



## 8th World Telecommunication/ICT Indicators Meeting (Geneva, 2010)

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**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 4*

**Document C/1-E**  
**23 November 2010**  
**English**

**SOURCE:** ITU/BDT

**TITLE:** Definitions of world telecommunication/ICT indicators (March 2010)

# DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

## March 2010

ITU code	Indicator	To be included in:		ITU Definition
		Short questionn aire	Long Questionn aire	
Fixed Telephone network				
112	Fixed telephone lines	Yes	Yes	112 = 112a+28c+1112+112IP  A <b>fixed</b> telephone line (previously called main telephone line in operation) is an active* line connecting the subscriber's terminal equipment to the public switched telephone network (PSTN) and which has a dedicated port in the telephone exchange equipment. This term is synonymous with the terms <i>main station</i> or <i>Direct Exchange Line (DEL)</i> that are commonly used in telecommunication documents. It may not be the same as an access line or a subscriber. This should include the active number of analog fixed telephone lines (112a), ISDN channels (28c), fixed wireless (WLL), public payphones (1112) and <b>VoIP subscriptions (112IP)</b> . If not included, specify in a note. *Active lines are those that has registered an activity in the past three months.
117	Total capacity of local public switching exchanges	No	No	The total capacity of public switching exchanges corresponds to the maximum number of fixed telephone lines that can be connected. This number includes, therefore, fixed telephone lines already connected and fixed lines available for future connection, including those used for the technical operation of the exchange (test numbers). The measure should be the actual capacity of the system, rather than the theoretical potential when the system is upgraded or if compression technology is employed. This should exclude capacity of fixed telephone lines from mobile cellular network.
1142	Percent of fixed telephone lines connected to digital exchanges	No	No	This percentage is obtained by dividing the number of active fixed telephone lines connected to digital telephone exchanges by the total number of fixed telephone lines. This indicator does not measure the percentage of exchanges which are digital, the percentage of inter-exchange lines which are digital or the percentage of digital network termination points. Respondents should indicate whether the fixed telephone lines included in the definition represent only those in operation or the total capacity.
112a	Analog fixed telephone lines (PSTN lines)	No	No	Number of active analog fixed telephone lines (network termination points at the end of the year). PSTN Direct services are defined as a situation where a customer is directly connected to a telecommunications operator which connects that customer to the public telecommunications network. Indirect services, which should not be included here, are provided to customer by means of their supplier's wholesale access to another operator's PSTN network infrastructure. The ISDN subscriptions should be excluded here.
112IP	VoIP subscriptions	No	Yes	Number of Voice over Internet Protocol (VoIP) fixed line subscriptions. Refers to fixed telephone line VoIP subscriptions that have generated in- or outbound traffic within the past three months. This includes VoIP subscriptions through fixed wireless, DSL, cable, and other fixed Internet platform that provides fixed telephony using Internet protocol, but excludes software-based VoIP applications( example: VoIP using Skype, hotmail, or yahoo).
116	Percent of fixed telephone lines which are residential	No	Yes	This percentage is obtained by dividing the number of active fixed lines serving households (i.e., lines which are not used for business, government or other professional purposes or as public telephone stations) by the total number of fixed telephone lines. A household consists of one or more people, who may or may not be related to each other who share accomodation; and who make common provision for food. If definition of household differs, please indicate in a note and the source of this definition. Active subscriptions means those that are in operation for the past three months.
1162	Percent of fixed telephone lines in urban areas	No	Yes	This percentage is obtained by dividing the number of fixed telephone lines in urban areas by the total number of fixed telephone lines in the country. The definition of urban used by the country should be supplied.

ITU code	Indicator	To be included in:		ITU Definition
		Short questionnaire	Long Questionnaire	
1163%	Percentage of localities with telephone service	No	Yes	This indicator reflects the percentage of localities that have telephone service, fixed or mobile or both. To enhance usefulness, the total number of localities should be provided as well as the population of localities covered by telephone service. A locality is defined as a distinct population cluster, that is, the population living in neighboring buildings which either: (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 coming within either of the above two requirements constitute a group, none of which is separated from its nearest neighbour by more than 200 metres.
1112	Public payphones	No	Yes	Total number of all types of public telephones, including coin- and card-operated and public telephones in call offices. Publicly available phones installed in private places should also be included, as should mobile public telephones. All public telephones regardless of capability (e.g., local calls or national only) should be counted. If the national definition of "payphone" differs from that above (e.g., by excluding pay phones in private places), then respondents should indicate their own definition.
311	Telex subscription lines	No	No	A telex subscription line is a line connecting the subscriber's terminal equipment to the public telex network and which has a dedicated port in the telex exchange equipment.
28	ISDN subscriptions	No	Yes	28 = 281+282 The number of subscriptions to the Integrated Services Digital Network (ISDN). This can be separated by basic rate interface service (i.e., 2B+D, ITU-T Rec. I.420) and primary rate.
281	Basic rate ISDN subscriptions	No	Yes	The number of subscriptions to the basic rate interface service.
282	Primary rate ISDN subscriptions	No	Yes	The number of subscriptions to the primary rate interface service.
28c	ISDN voice channel equivalents	No	Yes	28c = (281*2)+(282*30 or 23) B-channel equivalents converts the number of ISDN subscription lines into their equivalent voice channels, and represents the sum of basic and primary rate equivalents. The number of basic rate subscriptions is multiplied by two and the number of primary rate subscriptions is multiplied by 23 or 30, depending on the standard implemented.
112pt	Fixed numbers ported	No	Yes	Total fixed numbers ported within the year. Number portability is defined as the number of transactions (i.e. one number can be ported several times – transactions).

**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Questionn aire	
Mobile cellular network				
271	Mobile cellular telephone <b>subscriptions</b> (post-paid + prepaid)	Yes	Yes	Refers to the <b>subscriptions</b> to a public mobile telephone service and provides access to Public Switched Telephone Network (PSTN) using cellular technology, including number of pre-paid SIM cards active during the past three months. This includes both analogue and digital cellular systems (IMT-2000 (Third Generation, 3G) and <b>4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems</b> . Subscriptions to public mobile data services, private trunked mobile radio, telepoint or radio paging, and telemetry services should also be excluded. This should include all mobile cellular subscriptions that offer voice communications.
271p	Mobile cellular <b>subscriptions: prepaid</b>	Yes	Yes	Total number of mobile cellular subscriptions( <b>a subscription refers to a line) that used prepaid refills</b> . These are subscriptions that rather than paying a fixed monthly subscription fee, choose to purchase blocks of usage time. This includes both analogue and digital cellular systems (IMT-2000 (Third Generation, 3G) and 4G subscriptions. Only active prepaid subscriptions that have used the system( <b>as shown by traffic or whether they have recharged the card</b> ) during the past three months should be included.
2712	Digital mobile cellular <b>subscriptions</b>	No	<b>No</b>	Total number of mobile <b>subscriptions</b> (see 271 definition) to digital cellular systems. It should include both prepaid and post paid <b>subscriptions</b> .
271L	Total number of mobile cellular <b>subscriptions</b> to low and medium speed access to data communications	No	<b>No</b>	Number of mobile cellular <b>subscriptions</b> with access to data communications (e.g., Internet) at downstream speeds below 256 kbit/s.
271mb_access	Number of mobile cellular <b>subscriptions</b> with access to data communications at broadband speeds	Yes	Yes	Number of <b>subscriptions</b> to mobile cellular networks with access to data communications (e.g. the Internet) at broadband downstream speeds (here defined as greater than or equal to 256 kbit/s) . Note that this refers to potential mobile broadband subscriptions and not active subscriptions.  *If countries use a different definition of broadband, this should be indicated in a note.
271land	Percent coverage of mobile cellular network (land area)	No	No	Proportion of total mobile cellular coverage of the land area in percent. This is calculated by dividing the land area covered by a mobile cellular signal by the total land area.
271pop	Percentage of the population covered by a mobile cellular telephone network	No	Yes	Mobile cellular coverage of population in percent. This indicator measures the percentage of inhabitants that are within range of a mobile cellular signal, irrespective of whether or not they are subscribers. This is calculated by dividing the number of inhabitants within range of a mobile cellular signal by the total population. Note that this is not the same as the mobile subscription density or penetration. When there are multiple operators offering the service, the maximum amount of population covered should be reported.
271G	<b>3G/4G mobile networks coverage (percent of population)</b>	No	Yes	The percent of total population that are covered by at least 3G mobile communication network. This indicator measures the percentage of inhabitants that are within range of at least 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 3G mobile cellular signal by the total population. *Note: 3G is defined as IMT-2000 or IMT-advanced.
271pt	<b>Ported mobile numbers</b>	No	Yes	Total mobile numbers ported within the year. Number portability is defined as the number of transactions (i.e. one number can be ported several times – transactions).

# DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

## March 2010

ITU	Indicator	To be included in:		ITU Definition
code		Short questionnaire	Long Questionnaire	
INTERNET				
4213	Total fixed (wired) Internet subscriptions	Yes	Yes	The number of total Internet subscriptions with fixed (wired) Internet access, which includes dial-up and total fixed (wired) broadband subscriptions. Only active subscriptions that have used the system within the past 3 months should be included.
4213d	Dial-up Internet subscriptions	No	No	Number of Dial-up Internet subscriptions. Dial-up is a connection to the Internet via a modem and fixed telephone line, which requires that the modem dial a phone number when Internet access is needed. Only active subscriptions who used the system during the past three months should be included.
4212	Estimated Internet users	Yes	Yes	The estimated number of Internet users <b>out of total population. This includes those using the Internet from any device (including mobile phones) in the last 12 months.</b> A growing number of countries are measuring this through household surveys. In countries where household surveys are available, this estimate should correspond to the estimated number derived from the percentage of Internet users collected. (If the survey covers percentage of the population for a certain age group (e.g., 15-74 years old, the estimated number of Internet users should be derived using this percentage, and <b>note indicating the scope and coverage of the survey should be provided</b> ). In situations where surveys are not available, an estimate can be derived based on the number of Internet subscriptions.
4212f	Percent female Internet users	No	Yes	Share of females in the estimated number of Internet users. This is calculated by dividing the number of female Internet users by the total number of Internet users and multiplied by 100.
4212f%	Female Internet users as percent of female population	No	Yes	Share of female Internet users in the total number of females. This is calculated by dividing the number of female Internet users by the total number of females and multiplied by 100.
424	PWLAN access points	No	No	The number of <b>Public Wireless Local Area Network (PWLAN) access points</b> (i.e., <i>hotspots</i> ). PWLANs are based on the <b>IEEE 802.11</b> standard, commonly referred to as WiFi.
4214	International Internet bandwidth (Mbit/s)	Yes	Yes	Total capacity of international Internet bandwidth in Mega Bits Per Second (Mbit/s). If capacity is asymmetric (i.e., more incoming than outgoing), the incoming capacity should be provided. <b>This is measured as the sum of capacity of all Internet exchanges offering international bandwidth.</b>
4214og	International Outgoing Internet bandwidth (Mbit/s)	No	No	Total outgoing capacity of international Internet bandwidth in Mega Bits Per Second. <b>This is measured as the sum of capacity of all Internet exchanges offering international bandwidth.</b>
4214ic	International Incoming Internet bandwidth (Mbit/s)	No	No	Total incoming capacity of international Internet bandwidth in Mega Bits Per Second. <b>This is measured as the sum of capacity of all Internet exchanges offering international bandwidth.</b>
4214d	Domestic Internet bandwidth	No	Yes	Total capacity of domestic Internet bandwidth in Mega Bits Per Second (Mbit/s). If capacity is asymmetric (i.e., more download than upload), the download capacity should be provided.
4214di	Domestic download Internet bandwidth	No	No	Total <b>download</b> capacity of domestic Internet bandwidth in Mega Bits Per Second.
4214do	Domestic upload Internet bandwidth	No	No	Total <b>upload</b> capacity of domestic Internet bandwidth in Mega Bits Per Second.

**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Questionn aire	
Fixed (Wired) broadband subscriptions by TECHNOLOGY				
4213tfb	Total fixed <b>(wired)</b> broadband Internet subscriptions	Yes	Yes	Total fixed <b>(wired)</b> broadband Internet subscriptions 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. <b>This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions.</b> 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. If countries use a different definition of broadband, this should be indicated in a note. It should exclude technologies listed under wireless broadband category.
4213cab	Cable modem Internet subscriptions	Yes	Yes	The number of Internet subscriptions using cable modem (modems attached to cable television networks) services to access the Internet, at downstream speeds greater than, or equal to, 256 kbit/s. If subscriptions to lower speed cable modem services cannot be excluded this should be indicated in the note.
4213dsl	DSL Internet subscriptions	Yes	Yes	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. If subscriptions to lower speed DSL services cannot be excluded this should be indicated in the note. <b>It should exclude VDSL subscriptions if these are included in fibre-to-the-home/building subscriptions.</b>
4213ftth/b	Fibre-to-the-home/building	Yes	Yes	The number of Internet subscriptions using fibre to the home or fibre to the building with downstream speeds equal to, or greater than, 256 kbit/s. This should include subscriptions where fibre goes directly to the subscribers premises or fibre to the building subscriptions which terminate no more than 2 meters from an external wall of the building. Fibre to the cabinet and fibre to the node are excluded.
4213fttc/n	Fibre to the cabinet/node	No	No	The number of Internet subscriptions using fibre to the node (typically a cabinet), and another access medium (e.g. copper with VDSL technology) to the subscribers, with downstream speeds equal to, or greater than, 256 kbit/s. <b>(Under discussion)</b>
4213ob	Other fixed <b>(wired)</b> broadband Internet subscriptions	No	Yes	Internet subscriptions using other fixed <b>(wired)</b> broadband technologies to access the Internet (other than DSL, cable modem, and fibre) with downstream speeds equal to, or greater than, 256 kbit/s. This includes technologies such as powerline* communications, etc. It would exclude those users of temporary broadband access (e.g., roaming between PWLAN hotspots), and those with Internet access via mobile cellular networks. <b>WiMax should be excluded.</b> *Powerline subscriptions refer to subscriptions using broadband over power line services (BPL) to access the Internet (at downstream speeds greater than or equal to 256 kbit/s).

