilities that carry out these activities, may be based on a single technology or a combination of technologies.</p> <p>This class also includes:</p> <ul style="list-style-type: none"> - purchasing access and network capacity from owners and operators of networks and providing telecommunications services using this capacity to businesses and households - provision of Internet access by the operator of the wired infrastructure 	
6120	Wireless telecommunications activities
<p>This class includes:</p> <ul style="list-style-type: none"> - operating, maintaining or providing access to facilities for the transmission of voice, data, text, sound, and video using a wireless telecommunications infrastructure - maintaining and operating paging as well as cellular and other wireless telecommunications networks 	

<p>The transmission facilities provide omni-directional transmission via airwaves and may be based on a single technology or a combination of technologies.</p> <p>This class also includes:</p> <ul style="list-style-type: none"> - purchasing access and network capacity from owners and operators of networks and providing wireless telecommunications services (except satellite) using this capacity to businesses and households - provision of Internet access by the operator of the wireless infrastructure 	
6130	Satellite telecommunications activities
<p>This class includes:</p> <ul style="list-style-type: none"> - operating, maintaining or providing access to facilities for the transmission of voice, data, text, sound and video using a satellite telecommunications infrastructure - delivery of visual, aural or textual programming received from cable networks, local television stations or radio networks to consumers via direct-to-home satellite systems (The units classified here do not generally originate programming material.) <p>This class also includes:</p> <ul style="list-style-type: none"> - provision of Internet access by the operator of the satellite infrastructure 	
6190	Other telecommunications activities
<p>This class includes:</p> <ul style="list-style-type: none"> - provision of specialized telecommunications applications, such as satellite tracking, communications telemetry, and radar station operations - operation of satellite terminal stations and associated facilities operationally connected with one or more terrestrial communications systems and capable of transmitting telecommunications to or receiving telecommunications from satellite systems - provision of Internet access over networks between the client and the ISP not owned or controlled by the ISP, such as dial-up Internet access etc. - provision of telephone and Internet access in facilities open to the public - provision of telecommunications services over existing telecom connections: <ul style="list-style-type: none"> · VOIP (Voice Over Internet Protocol) provision - telecommunications resellers (i.e. purchasing and reselling network capacity without providing additional services) 	
62	Computer programming, consultancy and related activities
6201	Computer programming activities
6202	Computer consultancy and computer facilities management activities
6209	Other information technology and computer service activities
631	Data processing, hosting and related activities; web portals
6311	Data processing, hosting and related activities
6312	Web portals
951	Repair of computers and communication equipment
9511	Repair of computers and peripheral equipment
9512	Repair of communication equipment

Source: Adapted from UNSD (2008), 'International Standard Industrial Classification of All Economic Activities Revision 4', *Statistical Papers*, Series M No. 4/Rev.4, UN, New York.

Content and media sector definition

The following general principle is used for the identification of activities in the content and media sector:

“The production (goods and services) of a candidate industry must primarily be intended to inform, educate and/or entertain humans through mass communication media. These industries are engaged in the production, publishing and/or the distribution of content (information, cultural and entertainment products), where content corresponds to an organized message intended for human beings.”

The industries in the content and media sector can be grouped into Publishing; Motion picture, video and television programme activities; Programming and broadcasting; and Other information services. The ISIC Revision 4 industries that comply with the above general principle are provided in Table 6, as well as the definitions of the division Programming and broadcasting and the two groups it includes: Radio broadcasting; and Television programming and broadcasting activities.

Table 6. Definition of content and media sector based on ISIC Revision 4

ISIC code	Industry
581	Publishing of books, periodicals and other publishing activities
5811	Book publishing
5812	Publishing of directories and mailing lists
5813	Publishing of newspapers, journals and periodicals
5819	Other publishing activities
591	Motion picture, video and television programme activities
5911	Motion picture, video and television programme production activities
5912	Motion picture, video and television programme post-production activities
5913	Motion picture, video and television programme distribution activities
5914	Motion picture projection activities
592	Sound recording and music publishing activities
60	Programming and broadcasting activities
<p>This division includes the activities of creating content or acquiring the right to distribute content and subsequently broadcasting that content, such as radio, television and data programs of entertainment, news, talk, and the like. Also included is data broadcasting, typically integrated with radio or TV broadcasting. The broadcasting can be performed using different technologies, over-the-air, via satellite, via a cable network or via Internet. This division also includes the production of programs that are typically narrowcast in nature (limited format, such as news, sports, education or youth-oriented programming) on a subscription or fee basis, to a third party, for subsequent broadcasting to the public.</p> <p>This division excludes the distribution of cable and other subscription programming (included in the Telecommunications division).</p>	
6010	Radio broadcasting
<p>This class includes:</p> <ul style="list-style-type: none"> - broadcasting audio signals through radio broadcasting studios and facilities for the transmission of aural programming to the public, to affiliates or to subscribers 	

<p>This class also includes:</p> <ul style="list-style-type: none"> - activities of radio networks, i.e. assembling and transmitting aural programming to the affiliates or subscribers via over-the-air broadcasts, cable or satellite - radio broadcasting activities over the Internet (Internet radio stations) - data broadcasting integrated with radio broadcasting 	
6020	Television programming and broadcasting activities
<p>This class includes:</p> <ul style="list-style-type: none"> - creation of a complete television channel programme, from purchased programme components (e.g. movies, documentaries etc.), self produced programme components (e.g. local news, live reports) or a combination thereof <p>This complete television programme can be either broadcast by the producing unit or produced for transmission by third party distributors, such as cable companies or satellite television providers.</p> <p>The programming may be of a general or specialized nature (e.g. limited formats such as news, sports, education or youth oriented programming), may be made freely available to users or may be available only on a subscription basis.</p> <p>This class also includes:</p> <ul style="list-style-type: none"> - programming of video-on-demand channels - data broadcasting integrated with television broadcasting <p>This class excludes:</p> <ul style="list-style-type: none"> - assembly of a package of channels and distribution of that package via cable or satellite to viewers (included in the Telecommunications division) 	
639	Other information service activities
6391	News agency activities
6399	Other information service activities n.e.c.

Source: Adapted from UNSD (2008), 'International Standard Industrial Classification of All Economic Activities Revision 4', *Statistical Papers*, Series M No. 4/Rev.4, UN, New York.



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