<i>ITU code</i>	<i>Indicator</i>	<i>To be included in:</i>		<i>ITU Definition</i>
		<i>Short questionn aire</i>	<i>Long Questionn aire</i>	
<b>FIXED (Wired) BROADBAND by SPEED</b>				
4213_256to2	256kbps to less than 2Mbps subscriptions	No	Yes	All fixed (wired) broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 256 kbit/s and less than 2Mbps.
4213_2to20	2 Mbps to less than 10 Mbps subscriptions	No	Yes	All fixed (wired) broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 2 mbps and less than 10 Mbps.
4213_G10	Above 10Mbps	No	Yes	All fixed (wired) broadband Internet subscriptions with advertised downstream speeds equal to, or greater than 10 Mbps.
4213_10to100	10 Mbps to less than 100 Mbps subscriptions	No	No	All fixed (wired) broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 10 mbps and less than 100 Mbps.
4213_100to1G	100 Mbps to less than 1Gbps subscriptions	No	No	All fixed (wired) broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 100 mbps and less than 1 Gbps.
4213_G1GB	Above 1Gbps subscriptions	No	No	All fixed (wired) broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, 1Gbps.



**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

ITU code	Indicator	To be included in:		ITU Definition
		Short questionn aire	Long Questionn aire	
Wireless Broadband				
271twb	Total Wireless broadband subscriptions	Yes	Yes	Sum of satellite, terrestrial fixed wireless and terrestrial mobile wireless subscriptions. (271s + 271fw + 271mw)
271s	Satellite subscriptions	No	Yes	The number of satellite Internet subscriptions with advertised download speeds of at least 256 kbit/s.
271fw	Terrestrial fixed wireless subscriptions	No	Yes	The number of terrestrial fixed wireless subscriptions with advertised download of at least 256 kbit/s. <b>This could also include fixed WiMax</b> and fixed wireless subscriptions and excludes occasional users at hotspots etc.).
271mw	Terrestrial mobile wireless subscriptions	No	Yes	Sum of active mobile broadband subscriptions and dedicated mobile data subscriptions. (271mb_use + 271md).
271mb_use	Standard mobile subscriptions with use of data communications at broadband speeds	No	Yes	Standard mobile subscriptions (only included with active use): Includes mobile subscriptions with advertise data speeds of 256 kbit/s or greater and which have been used to make an Internet data connection via IP in the previous 3 months. To be counted, the subscription must allow access to the greater Internet via HTTP and must have been used to make a data connection using the Internet Protocol in the previous three months. Standard SMS and MMS messaging do not count as an active Internet data connection even if they are delivered via IP.
271md	Dedicated mobile data subscriptions	No	Yes	Subscriptions to dedicated data services over a mobile network which are purchased separately from voice services either as a stand-alone service (modem/dongle) or as an add-on data package to voice services which requires an additional subscription. All dedicated mobile data subscriptions with recurring subscription fees are included as “active data subscriptions” regardless of actual use. Pre-paid mobile broadband plans require active use if there is no monthly subscriptions. <b>This could also include mobile WiMax subscriptions.</b>

## DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

### March 2010

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Questionn aire	
TRAFFIC				
1311m	Local fixed <b>to fixed</b> telephone traffic (minutes)	No	<b>No</b>	Local fixed telephone traffic consists of 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. This should exclude minutes used for dial-up Internet access.
1312m	<b>Long distance fixed</b> to fixed telephone traffic (minutes)	No	<b>No</b>	Long distance fixed telephone traffic consists of effective (completed) fixed national long distance telephone voice traffic exchanged with a station outside the local charging area of the calling station. The indicator should be reported as the number of minutes of traffic. This should exclude minutes used for dial-up Internet access.
131m	Domestic fixed <b>to fixed</b> telephone traffic	No	<b>Yes</b>	Domestic fixed telephone traffic consists of completed local (1311m) and long-distance fixed telephone voice traffic (1312m). The indicator should be reported as the number of minutes of traffic. This should exclude minutes used for dial-up Internet access.
1313wm	Fixed telephone lines to mobile networks traffic (minutes)	No	<b>Yes</b>	Total minutes from the fixed telephone network to the mobile cellular network within the country.
1311im	Internet Dial-up traffic (minutes)	No	No	The total volume in minutes of dial-up sessions over the public switched telephone network to access the Internet.
132mb	International incoming and outgoing fixed telephone traffic (minutes)	No	<b>No</b>	Sum of international incoming and outgoing fixed traffic (132m+132mi).
132m	International outgoing fixed telephone traffic (minutes)	No	Yes	This covers the effective (completed) fixed telephone voice traffic originating in a given country to destinations outside that country. <b>This should include traffic to mobile phones.</b> The indicator should be reported in number of minutes of traffic.
132mi	International incoming fixed telephone traffic (minutes)	No	Yes	Effective (completed) fixed telephone voice traffic originating outside the country with a destination inside the country. The indicator should be reported in number of minutes of traffic.
133wm	<b>Domestic</b> mobile telephone traffic (minutes)	No	Yes	Total number of minutes made by mobile subscribers within a country (including minutes to fixed telephone and minutes to mobile phone subscribers) (133wm = 1331wm + 1332wm + 1332wmf).
1331wm	Outgoing mobile minutes to same mobile network	No	No	Number of minutes made by mobile subscribers to the same mobile network (within the country).
1332wm	Outgoing mobile minutes to other mobile networks	No	No	Number of minutes made by mobile subscribers to other mobile networks (within the country).
1332wmf	Outgoing mobile minutes to fixed networks	No	<b>Yes</b>	Number of minutes made from mobile cellular network to fixed networks within the country.
1333wm	Outgoing mobile minutes to international	No	Yes	Number of mobile minutes originating in a country to destinations outside that country to any destination.
1335wm	Incoming international minutes to mobile network	No	Yes	Number of incoming minutes (fixed and mobile) received by mobile networks from another country.
1334wm	Roaming minutes outside of home network ( <b>outbound roaming</b> )	No	No	Total minutes made and received by own customers in foreign networks (outbound roaming). Retail international roaming minutes from own network subscribers roaming on foreign networks abroad. Excludes minutes from foreign of non-national users who are not subscribers to domestic mobile networks and are temporarily roaming on domestic mobile networks.
1336wm	Roaming minutes by foreign subscribers ( <b>inbound roaming</b> )	No	No	Total number of minutes made by visiting (foreign) subscribers when making and receiving calls within a country (inbound roaming).

ITU code	Indicator	To be included in:		ITU Definition
		Short questionnaire	Long Questionnaire	
133sms	SMS sent	No	Yes	Total number of mobile Short Message Service (SMS) sent, both to national and international destinations. <b>This should exclude messages sent by computers to mobile or to computers.</b>
133msi	SMS international	No	Yes	Total number of mobile Short Message Service (SMS) sent to international destinations. <b>This should exclude messages sent by computers to mobile or to computers.</b>
133mms	MMS sent	No	Yes	Total number of mobile Multimedia Messaging Service (MMS) sent, both to national and international destinations. <b>This should exclude messages sent by computers to mobile or to computers.</b>
133rm	Number of countries with which there is a roaming agreement.	No	No	Total number of countries, with which there is a roaming agreement. If there are several operators with a different number of roaming agreements, the total number of countries with roaming agreement. For example, if operator 'A' has agreement with country '1', '2', '3', '4', and '5' where as operator 'B' has agreement with country '1', '6', and '7'. The total number of countries with which there is a roaming agreement should be '7'.
132tb	International incoming and outgoing total telephone traffic (minutes)	No	No	Sum of international incoming and outgoing fixed and mobile traffic (132t+132ti).
132t	International outgoing total telephone traffic (minutes)	No	Yes	This covers the effective (completed) international outgoing minutes originating from national networks, fixed and mobile, including managed VoIP. The indicator should be reported in terms of number of minutes of traffic (132m+1333wm).
132ti	International incoming total telephone traffic (minutes)	No	Yes	Effective (completed) International incoming minutes originating outside the country and terminated in national networks, fixed and mobile, without transit, and including managed VoIP. The indicator should be reported in terms of number of minutes of traffic. (132mi+1335wm).
131VoIP	VoIP minutes	No	Yes	Calls using managed fixed Voice over Internet Protocol telephony. A managed VoIP service means a publicly available telephone service provided using VoIP for call origination whereby the operator controls the quality of service provided. This variable specifies the total VoIP traffic (national and international). It should exclude traffic exchanged using software-based VoIP.
133i	Mobile Internet traffic	No	No	Total amount of data traffic (excluding SMS and MMS) for the past year from all mobile networks. (Under discussion)

# DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

## March 2010

ITU code	Indicator	To be included in:		ITU Definition
		Short questionn aire	Tariffs Questionn aire	
<b>Tariffs</b> Because most countries now have some form of competition in at least one market segment, there may not be a standard tariff. In addition, tariffs within services may not be uniform (e.g., telephone subscription charges may vary across the nation). The following guidelines may be useful: 1. It is preferable to use the tariffs of the operator with the largest market share (measured by the number of subscriptions). This may not be the operator offering the cheapest tariffs to customers. 2. It is preferable to use the tariffs that the majority of consumers pay (e.g., if most of the customers are in urban areas, use urban tariffs). 3. It is preferable to include taxes and provide a note specifying whether taxes are included and what the rate is. It is preferable to use the same operator each year to enhance chronological comparability. 4. It is preferable to report tariffs in national currency. If this is not the case, it should be specified in a note.				
<b>Fixed local telephone service tariffs – residential</b>				
151	Installation fee for residential telephone service	No	Yes	Installation (or connection) refers to the one-off charge involved in applying for residential basic telephone service. Where there are different charges for different exchange areas, the charge for the largest urban area should be used and specified in a note. Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.
152	Monthly subscription for residential telephone service	No	Yes	Monthly subscription refers to the recurring fixed charge for subscribing to <b>postpaid</b> 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. Separate charges should be stated where appropriate, for first and subsequent lines. If the rental charge includes any allowance for free or reduced rate call units, this should be indicated. If there are different charges for different exchange areas, the largest urban area should be used and specified in a note. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153	Price of a 3-minute fixed telephone local call (peak rate)	No	Yes	Local call refers to the cost of a peak rate 3-minute call including the call set-up charges if applicable, within the same exchange area using the subscriber's own terminal (i.e., not from a public telephone). <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153o	Price of a 3-minute fixed telephone local call (off-peak rate)	No	Yes	Local call refers to the cost of a off peak rate 3-minute call including the call set-up charges if applicable, within the same exchange area using the subscriber's own terminal (i.e., not from a public telephone). <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
<b>Fixed local telephone service tariffs – business</b>				
151b	Installation fee for business telephone service	No	Yes	Installation (or connection) refers to the one-off charge involved in applying for business basic telephone service. Where there are different charges for different exchange areas, the charge for the largest urban area should be used and specified in a note. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
152b	Monthly subscription for business telephone service	No	Yes	Monthly subscription refers to the recurring fixed charge for subscribing to a <b>postpaid</b> 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. Separate charges should be stated where appropriate, for first and subsequent lines. If the rental charge includes any allowance for free or reduced rate call units, this should be indicated. If there are different charges for different exchange areas, the largest urban area should be used and specified in a note. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153tm	International telephone call prices	No	No	This is the cost of a fixed 3-minute directly dialled (i.e., without operator intervention) call originating within the country to another country. The rate should be supplied for peak rate time calls and off-peak (discount) rate calls (if applicable). The cost should be reported in national currency, with a statement on what taxes are applied. International tariffs to all countries should be provided. <b>Taxes should be included.</b>

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Tariffs Questionn aire	
Mobile cellular tariffs				
151c	Mobile cellular <b>postpaid</b> connection charge	No	No	The initial, one-time charge for a new postpaid subscription. Refundable deposits should not be counted. Although some operators waive the connection charge, this does not include the cost of the SubscriberIdentity Module (SIM) card. The price of the SIM card should be included in the connection charge.It should also be noted if free minutes or free SMS are included in the connection charge. <b>Taxes should be included. If not included, it should be specified in a note including the tax rate applicable.</b>
151p	Mobile cellular <b>prepaid</b> connection charge	No	Yes	The initial, one-time charge for a new subscription. Refundable deposits should not be counted. Although some operators waive the connection charge, this does not include the cost of the SubscriberIdentity Module (SIM) card. The price of the SIM card should be included in the connection charge <b>(for a prepaid service the cost of SIM is equivalent to connection charge)</b> . It should also be noted if free minutes or free SMS are included in the connection charge. <b>Taxes should be included. If not included, it should be specified in a note including the tax rate applicable.</b>
151pcard	Mobile cellular - cheapest recharge card value	No	No	Refers to the cheapest available prepaid recharge card. <b>Please indicate how many equivalent minutes or SMS messages can be used out of the recharge card. Taxes should be included. If not included, it should be specified in a note.</b>
152c	Mobile cellular monthly subscription charge	No	No	The monthly subscription charge for mobile cellular service. Due to the variety of plans available in many countries, it is preferable to use the tariff with the cheapest initiation/connection charge. If prepaid services are used (for those countries that have more prepaid than post-paid subscribers), the monthly subscription charge would be zero. If the plan includes free minutes <b>and/or free SMS</b> , this should be put in a note. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153c	Mobile cellular <b>prepaid</b> -price of 3-minute local call (peak, <b>on-net</b> )	No	No	The price of a three minute peak rate call from a mobile <b>cellular prepaid</b> telephone to a mobile cellular subscriber of the same network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153pn	Mobile cellular prepaid – price of local call per minute (peak, on-net)	No	Yes	The price per minute of a peak rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of the same network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153po	Mobile cellular prepaid – price of local call per minute (peak, off-net)	No	Yes	The price per minute of a peak rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of another (competing) network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153pf	Mobile cellular prepaid – price of local call per minute (peak, to fixed)	No	Yes	The price per minute of a peak rate call from a mobile cellular prepaid telephone to a fixed telephone subscriber. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153co	Mobile cellular <b>prepaid</b> - price of 3-minute local call (off-peak, <b>on-net</b> )	No	No	The price of a three minute off-peak rate local call from a mobile <b>cellular prepaid</b> telephone to a mobile cellular subscriber of the same network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153pon	Mobile cellular prepaid – price of local call per minute (off-peak, on-net)	No	Yes	The price per minute of an off- peak rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of the same network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153poo	Mobile cellular prepaid – price of local call per minute (off-peak, off-net)	No	Yes	The price per minute of an off- peak rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of another (competing) network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153pof	Mobile cellular prepaid – price of local call per minute (off-peak, to fixed)	No	Yes	The price per minute of a off-peak rate call from a mobile cellular prepaid telephone to a fixed telephone subscriber. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153pwn	Mobile cellular prepaid – price of local call per minute (weekend/evening, on-net)	No	Yes	The price per minute of a weekend/evening rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of the same network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153pwo	Mobile cellular prepaid – price of local call per minute (weekend/evening, off-net)	No	Yes	The price per minute of a weekend/evening rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of another (competing) network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>

ITU code	Indicator	To be included in:		ITU Definition
		Short questionn aire	Tariffs Questionn aire	
153pwf	Mobile cellular prepaid – price of local call per minute (weekend/evening, to fixed)	No	Yes	The price per minute of a weekend/evening rate call from a mobile cellular prepaid telephone to a fixed telephone subscriber. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153psms	Mobile cellular prepaid-price of SMS (On_net)	No	Yes	Price of sending a Short Message Service (SMS) message from a mobile cellular prepaid handset to a mobile cellular subscriber of the same network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
153sms_po	Mobile cellular prepaid-price of SMS (off-net)	No	Yes	Price of sending a Short Message Service (SMS) message from a mobile cellular prepaid telephone to a mobile cellular subscriber of another (competing) network. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
<b>Internet tariffs</b> In countries where it is not clear which Internet Service Provider has the dominant market share in terms of subscriptions, tariffs should correspond to those offered by the (former) incumbent telecommunication operator.				
<b>Dial-up Internet tariffs</b>				
4213c	Dial-up Internet connection charge	No	No	The initial, one-time charge for a new dial-up Internet connection. Refundable deposits should not be counted. <b>Taxes should be included. If not included, it should be specified in a note.</b>
4213s	Dial-up Internet monthly	No	No	The monthly subscription charge for dial-up Internet service. <b>Taxes should be included. If not included, it should be specified in a note.</b> The note should also specify the amount of free monthly hours included if applicable.
4213p	Dial-up Internet - price of per minute (peak) connection	No	No	Cost of per minute (peak) connection once the free Internet hours included in the dial-up subscription are used up. <b>Taxes should be included. If not included, it should be specified in a note.</b>
4213po	Dial-up Internet - price of per minute (off-peak) connection	No	No	Cost of per minute (off-peak) connection once the free Internet hours included in the dial-up subscription is used up. <b>Taxes should be included. If not included, it should be specified in a note.</b>
<b>Fixed (Wired) broadband Internet tariffs</b>				
4213bc	Fixed (Wired) broadband Internet connection charge	No	Yes	The initial, one-time charge for a new fixed (wired) broadband Internet connection. The tariffs should represent the cheapest fixed (wired) broadband entry plan. Refundable deposits should not be counted. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
4213bs	Fixed (Wired) broadband Internet monthly subscription	No	Yes	The monthly subscription charge for fixed (wired) broadband Internet service. Fixed (wired) broadband is considered any dedicated connection to the Internet at downstream speeds equal to, or greater than, 256 kbit/s, using DSL. Where several offers are available, preference should be given to the 256 kbit/s connection. <b>Taxes should be included. If not included, it should be specified in a note including the applicable tax rate.</b>
4213bs_s	Fixed (Wired) broadband speed (Mbps)	No	Yes	Fixed (wired) broadband speed (Mbps) represents the advertised maximum theoretical download speed and not speeds guaranteed to users.
4213bs_c	Fixed (Wired) broadband_Cap	No	Yes	Maximum amount of data (Gigabytes) that can be transferred within a month that is included in the fixed (wired) broadband subscription.
4213bs_cp	Fixed (Wired) broadband_Price Cap+	No	Yes	Price per additional data downloaded (Gigabytes) once the monthly allotted limit of the fixed (wired) broadband subscription is used.

## DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

March 2010

March 2016

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Questionn aire	
Quality of Service				
123	Waiting list for <b>fixed</b> lines	No	<b>No</b>	Un-met applications for connection to the Public Switched Telephone Network (PSTN) due to a lack of technical facilities (equipment, lines, etc.). The waitlist should reflect the total number reported by all PSTN service providers in the country.
143	Faults per 100 <b>fixed</b> lines per year	No	Yes	The total number of reported faults to fixed telephone lines for the year. Faults, which are not the direct responsibility of the public telecommunications operator, should be excluded. This is calculated by dividing the total number of reported telephone faults <i>for the year</i> by the total number of fixed lines in operation and multiplied by 100. The number of faults per 100 fixed lines per year should reflect the total reported by all PSTN service providers in the country.
141	Percent of <b>fixed</b> telephone faults cleared by next working day	No	Yes	Percentage of PSTN faults reported that have been corrected by the end of the next working day (i.e., not including non-working days, e.g., weekends, holidays). The percent of fixed telephone faults cleared by next working day should reflect the total number across all PSTN service providers in the country.

**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

ITU code	Indicator	To be included in:		ITU Definition
		Short questionn aire	Long Questionn aire	
STAFF				
51	Total full-time telecommunication staff	No	Yes	Total full-time staff employed by telecommunication network operators in the country for the provision of public telecommunication services, including fixed, mobile and Internet services. <b>This should include all operators (both network and virtual operators) offering services within the country.</b> This should exclude staff working in national broadcasting networks if offering only the traditional broadcasting services. Part-time staff should be expressed in terms of the full-time staff equivalent.
51f	Female telecommunication staff	No	Yes	The number of full-time telecommunication staff that are female.
51fp	Female professional telecommunication staff	No	No	The number of full-time professional staff that are female. Professional staff is those included in ISCO-88 group 2.
51w	Mobile telecommunication staff	No	<b>No</b>	Total number of staff employed by mobile cellular network operators. This refers to mobile operators' staff only, and not staff employed by resellers. <b>In cases where it is difficult to separate the exact number of staff working on mobile services, please provide an estimate.</b>
51wf	Female mobile telecommunication staff	No	<b>No</b>	Total number of female staff employed by mobile cellular network operators. This refers to mobile operators' staff only, and not staff employed by resellers.
51wfp	Female professional mobile telecommunication staff	No	<b>No</b>	Total number of professional female staff employed by mobile cellular network operators. This refers to mobile operators' staff only, and not staff employed by resellers. Professional staff is those included in ISCO-88 group 2.
51_ISP	<b>Total staff employed by Internet Service Providers (ISPs)</b>	No	No	Full time staff employed by Internet Service Providers (ISP). Part-time staff should be expressed in terms of full-time staff equivalents. In cases where it is difficult to separate the exact number of staff working on Internet services, please provide an estimate. Both wired and wireless Internet service providers should be included.



# DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

## March 2010

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Questionn aire	
REVENUE				
75	Total revenue from all telecommunication services	No	Yes	This is the total (gross) telecommunication revenue earned from all (fixed, mobile and data including Internet) <b>operators (both network and virtual operators)</b> offering services within the country. This should exclude revenues from non-telecommunications services. Revenue (turnover) consists of telecommunication service earnings during the financial year under review. This should refer to actual revenues earned by retailers and not from wholesale. Revenue should not include monies received in respect of revenue earned during previous financial years, neither does it include monies received by way of loans from governments, or external investors, nor monies received from repayable subscribers' contributions or deposits. Revenues should be net of royalties. <b>It should exclude revenues generated from traditional broadcasting.</b>
71	Revenue from fixed telephone services	No	Yes	Revenues from fixed telephone services includes: Revenue received for the connection (installation) of telephone service (this may include charges for transferring or cancelling a service); Revenues from recurring charges for subscription to telephone (and broadband and Internet access if can not be separated from fixed telephone) including equipment rentals where relevant; and Revenue from calls (local, national and international calls).
711	Revenue from fixed telephone connection charges	No	No	Revenue received for connection (installation) of fixed telephone service. This may include charges for transfer or cessation of service.
712	Revenue from fixed telephone subscription charges	No	No	Revenues from recurring charges for subscription to the PSTN including equipment rentals where relevant.
713	Revenue from fixed telephone calls	No	No	The sum of income from local, national long distance and international calls.
7131	Revenue from <b>fixed</b> local calls	No	No	Revenue from fixed local calls based on applicable retail charges on users.
7132	Revenue from <b>fixed</b> national long distance calls	No	No	Revenue from fixed national long distance calls based on applicable retail charges on users.
7133	Revenue from <b>fixed</b> international calls	No	No	Revenue from fixed international calls based on applicable retail charges on users.
741	Revenue from mobile networks	No	Yes	Revenues from the provision of mobile cellular communications services including all voice and data (narrowband and broadband) services. <b>This should refer to actual revenues earned by retailers and not from wholesale.</b>
76ro	Revenue from outbound roaming	No	No	Roaming revenues from own mobile subscribers that make and receive calls when outside the country (outside home network), e.g. when travelling abroad.
76ri	Revenue from inbound roaming	No	No	Roaming revenues from visiting (foreign) subscribers that make and receive calls within the country. These revenues are obtained by network operators within the country from network operators of visiting subscribers.

**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

<i>ITU code</i>	<i>Indicator</i>	<i>To be included in:</i>		<i>ITU Definition</i>
		<i>Short questionn aire</i>	<i>Long Questionn aire</i>	
741d	Mobile data revenues	No	<b>No</b>	Revenues from mobile data services such as text messaging (SMS), multimedia messaging (MMS), data and Internet services.
741m	Text and multimedia messaging revenues	No	<b>No</b>	Revenues from text messaging and multimedia messaging (SMS and MMS).
731	Revenue from data services	No		Revenues from all data services such as data communications (e.g., packet switching) and Internet access (including revenues generated from mobile broadband subscriptions and usage) but not telegram or telex.
7311	Revenue from Internet services	No	<b>No</b>	Revenues from the provision of fixed Internet services such as subscriptions, traffic and data communication. It should exclude the provision of access lines used to connect to fixed Internet (such as fixed telephone line used to access DSL connection).
<b>7311_fb</b>	<b>Revenue from fixed broadband services</b>	No	No	Revenues from the provision of high-speed (at least 256 kbps) data connectivity and related services over fixed (wired) infrastructure.
<b>7311_wb</b>	<b>Revenue from wireless broadband services</b>	No	No	Revenues from the provision of high-speed (at least 256 kbps) data connectivity and related services over wireless infrastructure.
732	Revenue from leased lines	No	Yes	Revenue from the provision of leased lines. <b>This should refer to actual revenues earned by retailers and not from wholesale.</b>
733	Revenue from fixed value-added telecommunication services	No	No	Represents the revenue generated by the telecommunication service sector for fixed value-added telecommunication services (for example, call forwarding, conference call, detailed billing etc)
74	Other telecommunication revenues	No	No	Any other revenues not accounted for elsewhere for the provision of public telecommunication services. Respondents should indicate in a note what the main sources of "other" telecommunications revenues are. This should refer to actual revenues earned by retailers and not from wholesale.

# DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

## March 2010

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Questionn aire	
INVESTMENT				
81	Total annual investment in telecom	No	Yes	Also referred to as annual <i>capital expenditure</i> , this is the gross annual investment in telecom (including fixed, mobile and Internet services) for acquiring property and network. <b>This should include all operators (both network and virtual operators) offering services within the country.</b> The term investment means the expenditure associated with acquiring the ownership of property (including intellectual and non-tangible property such as computer software) and plant by the operator. This includes expenditure on initial installations and on additions to existing installations where the usage is expected to be over an extended period of time. Note that this applies to telecom services that are available to the public, and excludes investment in telecom software or equipment for internal use. <b>Excludes expenditures on research and development and fees for operating licenses and for the use of radio spectrum.</b>
i81t	Non-tangible investment			This should include all operators (both network and virtual operators) offering services within the country. This is investment associated with acquiring non-tangible property such as computer software and licenses by the operator. Note that this applies to telecom services that are available to the public, and excludes investment in telecom software or equipment for internal use.
83	Fixed telephone service investment	No	Yes	Annual investment in fixed telephone service for <b>acquiring property and network</b> within the country.
87	Fixed (wired) broadband investment	No	Yes	Annual investment in fixed (wired) broadband service for <b>acquiring property and network</b> within the country.
841m	Mobile communication investment	No	Yes	Annual investment in mobile telephone service for <b>acquiring property and network</b> within the country. It should include investments made for mobile broadband services.
841f	Foreign investment	No	Yes	Annual investment in telecom (for fixed, mobile and Internet) services coming from foreign sources, also referred to as Foreign Direct Investment (FDI). This is usually collected by national banks as part of the Balance of Payments.
88	Total investment in pay TV services	No	No	Annual investment for acquiring property and equipment for the provision of pay TV (cable, DTH, MMDS or other) services. The term investment means the expenditure associated with acquiring the ownership of property (including intellectual and non-tangible property such as computer software) and plant by the operator. This includes expenditure on initial installations and on additions to existing installations where the usage is expected to be over an extended period of time. This term is also referred to as capital expenditure.  (Under discussion)

# DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS

## March 2010

ITU	Indicator	To be included in:		ITU Definition
code		Short questionn aire	Long Question naire	
COMMUNITY ACCESS INDICATORS				A locality is defined as a distinct population cluster, that is, the population living in neighboring buildings which either: (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 coming within either of the above two requirements constitute a group, none of which is separated from its nearest neighbour by more than 200 metres.
PIAC5	Total number of public Internet access centres (PIAC)	No	No	Refers to the total number of public Internet access centres (PIAC). A PIAC is a site, location, or centre of instruction at which Internet access is made available to the public, on a full-time or part-time basis. This may include telecentres, digital community centres, Internet cafés, libraries, education centres and other similar establishments, whenever they offer Internet access to the general public. All such centres should have at least one public computer for Internet access.
PIAC6	Total number of Digital Community Centres (DCC)	No	No	Refers to the total number of a nation's Digital Community Centres (DCC). A DCC is a place where the public can access Internet services from terminal facilities placed at their disposal. A DCC is an undertaking based on a government framework for universal access. It should offer equitable, universal and affordable access. A DCC is a sub-category of a PIAC but there are some minimum requirements for a public Internet access centre (PIAC) to be considered a DCC. Every DCC should have at least one computer and one printer and a minimum connection speed of 64 kbit/s per centre to the Internet Service Provider (ISP). DCC users should also be provided with support and maintenance and it should be opened a minimum of 20 hours per week.
PIAC7	Total number of other public Internet access centres (PIAC)	No	No	Refers to the total number of other public Internet access centres (not PIACs and not DCCs). Other PIACs include cybercafés. Education Centres may be classified as a DCC or a PIAC, depending on the conditions they satisfy.
PIAC3	Number of localities with public Internet access centres (PIAC)	No	No	Refers to all localities (a nation's villages, towns, and cities) that have at least one public Internet access centre (PIAC). A PIAC is a site, location, or centre of instruction at which Internet access is made available to the public, on a full-time or part-time basis.
PIAC1	Percentage of localities with public Internet access centres (PIAC)	No	Yes	A public Internet access centre (PIAC) is a site, location, centre of instruction at which <b>broadband</b> Internet access is made available to the public, on a full-time or part-time basis. This may include telecentres, digital community centres, Internet cafés, libraries, education centres and other similar establishments, whenever they offer Internet access to the general public. All such centres should have at least one public computer for Internet access. The percentage of localities with public Internet access centres (PIACs) is computed by dividing the number of localities with at least one PIAC by the total number of the country's localities and multiplying by 100. The indicator should be broken down by range (number) of inhabitants. This indicators will be used to measure the WSIS target "to connect villages with ICTs and establish community access points" by 2015.
PIAC2	Percentage of the population with access to a public Internet access centre (PIAC)	No	Yes	Measures the number of inhabitants enjoying PIAC coverage as a proportion of the country's total population. When a locality (village, town, city, etc.) has at least one PIAC, then the entire population living in this locality is considered to be served by that PIAC.
PIAC4	Target population for DCC (Digital Community Centres) services	No	No	Refers to the potential population (the potential population refers to anyone of age 6 years or more) minus the number of non-community Internet users (non-community Internet users are those citizens that have Internet access from a point different from a PIAC, for example from at home).

**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

<b>ITU code</b>	<b>Indicator</b>	<b>To be included in:</b>		<b>ITU Definition</b>
		<b>Short questionnaire</b>	<b>Long Questionnaire</b>	
PIAC8	Total number of computers in Digital Community Centres (DCC)	No	No	Refers to the total number of computers available in all Digital Community Centres. A DCC is a place where the public can access Internet services from terminal facilities placed at their disposal. See indicator 36.1 for the definition of a DCC.
PIAC9	Actual Digital Community Centre (DCC) usage percentage	No	No	To calculate the actual DCC usage percentage, countries should divide the actual number of DCC users by the DCC target population (see indicator 36.6 for definition) for DCC services and multiply by 100. A user is defined as a person who accesses the Internet at least once a month.
PIAC10	Terminals installed in Digital Community Centres (DCC)	No	No	Refers to the total number of computers installed in all Digital Community Centres. A DCC is a place where the public can access Internet services from terminal facilities placed at their disposal.
PIAC11	Rural localities with public Internet access centres	No	No	Refers to all rural localities (villages, town, etc of a country) that have at least one community access centre which is a site, centre of instruction at which Internet access is made available to the public, on a full-time or part-time basis. (Since the definition of rural differs between countries, the definition of rural should be provided.)

**DEFINITIONS OF WORLD TELECOMMUNICATION/ICT INDICATORS**  
**March 2010**

ITU code	Indicator	To be included in:		ITU Definition
		Short questionn aire	Long Questionn aire	
OTHER INDICATORS				
955	Number of radio sets	No	No	The total number of radio sets. A radio set is a device capable of receiving broadcast radio signals, using popular frequencies, such as FM, AM, LW and SW. <b>It includes a radio set integrated into another device, such as a Walkman, a car or an alarm clock but excludes radios integrated in a mobile phone or in a computer.</b>
965	Number of TV sets	No	No	The total number of television sets. A television set is a <b>stand-alone</b> device capable of receiving broadcast television signals, using popular access means such as over-the-air, cable and satellite. <b>It excludes TV functionality</b> integrated into another device, such as a computer or a mobile phone. It may be useful to distinguish between digital and analogue signal delivery and between TV sets receiving only a limited number of signals (usually over-the-air) and those that have multiple channels available (e.g., by satellite or cable).
965m	Total number of multi-channel TV subscriptions	No	No	965m=965c+965s.
965c	Number of terrestrial multi-channel TV subscriptions	No	No	Number of terrestrial multi-channel TV such as cable TV, digital terrestrial TV, Microwave Multi-point Distribution systems (MMDS) and Satellite Master Antenna Television (SMATV) subscriptions.
965s	Direct to Home satellite antenna subscriptions	No	No	The number of subscriptions to a home satellite antenna that can receive television broadcasting directly from satellites.
965cp	Homes passed by multi-channel TV	No	No	Number of households that have a multi-channel (both terrestrial and satellite) television connection whether they are subscribing or not.
422	Number of computers	No	No	The number of computers measures the number of computers installed in a country. The statistic includes PCs, laptops, notebooks etc, but excludes terminals connected to mainframe and mini-computers that are primarily intended for shared use, and devices such as smart-phones that have only some, but not all, of the functions of a PC (e.g., they may lack a full-sized keyboard, a large screen, an Internet connection, drives etc) <b>or TV sets.</b>
4213l	Leased line subscriptions	No	Yes	Number of leased line subscriptions. A leased line connects two locations for private voice and/or data telecommunication service. Not a dedicated cable, a leased line is a reserved circuit between two points. Leased lines can span short or long distances. They maintain a single open circuit at all times, as opposed to traditional telephone services that reuse 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 these lines guarantee bandwidth for network traffic.

**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 3*

**Document C/2-E**  
**15 November 2010**  
**English**

**SOURCE:** Central Statistical Office, Trinidad and Tobago

**TITLE:** Recent developments in measuring household, individual and business ICT access & use indicators

## RECENT DEVELOPMENTS IN MEASURING HOUSEHOLD, INDIVIDUAL AND BUSINESS ICT ACCESS & USE INDICATORS – CENTRAL STATISTICAL OFFICE – TRINIDAD & TOBAGO

### BACKGROUND

In **January 2009**, representatives from the national statistical offices, telecommunication regulators, agencies with an interest in ICT met in Port of Spain (POS) Trinidad for the **‘First Capacity Building Workshop on Information Society Measurement in the Caribbean’** which was held from the 26<sup>th</sup> to 30<sup>th</sup> January 2009.

This workshop was organized jointly by UNECLAC, ITU and UNCTAD. It was host by UNECLAC and the Ministry of Public Administration, Government of Trinidad & Tobago.

The purpose of this workshop was a Training course on measuring ICT access and use in households and businesses.

The course was aimed at improving the capacity of official data producers in the Caribbean countries to produce internationally comparable statistics on ICT access and use in households and by individuals, ICT use by businesses , the ICT sector and international trade in ICT goods.

The training course offered to Caribbean countries an opportunity to get to know ICT statistics and the importance of measuring ICT in a harmonized way for better policy making and addressing the digital divide. At the same time, the importance of quality and reliability when carrying out surveys and producing statistics was addressed.

Approximately 12 islands were represented with a majority of the participants from regional NSO’s. Other participants came from ICT policy making bodies with 1 representative from a telecommunications authority.

Some of the outcomes of this meeting were:

- a) Those NSO’s who lacked experience in collecting ICT data showed high interest in topics like survey implementation in both household and business sectors as well as on survey design and data sources.
- b) This training course was useful in bringing together ICT policy makers and ICT data users around the table. On the issue of measuring ICT statistics, the training was a good opportunity to promote this interaction, which helps to encourage NSO’s to measure ICT statistics.

In view of the latter, invitations were also sent to all NSO’s in the CARICOM territories for a representative to attend the **‘5<sup>th</sup> Regional Workshop on Information Society Measurement In Latin America and the Caribbean’** in Rio de Janeiro April 6<sup>th</sup> – 8<sup>th</sup> 2009. This workshop was organized by the Observatory for Information Society in Latin America & the Caribbean (OSILAC), ECLAC, Canada’s International Development Research Centre and the European Commission @LIS.

Trinidad & Tobago was represented by Mr. Tyrone Gopaul, Statistician I from the Central Statistical Office. There were no other representatives from the Caribbean region.



The agenda was dominated by the Latin American countries present at the meeting. They presented their most recent progress on the implementation of:

- a) ICT Indicators in Business Surveys and the ICT sector
- b) ICT access & use indicators in household surveys

And the development of indicators on:

- c) The use of ICT for e – government
- d) The use of ICT for education.

Other worthwhile topics discussed were the:

- 1. Advances, challenges and perspectives in measuring ICT
- 2. Revised ICT Core List Indicators for Households – Methodological discussion on harmonization challenges
- 3. Revised ICT Core List Indicators for Businesses – Methodological discussion on harmonization challenges

Together with topics on:

- 4. Using ICT indicators for the development of public policies
- 5. Analysis of ICT indicators for designing public policies.

At the 5<sup>th</sup> workshop, Trinidad & Tobago CSO did not present on any of the above topics because at the time it was not involved in the actual measurement of these indicators.

## **WORK CURRENTLY BEING DONE TO MEASURE ICT INDICATORS IN THE CSO.**

**This was a direct result of the 5<sup>th</sup> workshop in Rio de Janeiro (April 2009) and the first capacity building workshop in Port-Of-Spain (Jan 2009).**

### **A) Inclusion of a section in the Population and Housing Census questionnaire re : Individual Use of Information & Communication Technology**

Initially, all 6 questions from pgs 94 to 96 of the ‘**Manual for measuring ICT access and use by Households & Individuals**’ 2009 Ed were proposed for inclusion into the questionnaire.

Because of the total number of questions to be included in the questionnaire (70), it was agreed that only the first 3 questions (Pg 94) can be placed on the form. There was also change in the reference period from 1 year to **3 months** and a change in the age group to be measured from 14 to 74 years (which was the stipulation in the manual) to **3 years and over**.

These changes in age and reference period were made to facilitate policy interests by the government. For international reporting purposes, the number of individuals aged 14 to 74 can be tabulated after the conclusion of the census for these 3 questions.

The questions included in this Section 10 of the questionnaire and their response categories are:

1. Did you have use of a mobile telephone during some or all of the **last 3 months**?
2. Have you used a computer from any location in the **last 3 months**?
3. Have you used the internet from any location in the **last 3 months**?

The response categories are:            1. Yes                            2. No                            3. Not stated

The response rate is expected to be high because: a) Problem of recall is low            b) Not many response categories.

## **B) Household Use of Information & Communication Technology**

The household section of the questionnaire also contains questions on ICT. These are:

1. Does the household have internet?                            1. Yes                            2. No
2. What type of internet access services is used?                            Multiple Responses Allowed

These are:

- a) Analogue                            b) Other Narrowband                            c) DSL                            d) Cable Modem  
e) Other Fixed Broadband                            f) Mobile Broadband                            g) Don't Know

**Question 2 above** may require the enumerator to explain and / or decipher what are the applicable types of internet access since some household heads may not know the answer to this question.

Explanations are provided in the enumerator's manual for the census to assist enumerators.

## **FUTURE WORK – HOUSEHOLD & INDIVIDUAL USE ICT INDICATORS**

The 2011 Census would be undertaken during the period January 9<sup>th</sup> to February 20<sup>th</sup> 2011.

When completed it would provide an ICT household and individual population frame. This can be used to collect more detailed information on ICT from individuals and households. Questionnaires can then be mailed or field interviewers employed to ascertain the following information in follow up surveys: **(See Manual for measuring ICT Access and Use by Households & Individuals) 2009 Ed ITU Pgs 95 – 96**. These questions are:

## INDIVIDUAL USE OF ICT

1. Where did you use the internet in the last 12 months?
2. How often did you typically use the internet during the last 12 months (from any location)?
3. For which of the following activities did you use the internet for private purposes in the last 12 months (from any location)?

**With respect to 3. above**, these categories have one additional activity since the first publication in 2009. The entire list of activities can be seen in the publication **CORE ICT INDICATORS 2010** – Partnership on Measuring ICT for Development Pg 23 & 24.

## C. BUSINESS ICT ACCESS & USE QUESTIONNAIRE

This is an ICT instrument that was designed from the '**Manual for the Production of Statistics on the Information Economy**' 2009 Rev Ed UN. It is patterned on the UNCTAD Model Questionnaire on Pages 125 – 127.

It contains the 12 core business indicators recommended by the Partnership on Measuring ICT for Development.

A project proposal was prepared in **April 2010** with a budget for the conduct of this first ICT Business Surveys Census.

It was primarily designed to collect benchmark ICT data and at the same time obtained firm specific data that can be used to update the firm's records on the Business Register.

In **October 2010**, the Ministry responsible for the CSO allocated a total of \$100,000 TT or approximately \$ 15,750 US for this project. These monies are to be used from October 1<sup>st</sup> 2010 to September 30<sup>th</sup> 2011.

This UNCTAD manual states that businesses with **10 or more employees can be considered the 'in scope population'**. In the CSO Business Register of establishments, this would equal to approximately 15,000 businesses from various economic classifications and localities.

It was originally planned to do a complete census of business establishments (estimated at 30,000 firms) but the amount of funds allocated would not be able to satisfy this goal.

In fact, the level of funding provided would mean this survey would have to be carried out by **primarily by mail**.

The questionnaire can also be emailed to firms for completion. Interviews can be done by telephone with some personal interviews on the field at the firm's location.

The administration of this survey would have to be conducted in ways that are not customarily used at present in the CSO. For example:

1. The questionnaire can be published in its entirety in the national newspapers with an invitation for firms to complete and submit by a specific deadline date.

The estimated response rate using this procedure can be assumed to be low, since there is no incentive for firms to submit the questionnaire. But the cost to print the entire questionnaire in the newspaper would be low compared to the 'circulation' of the papers i.e. the proportion of the in scope businesses that can be reached in any one day.

2. The questionnaire can be administered with the assistance of another government organization. For eg:
  - a) the Board of Inland Revenue. At the point where businesses have to pay their quarterly taxes four times per year. While waiting in line, the survey can be administered.
  - b) the National Insurance Board. At the point where businesses have to pay their monthly contributions for number of employees employed. Same procedure applies above

In both cases, the administration of the survey can temporarily be placed in these organizations because it is a 'legal' obligation for firms to pay taxes and insurance contributions.

**Note: This would require these organizations to want to collaborate with the Central Statistical Office.**

The cost of the provision of this service would be free to all parties because it is different arms of the state.

The business would have to **complete the questionnaire only once** and not every time a visit is made to these government agencies.

3. The questionnaire can be administered simultaneously with the Population and Housing Census questionnaire.

In theory, while this would be practical to do, in reality it is very onerous to implement.

The census enumeration is aimed at getting specific information about individuals in the household and characteristics of households. The only information collected on businesses in Trinidad & Tobago in the Census Visitation Record is: Name, Address, Economic Activity and No. of persons employed.

To do an additional survey together with the Census questionnaire targeted to businesses may seem burdensome on the part of the enumerator.

The final strategy for the administration of the Business ICT survey has not been finalized but options 1 & 2 above would be looked at earnestly when the final proposal is completed.

This Business ICT project is tentatively scheduled to begin after the census is completed i.e. Feb 2010. It would most likely be administered in the 3<sup>rd</sup> quarter of the 2011 i.e. July to September 2011.

## **FUTURE WORK - BUSINESS ICT INDICATORS**

Once the Business ICT survey has been completed, periodic surveys every two or three years can be done. A time series can then be produced. Based on these outcomes, the progress of the 12 ICT business indicators can be monitored to see if there would be increased use and access of ICT in Businesses in Trinidad & Tobago and its effect on the development and prosperity of the business community.

## **CONCLUDING REMARKS**

The overall status of Trinidad & Tobago - Central Statistical Office (CSO) with respect to the collection of the ICT indicators is in its infancy.

This office has benefited tremendously from the training offered by international and regional agencies with respect to the: 1. Design of the survey instruments 2. The collection and inclusion of ICT statistics in the work program of the National Statistics Office and 3. The results from different countries in Latin America with respect to their own country experiences and their shortfalls and problems identified with these surveys. For e.g. these would be low response rates, misinterpretation of questions on the survey instrument etc.

The 8<sup>th</sup> World Telecommunication/ICT Indicators meeting in Geneva would be a gathering of world experts and best practices in the areas of Households, Individual and Business ICT Indicators. Since Trinidad & Tobago CSO would be making a bold step in the measurement of these indicators, it is hoped that the experiences gained in this seminar can be used and implemented during the administration of the ICT survey questions & instruments in 2011.

Also, Trinidad & Tobago has taken the lead in the CARICOM region with respect to the inclusion of an entire section on Individual ICT Indicators in the Population & Housing Questionnaire and the administration of a stand alone Business ICT Indicators Survey.

Our experiences with these survey questions would be shared with other Caribbean islands in the future with the intent to encourage each one of the 18 islands in the region to incorporate ICT surveys / censuses in the work programs of their various National Statistical Offices.

Regards

**Tyrone Gopaul**

Statistician I

Business Surveys Section

Central Statistical Office

Republic of Trinidad & Tobago

October 4<sup>th</sup> 2010

**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 8*

**Document C/4-E  
16 November 2010  
English**

**SOURCE:** Agência Nacional de Telecomunicações, Brazil

**TITLE:** Analysis of the use of ICT by Children in Brazil - ICT Households 2009 Survey

**Background paper for the 8<sup>th</sup> ITU / ICT Indicators (WTI) Meeting, Geneva, 24-26 November 2010**

**Analysis of the use of ICT by Children in Brazil – ICT Households 2009 Survey**

*Alexandre Barbosa (NIC.br/CETIC.br)*

*Juliano Cappi (NIC.br/CETIC.br)*

*Tatiana Jereissati (NIC.br/CETIC.br)*

**Introduction**

In this article, we present the analysis of the results of an ICT survey conducted by Center of Studies on Information and Communication Technologies in Brazil (CETIC.br) which aims at assessing ownership and use of Information and Communication Technologies (ICTs) by children across the national territory aged between 5 and 9 years old. The results here presented are a sample of the state of ICT statistics collection and dissemination in Brazil for a very specific segment: young children. CETIC.br has consolidated its position as a reference center for the production of indicators and statistics on the uses of ICTs in Brazil. CETIC.br has been concentrating its efforts on broadening the scope and improving the quality of the indicators and statistics produced annually in its surveys. These efforts are intended to ensure the reliability of the results, the production of higher quality information and, most importantly, a higher degree of international comparability. CETIC.br has been accumulating significant experience in conducting national ICT surveys in different segments such as education, households, enterprise, electronic government, etc.

The current generation is immersed in a world where ICTs are increasingly becoming more present in their daily lives. As children become more familiar with these technologies and start using them, understanding the implications of this new reality becomes paramount. How do children aged 5 to 9 years old use the worldwide computer network? What are the implications of these habits? The present study aims at stimulating these and other thoughts.

Due to the complexity involved in researching such a young group, we have opted to have the questionnaire answered by two different types of interviewees. Thus, the first part of the survey was conducted with the parents or guardians of the children and information was gathered regarding access to ICTs in their households. These interviewees also presented their views on how their children use ICTs. The second part of the questionnaire targeted children themselves and touched on the specifics that characterize the use of computers, the Internet and mobile phones. It

is worth noting that the questions were adapted to the universe of children aged 5 to 9 years old, and the answers reveal their understanding of what was asked. Certain concepts, such as time and space, were adapted in order to improve perception by a child; when asking about the frequency of use, for instance, alternatives such as “daily”, “at least once a week”, “at least once a month”, “less than once a month”, which were used with adults, were replaced by “always”, “sometimes” and “just a little”, which are closer to the perception of a child.

The main highlights from the results obtained by the “ICT Households Survey – Children” are synthesized below:

- **Use of Computers vs. Use of the Internet:** Children use computers much more than they access the Internet. Income partially explains this phenomenon; however, the main hypothesis regarding the issue suggests that the Internet is not very accessible to children, that is, it does not offer much content designed specifically for them.
- **Location of access:** The indicator “location of access to the Internet” reveals the importance of households as the main doorway to the worldwide computer network for children. Moreover, with regard to the most frequent locations of access to the Internet, the study shows the importance of LAN houses, even for such a young audience.
- **The Internet in schools:** Despite the importance of the media in the education of children, schools play a secondary role as locations of access to the Internet: while 27% of children claimed to have accessed the Internet from these places, only 14% of them mentioned schools as the location of most frequent access. Even LAN houses obtained a more significant result regarding the “location of access to the Internet – most frequent” indicator (17%).
- **Internet Activities:** Recreational activities were the most commonly mentioned by children regarding Internet use. While games are widely engaged in, activities involving communication and education were not very popular among the subjects surveyed.
- **Mobility:** Mobile phones appeared as the most common technology among children aged 5 to 9 years old: 65% have already used one of these devices and 14% own one. Despite the high incidence of mobile phone use among the subjects surveyed, these devices are used mainly for gaming and listening to music, and not as a communication device.

#### **A. Access to information and communication technologies in households**

The results of the first ICT Households 2009 Survey – Children reveal that the determinant factors for the presence of information and communication technologies in households with children aged 5 to 9 years old are family income, social class and region of the country, following the pattern observed in the survey involving the general population. In terms of distribution, ICT penetration is

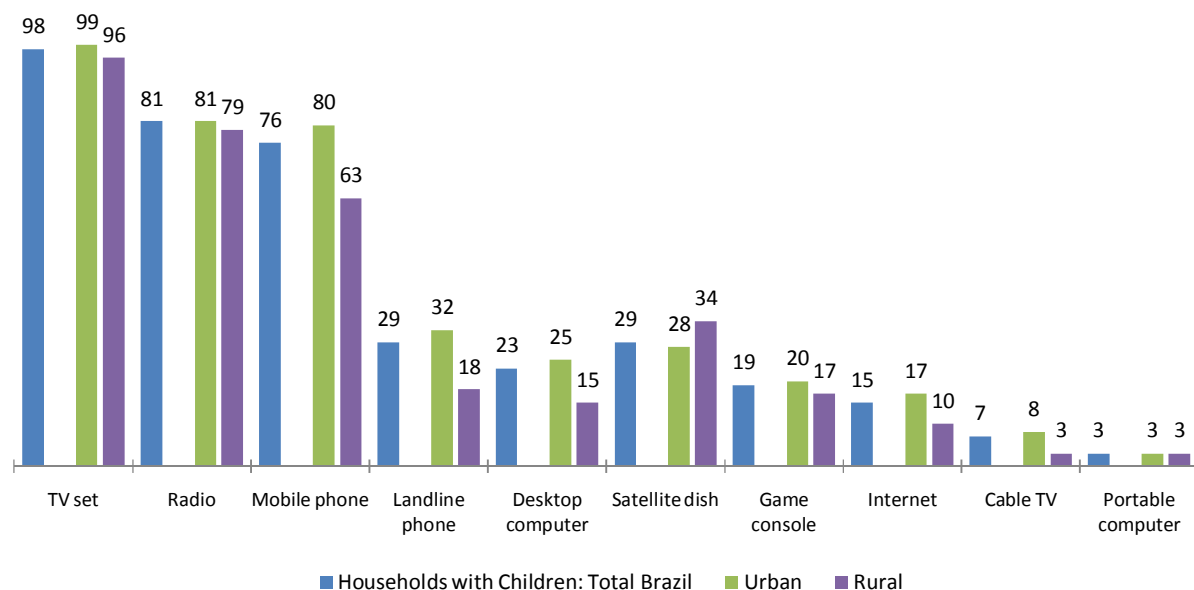


more prominent among households with higher family incomes and households located in economically privileged regions.

TV sets and stereos are also practically universal. According to the survey, of the households with at least one child, 98% own a TV set and 81% have a radio. Mobile phones also show a high rate of penetration, as they are present in 76% of these households, a percentage that vastly surpasses the 29% registered for landline phones. Desktop computers, on the other hand, are present in only 23% of the households, which is lower than the percentages registered in relation to older, less expensive media, such as TVs and radios. Desktop computers are present in all households from class A, that is, 100% of the households with children aged 5 to 9 years old have them. In class DE, this figure is significantly reduced to 4%. Game consoles are present in 19% of Brazilian households with children aged 5 to 9 years old, a significant figure when compared to the 16% found in the households of the general population.

Comparisons between households in urban and in rural areas reveal significant differences regarding the penetration of these technologies: while 80% of households in urban areas have mobile phones, only 63% of them do so in rural areas. The same is true for landline phone ownership (32% in urban areas versus 18% in rural areas) and desktop computers (25% in rural areas versus 15% in rural areas).

**Chart 1: PROPORTION OF HOUSEHOLDS THAT HAVE ICT DEVICES (%)**  
*Percentage over the total number of households with children*

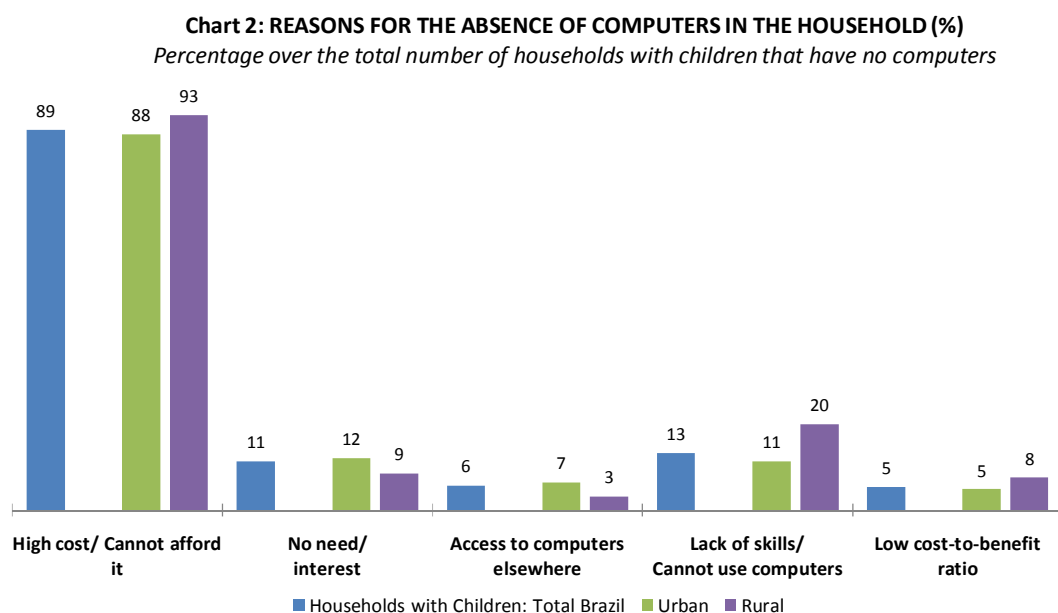


**a. Computer ownership, access to the Internet and type of connection to the Internet**

The survey showed that 25% of the households where children live have at least one computer, regardless of whether it is a desktop or a portable computer.

The absence of computers in the remaining households is mainly due to their high cost, as 89% of the interviewees who do not have this technology claim not to be able to afford it. This factor is predominant and ranks much higher than the other reasons mentioned by interviewees.

The second most common reason is “lack of skills” to use these devices, mentioned by 13% of the interviewees. The nine-percentage-point difference between interviewees from urban and rural areas who claimed to lack computer skills is noteworthy. In urban areas, this reason was mentioned by 11% of the people who do not have computers in their household; in rural areas this figure reaches 20%, suggesting a greater deficiency of ICT skills in the rural areas of the country. Finally, 11% of interviewees mentioned lack of necessity or interest as the main reason for not having computers in their households.



It is worth noting that 87% of household computers are equipped with Microsoft/Windows operating systems, which brings into evidence the high predominance of this type of system. Linux

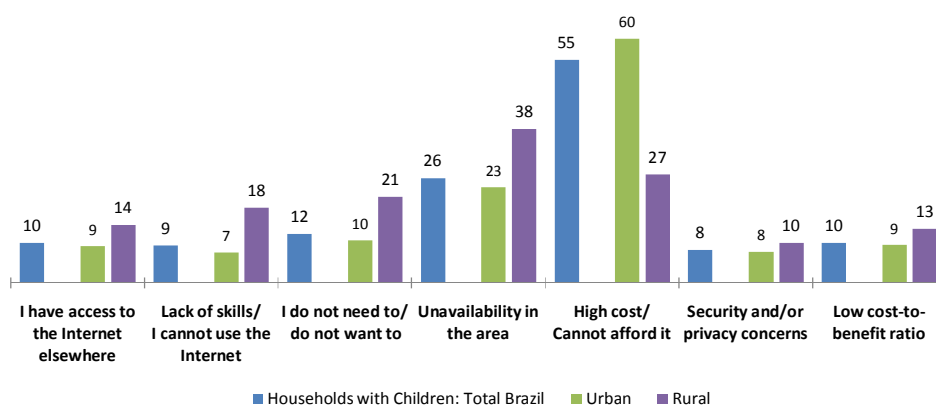
and Mac OS operating systems were mentioned by less than 1% of interviewees, while 12% claimed not to know which operating system they had.

Since 2003, the Brazilian government has been investing on policies that promote the use of free, open-code operating systems. However, the results from the survey show that these efforts have not yet resulted in any benefits. Moreover, as the survey targets households with children, a potential implication of the strong prevalence of Microsoft operating systems is that new generations of computer and Internet users may become used to this software, which suggests a tendency to perpetuate its prevalence and excludes the opportunity to develop an open software culture.

Regarding Internet access, only 15% of the households selected in the sample had access to the network. When the regions of the country are factored in, the analysis of the survey data reveals a strong disparity in the proportion of households connected in each region. At 5%, the Northeast region features the lowest percentage, while the South and Center-West regions rank first, with 25% of households connected to the worldwide computer network in each region. The North region registered 9%, whilst in the Southeast region, this value reaches 21%.

When analyzing the households that have computers but no access to the Internet, it becomes clear that the main barrier preventing access to the network is the high cost of the service, mentioned by 55% of all the interviewees. The results for the rural areas show that this is not the main reason preventing households from having the service, but the “unavailability in the area” instead, which accounted for 38% of all the answers, which is 11 percentage points higher than “High cost/ Cannot afford it”.

**Chart 3: REASONS FOR THE ABSENCE OF INTERNET ACCESS IN THE HOUSEHOLD (%)**  
*Percentage over the total number of households with children that have computers, but no access to the Internet*



Broadband is the most common type of connection among Brazilians, and it was mentioned by 66% of the households from the general population connected to the Internet, as shown by the ICT Households 2009 survey. This percentage remains the same for households with children: broadband was present in 66% of the households interviewed. Traditional modems are present in 20% of the households from the general population, and among households with children the percentage is lower: 16%, which shows that broadband distribution among households with children is generally similar to that of the households from the general population.

The influence of income on the acquisition of Internet access was significant. If households with children are divided into two different categories according to family income, one up to three minimum wages and the other more than three minimum wages, 22% of the lower-income range population connects to the Internet through dial-up connections and 69% through broadband. Among households earning higher incomes, the corresponding percentages are 9% and 84% respectively.

## **B. Use of information and communication technologies by children aged 5 to 9 years old**

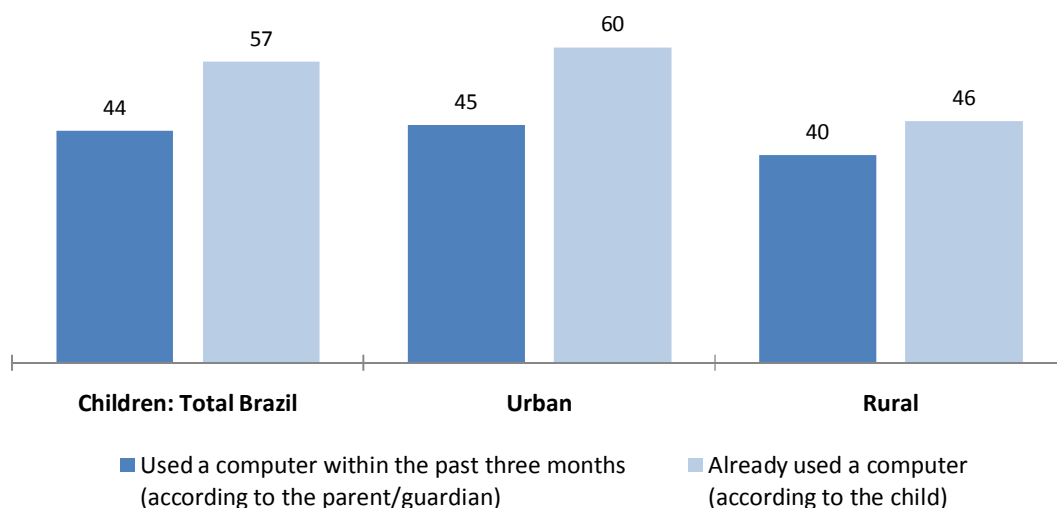
### **a. Use of Computers, location and frequency of use**

The results from the survey reveal that 57% of children aged between 5 and 9 years old have already used a computer, which is higher than the 53% registered by the ICT Households 2009 survey, suggesting that younger generations are significantly more familiar with this technology.

However, when considering the answers given by parents or guardians when asked if their children or wards had used computers in the previous three months, the percentage of use drops to 44%, which is closer to the 43% observed among the general population.

**Chart 4: PROPORTION OF CHILDREN WHO HAVE ALREADY USED A COMPUTER (%)**

*Percentage over the total population aged between 5 and 9 years old*



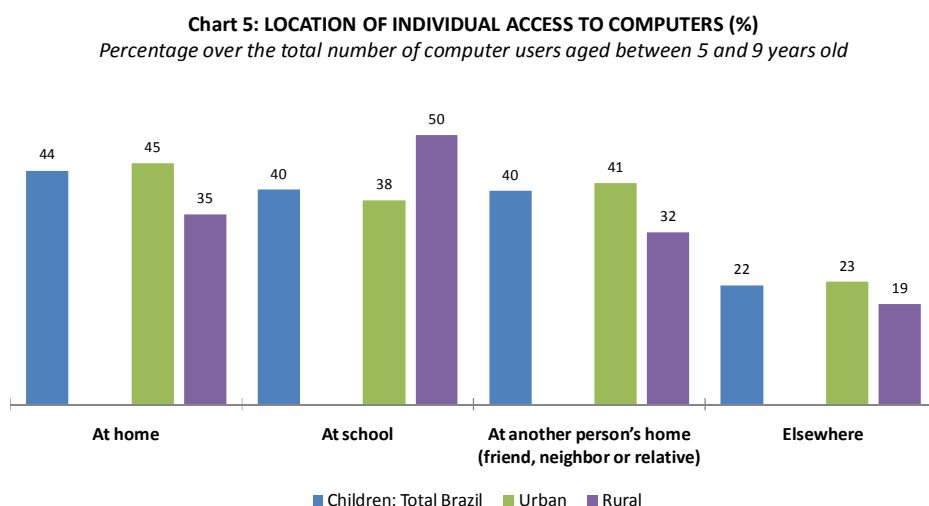
A possible explanation for this variation may be the different reference periods used in each question. Parents or guardians were asked specifically about use within the “previous 3 months”, whereas children were not. Having considered this, the answers given by the children may refer to several reference periods, including periods longer than the “past 3 months”. The question asked of the adults made reference to a fixed period, and this is probably why its corresponding index is lower.

With regard to the locations of access to computers in the survey involving children, the home of the child (44%), the school (40%) and another person’s home (40%) registered very similar proportions. However, the results for the general population show that households are the main location of access, far surpassing another person’s home and school (54%, 27% and 17%, respectively).

When the results regarding children are analyzed separately for urban and rural areas, different patterns of use emerge. In rural areas, schools rank first (50%), followed by the home of the interviewee (35%) and then by another person’s home (32%). These data reveal the importance of schools as a location of access to computers, as they are more conducive to this purpose in rural areas. Moreover, the fact that schools feature as the most important locations of access to the Internet in rural areas, ahead of households, corroborates the idea that the low penetration of computers in these households may help explain why the results regarding computer access and use are lower in these areas than in urban areas. While in urban areas 45% of the children had used

computers within the 3 months prior to the survey, in rural areas, where household access is less common, only 40% of children had done so within the same reference period.

The survey also explores the perspective of the child regarding the relevance of these locations for the use of computers. From this perspective, the household features as the location where children use computers “more times”, significantly surpassing the results obtained by schools. When only the location of access to computers is taken into account, and not the frequency of use in these locations, schools and households are at the same level. However, when surveying the location where access is most frequent, 36% of children claimed the household to be the location where computers were used more often, while 24% mentioned schools and/or another person’s home, revealing a 12-percentage-point difference between the first and the other places mentioned.



Among the computer users interviewed, 17% claimed to “always” use the device. In urban areas, 18% of children claim to always use computers, whereas only 9% of the children in rural areas do so. Moreover, 45% of interviewees claim to use computers “sometimes” and 39% “just a little”.

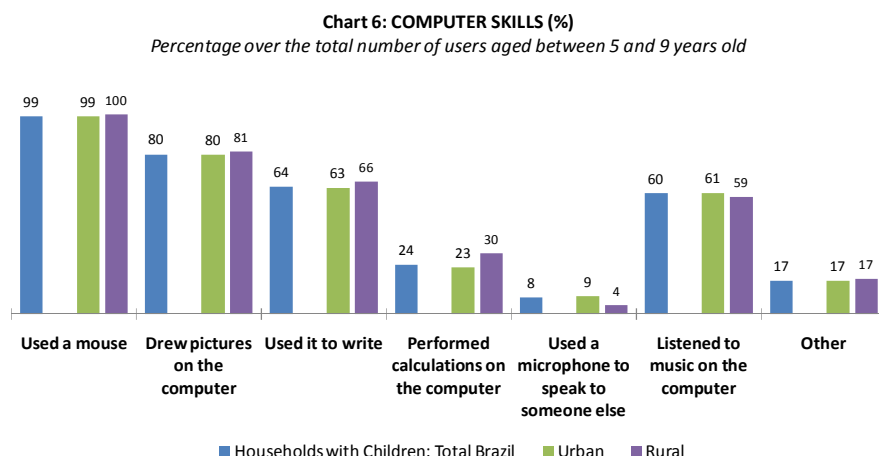
When comparing the location of access to computers with the frequency of use, as perceived by the child, households are the location where use is most frequent. This suggests that the presence of computers at home contributes toward a more skilled use of computers. Among the children who claimed to use computers at these locations, 29% “always” use it, which is 12 percentage points above the average when compared to other access locations. The survey also shows that the percentage regarding the location where computers are used most frequently is twice as high for

households (29%) as for schools (14%). A more frequent use of computers results in better computer skills, bringing as a consequence the ability to perform a wider range of activities.

## b. Computer Skills

Regarding computer skills, the main skill mentioned by all of the children that had used a computer was using a mouse, which is needed to carry out various activities. Additionally, 80% of them claimed to use computers to draw, 64% to write and 60% to listen to music.

The gap between the indexes regarding the skills mentioned by children in the rural and the urban areas of the country is only evident when more specific activities are considered, such using microphones and performing calculations with the computer. In urban areas, 30% of children claimed to have used computers to add and to divide, whereas 23% had done so in rural areas. Regarding the use of microphones, results in urban areas reached 9%, whereas in rural areas this index dropped to 4%. Another activity that revealed significant disparity was the use of computers to write: 66% of the children interviewed do so in urban areas, against 63% in rural areas. Activities such as “drawing” (81% in urban areas and 80% in rural areas) and “listening to music” (61% in urban areas and 59% in rural areas) had very similar results.



Regarding the skills developed through the use of computers, it is noteworthy that girls outnumber the boys when it comes to drawing and writing. While 76% of boys had used computers to draw,

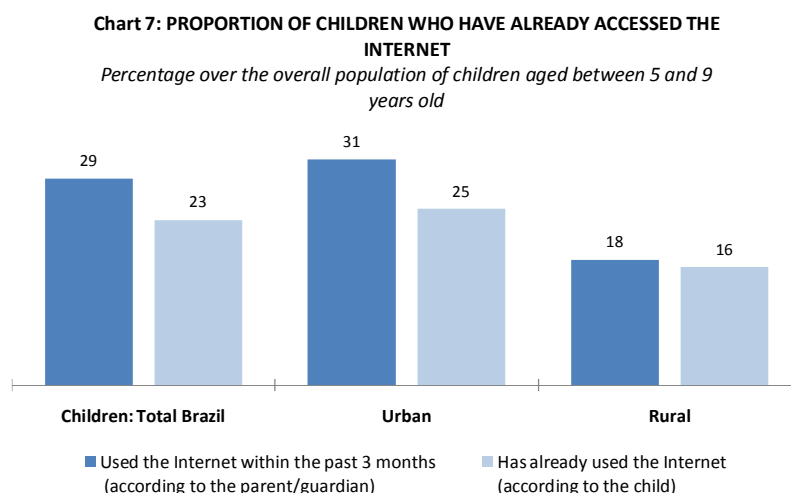
among the girls this proportion is of 84%. Moreover, 58% of boys claimed to have used the computer to write, while among girls this skill was mentioned by 70% of the interviewees.

The frequency of use of computers has a direct impact on skill development. In all the activities mentioned by children, as the frequency of computer use increases, so do skills. Thus, the percentage of children who had performed each of the activities was higher among those who claimed to “always” use computers, and lower among those who claimed to use it “just a little”.

Regarding the location where children acquire these skills, the survey shows that schools are the most prominent, as they were mentioned by 20% of the interviewees who use computers. The high percentage of self-teaching is also noteworthy, as it was mentioned by 16% of children. Also, parents were mentioned by 16% of interviewees, a percentage that in rural areas drops to 7%, suggesting that people are less familiar with ICTs in these areas. Thus, although schools are not the main location of access to computers, they play an important role in promoting skills related to their use.

### c. Use of the Internet, location and frequency of use

The survey revealed that 28% of the children aged between 5 and 9 years old claimed to have already used the Internet. In rural areas, the percentage of use drops to 18%, which means that 82% of the interviewees in these areas have never used the Internet. From the perspective of the parents or guardians, however, the percentage of children who had used the network within the three months prior to the interviews was 23%, which is the indicator that determines Internet users in this population, as it refers to use within a recent period of time.

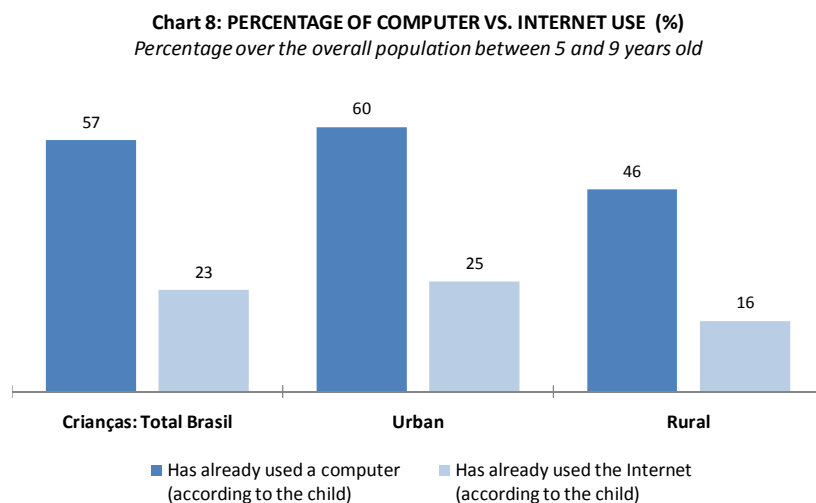




A large variation in Internet use is also revealed when the various regions of Brazil, household income and user age group are taken into account. In the North and Northeast regions, for example, children who had used the Internet within the previous 3 months represented 12% and 13%, respectively, which is far below the 43% registered in the Center-West region. Regarding income, 72% of the children who live in households that earn 10 or more minimum wages had used the Internet within the reference period, whereas among households earning up to 1 minimum wage this proportion was of only 8%.

Age is also a relevant factor regarding the use of the Internet: the older the child, the higher the percentage of children that used the Internet within the three months prior to the survey. Among 5-year-olds, the proportion of Internet users is of 14%, whereas among 9-years-olds it reaches 33%. Social class also featured as a relevant factor affecting this indicator, as among interviewees in class A the proportion of Internet users is of 89%, whereas in classes DE only 8% had used the Internet within the past three months.

It is worth noting that there are significant discrepancies between the use of computers and the Internet, both from the perspective of the children and that of the parents/guardians. From the perspective of the children, 57% claimed to have used computers and only 29% claimed to have used the Internet. Their parents and guardians also perceive computers use as being much more frequent than Internet use. According to them, 44% of children aged 5 to 9 years old had used a computer within the previous 3 months, whereas only 23% had accessed the Internet within the same period.



Among the general population this difference is very small: four percentage points. While 43% of the people aged 10 years old or older claimed to have used computers within the three months

prior to the survey, 39% had used the Internet within the same reference period, and this difference is not very constant when income ranges are taken into consideration, which implies that this variable may provide a partial explanation to the phenomenon. The gap between computer users and Internet users decreases as family income increases: among those who earn up to one minimum wage, 22% are computer users and 8% Internet users, revealing a gap of 192%. Nonetheless, the percentage of children who are computer users (75%) is only 4% higher than the percentage of children who are Internet users (72%) among those who earn 10 or more minimum wages.

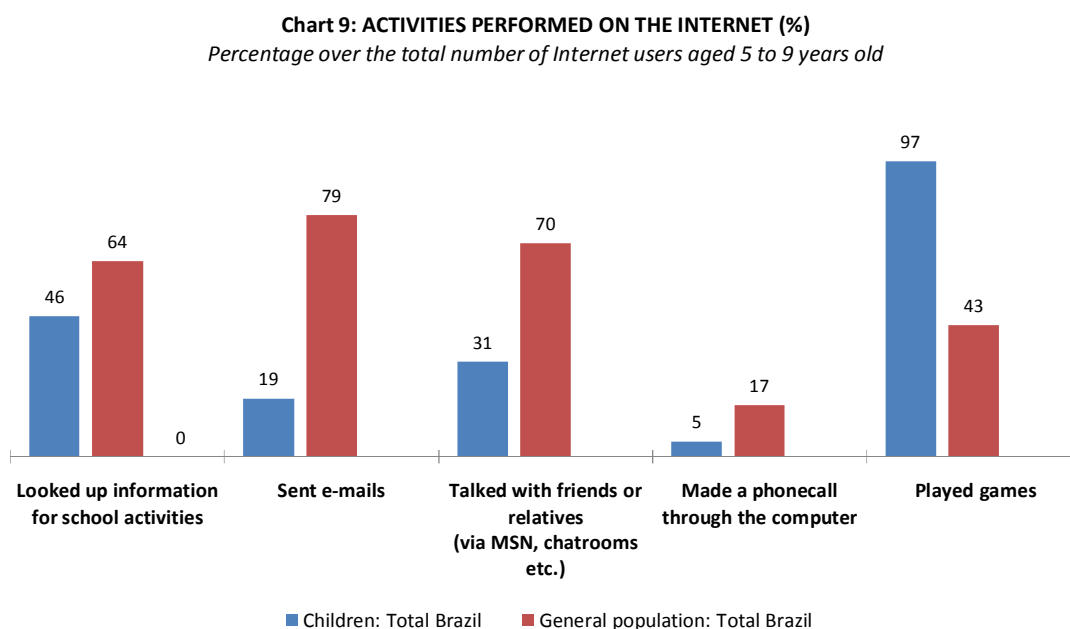
Therefore, the difference between the general population and the behavior of children is expressive and cannot be explained by the income variable alone. Thus, another possible explanation for the low rate of Internet use among children is related to accessibility and the content available on the Web.

Within this context, it is worth questioning whether Internet websites are appropriate for an infant audience, that is, whether they are accessible to children. The term Web accessibility was initially coined with the purpose of providing Internet access for the disabled. Specific guidelines for website design were then set forth to meet these demands. From a broader viewpoint, this is a highly relevant concept, because it involves the construction of the kind of Web that enables everyone to perceive and understand the Internet, as well as browse and interact through it, thereby also contributing to its construction. Hence, we must ask if those who contribute to the development of the Web on a daily basis are aware of the need to make it accessible to children. Another question: are there any guidelines for the development of a Web accessible to children?

The results of the survey with children aged up to 10 years old show evidence that the Internet can be more exclusive toward this segment of the population. A sign of this is the discrepancy between the percentage of children who are only computer users and that of those who are Internet users as well. Moreover, the perception that the Internet is not very accessible to them is confirmed when comparing the different uses mentioned by the general population and by those who are 5 to 9 years old. The analysis of the activities performed by 5- to 9-year-olds shows that their use is focused on activities involving games. Thus, it can be seen that 97% of children use the Internet to play games. The most prominent among the other activities surveyed, “played on TV cartoon websites”, has only half of the penetration of gaming, that is, it was mentioned by 55% of the children who use the Internet.

According to Chart 9, Internet use among the general population is more diverse and widespread than among the children interviewed. On the other hand, among the uses mentioned by children aged 5 to 9 years old, the percentage of activities involving recreation and gaming is noteworthy.

Other activities involving communication and education are not widely performed among this segment of the population.



Communication between children and friends and relatives was mentioned by 19% of internauts in this age group. Sending e-mails reached 31%, but it was concentrated among 8- and 9-year-olds (24% and 27%, respectively). Besides, 5% of the children who use computers talk to friends using a microphone. Thus, activities such as games and children's play, although not widespread, show evidence of future changes in the way people communicate. Apart from the wider variety of channels used, there is also a different perception of value associated with these activities, due to the fact that this segment of society becomes accustomed to less expensive means of communication from a young age.

Access to the Internet among children aged 5 to 9 years old takes place mainly in the household, which was mentioned by 49% of the interviewees who had accessed the worldwide computer network. "Another person's home" ranked second, and was mentioned by 35% of children. The high rate of household Internet use revealed by the survey reinforces the importance of computer ownership for bringing new technologies closer to users.

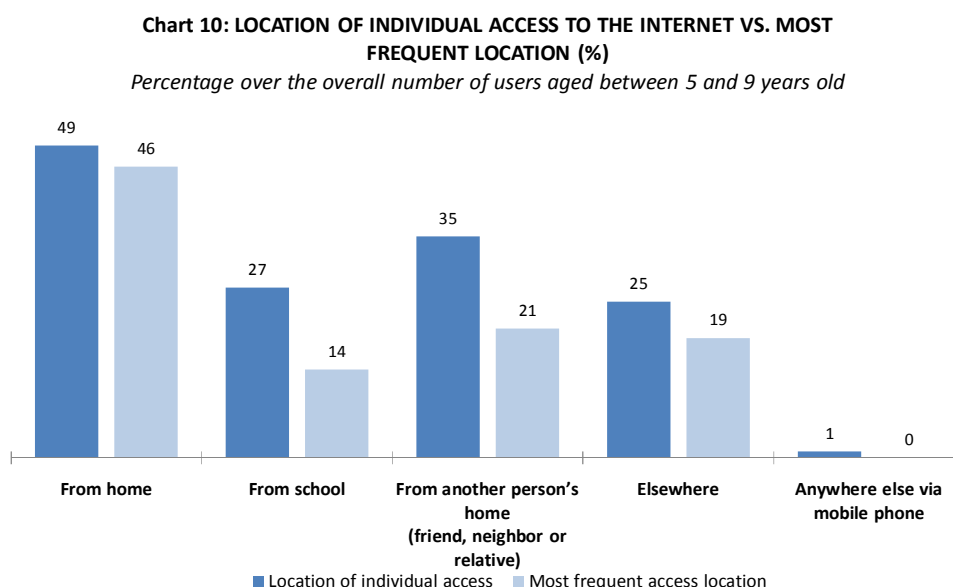
Besides households, other places of access to the Internet are relevant to children. "School" is mentioned by 27% of interviewees aged 5 to 9 years old, followed by "other places" (25% - in which

LAN houses registered 22%). Telecenters are not very expressive within this age group and are used by approximately 5% of the interviewees in this segment.

It is noteworthy that the location of access to the Internet varies according to the age of the interviewee. In school, for example, the percentage of Internet use is lower among 5-year-olds (15.5%) and higher among 9-year-olds (35%). Interestingly, the situation is reversed when it comes to households: whereas 64% of the children aged 5 years old claimed to have accessed the Internet from their households, 40% of 9-year-olds had done so.

It is worth noting that the location where computers are used does not always coincide with the location of Internet access. According to the survey, 40% of children claim to use computers at school, whereas only 27% access the Internet from this place. The low rate of access to the Internet from schools, compared to the higher rate of computer use, may be related to an infrastructural issue, such as unavailability of a local connection, restricted or controlled use of the Internet at school, teachers who are not qualified to use it with students, or the school staff being unfamiliar with the use of ICTs.

Another factor that corroborates this analysis is the results for the “most frequent place of access” indicator: schools were behind households and LAN houses, and were mentioned by 14% of children as the most frequent access location.



It is worth noting that despite the low rate of Internet use in school, this place was mentioned as the most important for computer skill acquisition. Besides, mass communication outlets, which include the Internet, play a key role in the process of social interaction, as they are the main providers of information and images of our time (GIRARDELLO, 2008).

It seems beyond any doubt that the various communication outlets currently play a fundamental pedagogical role: they promote socialization and communicate the codes that make the world function, a role that is shared between the media and schools. After all, the importance of the Internet in this process raises the legitimate question of whether schools are, in fact, preparing students to use it appropriately (GIRARDELLO, 2008).

Households featured as the most frequently mentioned location of Internet access, mentioned by 46% of the children. Another person's home (21%) ranked second, followed by "elsewhere", with 19% (17% of children mentioned that LAN houses were this other location).

The survey also takes into account the perception of children themselves when interviewed about their frequency of Internet access. According to the results from the survey, 21% of users aged 5 to 9 years old claimed to access the Internet "always", 49% "sometimes" and 30% "just a little". Among households, the proportion of children who claimed to always access the Internet was higher than the general average: 34%. Moreover, it was twice the percentage observed in schools, which came to 17%. Use of the network in schools is still behind "another person's home", which features 18%.

#### **d. Use of e-mail**

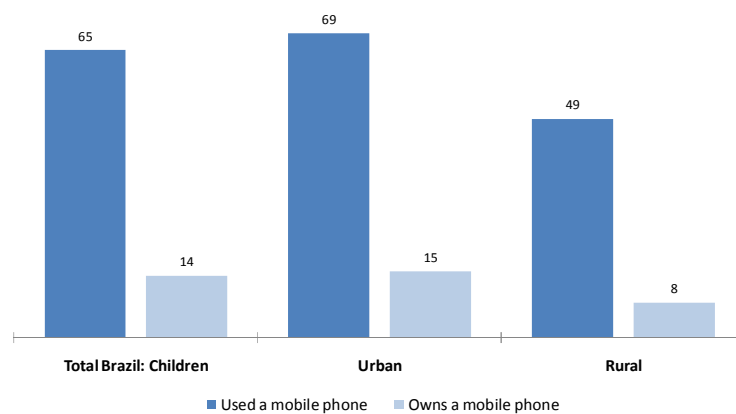
The results from the survey show that 31% of the users interviewed who use the Internet have e-mail accounts. Analysis of the data by age group reveals that, generally, the increase of this figure is directly proportional to age. While 10% of children aged 5 years old claimed to have e-mail accounts, this percentage increased to 37% among 9-year-olds. Additionally, among those who have e-mail accounts, 26% are boys and 36% are girls. It is also noteworthy that 19% of children claimed to send e-mails, which is less than the 31% registered among 5- to 9-year-olds who claim to have e-mail accounts. It is possible that parents or guardians be the ones who create e-mail accounts for their children, especially in the case of 5-year-olds, in order to provide them with access to applications such as social networks or even online games.

#### **e. Wireless Access**

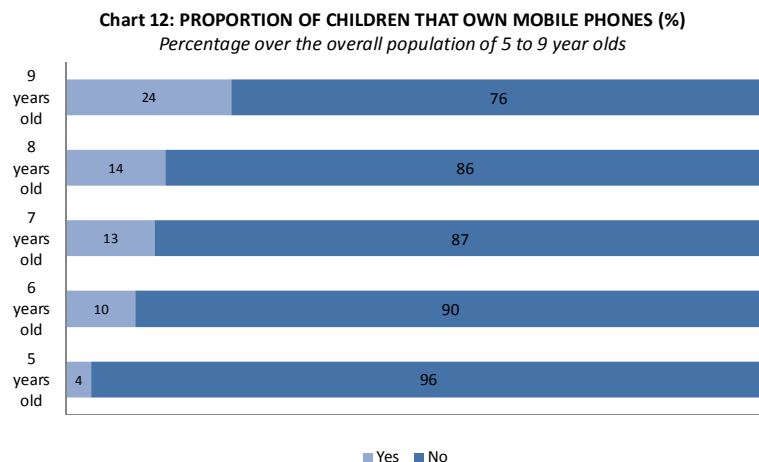
Besides the use of computers and the Internet, the survey also investigated the use of mobile phones among children. This technology proved to be the most common among the subjects surveyed: 64% of children aged 5 to 9 years old have already used a mobile phone and 14% own a

device. It also shows that, in addition to the high penetration of mobile phones among children, there is a large gap between ownership and use of these devices, which could be due to the high number of users per phone, which often belongs to one member of the family but is used collectively.

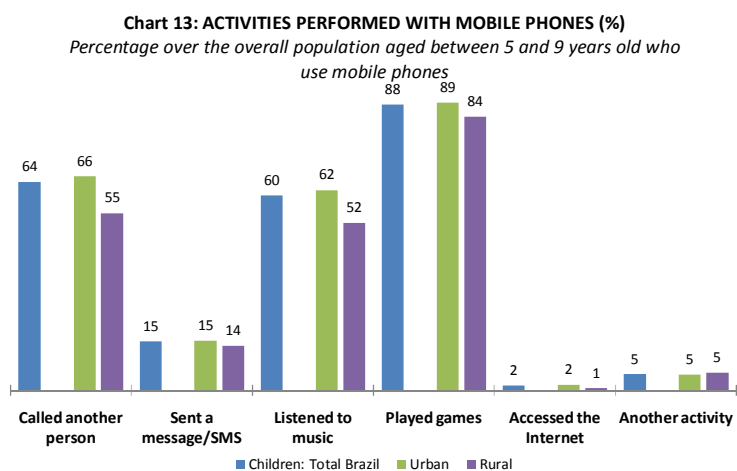
**Chart 11: PERCENTAGE OF USE VS. OWNERSHIP OF MOBILE PHONES (%)**  
*Percentage over the total population aged between 5 and 9 years old*



Despite the fact that the percentage of ownership of mobile phones is lower among children than among the general population, 14% and 59% respectively, the percentage registered for children under nine years of age is significant. It should be taken into account that interviewees are not yet able to make decisions regarding which device they purchase, and therefore are bound by the decision made by the parents. Nine-year-old children registered the most prominent results regarding mobile phone ownership, which was claimed by 24% of interviewees.



Among children, the main use of this technology is not communication, but entertainment. Therefore, 88% of the children who use mobile phones do so to play games, an activity that is far more recurrent than communication, compared to 64% who claimed to use mobile phones to talk with other people. Moreover, the survey revealed that mobile phones are often used to listen to music, as 60% of children claimed to use them for this purpose. It is worth noting that this is a much higher percentage than the one obtained when interviewing the general population, 25% of which claimed to use mobile phones to access songs or videos.



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**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 1 and 2*

Document C/5-E  
23 November 2010

English

**SOURCE:** Columbia Business School

**TITLE:** Data requirements to measure the economic impact of broadband

# **DATA REQUIREMENTS TO MEASURE THE ECONOMIC IMPACT OF BROADBAND**

**By Dr. Raul L. Katz (\*)**

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(\*) This paper was prepared as an input to the discussion at the 8<sup>th</sup> World Telecommunication/ICT Indicators Meeting of the International Telecommunication Union, held in Geneva, Switzerland on November 24-26, 2010. The author is President of Telecom Advisory Services, LLC, Adjunct Professor in the Division of Finance and Economics at Columbia Business School, and Director of Business Strategy Research at the Columbia Institute for Tele-Information at Columbia University. He would like to acknowledge the support of Javier Avila and Giacomo Meille, both research analysts at Telecom Advisory Services, LLC.

## **TABLE OF CONTENTS**

- 1. Introduction**
- 2. A review of the research literature on measuring the economic impact of broadband**
  - 2.1. Contribution to employment and output of broadband deployment**
  - 2.2. Impact on GDP growth and employment through externalities**
  - 2.3. Creation of consumer surplus**
- 3. Methodologies and data utilized in measuring broadband economic impact**
  - 3.1. Input/output analysis to measure multipliers of broadband deployment**
  - 3.2. Econometric analysis to measure externalities of broadband**
  - 3.3. Measuring consumer surplus of broadband**
- 4. Proposed set of indicators for measuring broadband impact**
  - 4.1. Disaggregated data for ICT, broadband and economic indicators**
  - 4.2. Quarterly data**
  - 4.3. Range of broadband download speed**
  - 4.4. Data on wireless Internet**
  - 4.5. Data for measuring the demand gap**
  - 4.6. Variables for income endogeneity**
- 5. Conclusion**
- Bibliography**

## 1. INTRODUCTION

The explosive diffusion of broadband technology has been inextricably linked to the emergence of the Internet. By 2009, there are 1.8 billion Internet users worldwide and 471 million broadband subscriptions<sup>1</sup>. In most developed countries, Internet penetration has exceeded 60 % of households, and in some, like the Republic of Korea, is about to reach universal adoption (95.9 %)<sup>2</sup>. In addition, in the last five years, the combination of wireless technology and broadband service is taking service adoption from the household to the individual user.

To fuel this diffusion, telecommunications service providers and cable TV operators have been investing considerable amount of capital. Between 2004 and 2010, telecommunications and cable TV companies in the United States invested over US \$ 97.7 billion in broadband deployment. Chinese companies have invested US \$ 7.44 billion in broadband since 2009<sup>3</sup>, while Malaysian operators invested US \$ 1.6 billion since 2009<sup>4</sup>. With these amounts of capital being dedicated to the technology, it is natural that policy makers and researchers in the social sciences started looking at the economic and social impact of broadband. In fact, social scientists and policy makers had been researching the economic impact of information and communication technologies (ICTs) for quite a while. The first analyses of the impact of fixed telephone density on economic growth were generated in the mid-1970s by World Bank researchers. Ever since, enhancements both in the quality of data and sophistication of econometric tools have yielded continuous improvement in tackling the question of economic impact of telecommunications. Broadband, however, represents a new challenge for researchers. First, its deployment had been proceeding at an incredibly fast pace. Consequently, the length of time series of broadband adoption was considerably shorter than for voice telecommunications. Second, only the countries that have understood early on its economic potential have proceeded to collect statistics at the beginning of the diffusion process. Third, broadband, as an access technology for data communications, would have an economic impact only in combination with the adoption of information technology. The short time-span of deployment and its characteristic of an enabler of remote information technology access represented a substantial challenge. Third, most importantly, researchers are confronted, particularly in the developing world, with limited data to support efforts to understand the economic impact of broadband.

The purpose of this paper is to provide some guidance to national regulators and policy makers regarding the data requirements in order to conduct rigorous analysis aimed at understanding how broadband contributes to economic growth, and under what conditions this occurs. It begins by briefly introducing the reader to the research that has

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<sup>1</sup> Source: Internet World Wide Statistics (September 2009). For June 2010, the number of total Internet users has reached 1.96 billion.

<sup>2</sup> International Telecommunication Union data for December 2009. The OECD reports penetration of 61.7% without Chile and Mexico, and 60% with these two countries.

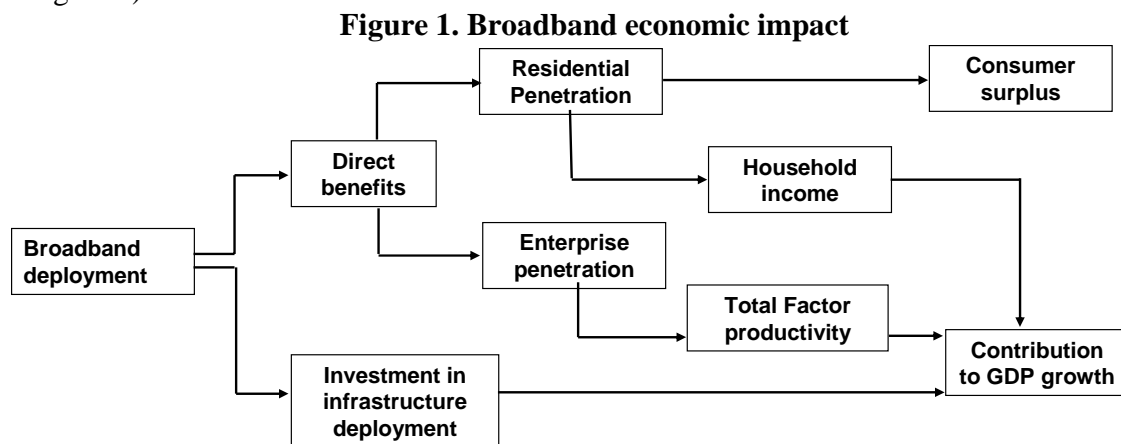
<sup>3</sup> See Sinopac (2009). Taiwan Research.

<sup>4</sup> See AM Research (2010). Telecommunications: CAPEX risk from escalating competition in broadband.

been conducted so far in terms of ascertaining the economic impact of broadband. It then presents the underlying analyses and data requirements that have been utilized. On that basis, it defines a set of requirements ("wish list") of data that are required in order to conduct economic analyses.

## 2. A REVIEW OF THE RESEARCH LITERATURE ON MEASURING THE ECONOMIC IMPACT OF BROADBAND

The economic impact of broadband manifests itself through four types of effects (see figure 1)



The first effect results from the construction of broadband networks. In a way similar to any infrastructure project, the deployment of broadband networks creates jobs and acts over the economy by means of multipliers. The second effect results from the "spill-over" externalities which impact both enterprises and consumers. The adoption of broadband within firms leads to a multifactor productivity gain, which in turn contributes to growth of GDP. On the other hand, residential adoption drives an increase in household real income as a function of a multiplier. Beyond these direct benefits which contribute to GDP growth, residential users receive a benefit in terms of consumer surplus, defined as the difference between what they would be willing to pay for broadband service and its price. This last parameter, while not being captured in the GDP statistics, can be significant, insofar that it represents benefits in terms of enhanced access to information, entertainment and public services.

Research aimed at generating hard evidence regarding the economic impact of broadband is fairly recent. The results of the research and the evidence generated so far fall into three categories:

- Contribution to employment and output of broadband deployment ("countercyclical effect")
- Impact on GDP growth and employment ("externalities")
- Creation of consumer surplus

Each set of studies will be briefly reviewed in turn.

## 2.1. Contribution to employment and output of broadband deployment

Six national studies have estimated the impact of network construction on job creation: Crandall et al. (2003), Katz et al. (2008), Atkinson et al. (2009), Liebenau et al. (2009) Katz et al. (2009), and Katz et al. (2010). They all relied on input-output matrices and assumed a given amount of capital investment: US \$ 63 billion (needed to reach ubiquitous broadband service) for Crandall et al. (2003), CHF 13 billion for Katz et al. (2008) (to build a national multi-fiber network for Switzerland), US \$ 10 billion for Atkinson et al. (2009) (as a US broadband stimulus), US\$ 6.3 billion to implement the Broadband Technology Opportunity Program (Katz et al., 2009), US \$ 7.5 billion for Liebenau et al. (2009) (needed to complete broadband deployment in the United Kingdom), US \$ 45 billion for Katz et al. (2010) (required to implement Germany's National Broadband Strategy).

Since these studies were triggered by the consideration of countercyclical plans devised to face the economic crisis, they tend to focus primarily on gauging the ability of broadband jobs to create jobs. All studies calculate multipliers, which measure the total employment change throughout the economy resulting from the deployment of a broadband network. Beyond network construction (direct employment), broadband deployment has two additional employment effects. Network deployment will result in indirect job creation (incremental employment generated by businesses selling to those that are directly involved in network construction) and induced job creation (additional employment induced by household spending of the income earned from the direct and indirect effects) (see Table 1).

**Table 1. Broadband Construction Impact on Job Creation**

Country	Study	Objective	Results
United States	Crandall et al. (2003)	Estimate the employment impact of broadband deployment aimed at increasing household adoption from 60% to 95%, requiring an investment of US \$ 63.6 billion	<ul style="list-style-type: none"> <li>• Creation of 140,000 jobs per year</li> <li>• Total jobs: 1.2 million (comprising 546,000 for construction and 665,000 indirect)</li> </ul>
	Atkinson et al. (2009)	Estimate the impact of a US \$10 billion investment in broadband deployment	<ul style="list-style-type: none"> <li>• Total jobs: 180,000 (including 64,000 direct and 116,000 indirect and induced)</li> </ul>
	Katz et al. (2009)	Estimate the impact of a US \$6.3 billion investment in the BTOP program	<ul style="list-style-type: none"> <li>• Total jobs: 127,800 (comprising 37,300 direct, 31,000 indirect, and 59,500 induced)</li> </ul>
Switzerland	Katz et al. (2008)	Estimate the impact of deploying a national broadband network requiring an investment of CHF 13 billion	<ul style="list-style-type: none"> <li>• Total jobs: 114,000 (including 83,000 direct and 31,000 indirect)</li> </ul>
United Kingdom	Liebenau et al. (2009)	Estimate the impact of investing US \$ 7.5 billion to achieve the target of the "Digital Britain" Plan	<ul style="list-style-type: none"> <li>• Total jobs: 211,000 (including 76,500 direct and 134,500 indirect and induced)</li> </ul>
Germany	Katz et al. (2010)	Estimate the impact of a US \$45 billion investment in the National Broadband Strategy	<ul style="list-style-type: none"> <li>• Total jobs: 541,000 (comprising 281,000 direct, 126,000 indirect, and 75,000 induced)</li> </ul>

Source: Compiled by the author

Multipliers are of two types. Type I multipliers measure the direct and indirect effects (direct plus indirect divided by the direct effect), while Type II multipliers measure Type I effects plus induced effects (direct plus indirect plus induced divided by the direct effect). Cognizant that multipliers from one geographic region cannot be applied to another, it is useful to observe the summary results for the multipliers of the four input-output studies (see table 2):

**Table 2. Employment Multiplier Effects of Studies relying on Input-Output Analysis**

Country	Studies	Type I	Type II
EE.UU.	Crandall et al. (2003)	N.A.	2.17
	Atkinson et al. (2009)	N.A.	3.60
	Katz et al. (2009)	1.83	3.42
Switzerland	Katz et al. (2008)	1.38	N.A.
United Kingdom	Liebenau et al. (2009)	N.A.	2.76
Germany	Katz et al. (2010)	1.45	1.92

Note: Crandall et al. (2003) and Atkinson et al. (2009) do not differentiate between indirect and induced effects, therefore we cannot calculate Type I multipliers; Katz et al. (2008) did not calculate Type II multiplier because induced effects were not estimated.

*Source: Compiled by the author*

According to the sector interrelationships depicted above, a European economy appears to have lower indirect effects than the US. Furthermore, the decomposition also indicates that a relatively important job creation induced effect occurs as a result of household spending based on the income earned from the direct and indirect effects.

## **2.2. Impact on GDP growth and employment through externalities**

The study of the impact of broadband covers numerous aspects, ranging from its aggregate impact on GDP growth, to the differential impact of broadband by industrial sector, the increase of exports, and changes in intermediate demand and import substitution. While the research on the contribution of broadband to GDP growth has confirmed its positive impact, it has also yielded results that vary widely. Constrained by data availability, the analyses have primarily focused on OECD countries (generally Western European and North American) and states in the United States (see table 3).

**Table 3. Research results of Broadband Impact on GDP growth**

<b>Country</b>	<b>Study</b>	<b>Data</b>	<b>Effect</b>
<b>United States</b>	Crandall et al (2007)	48 States of US for the period 2003-2005	Not statistically significant results
	Thompson and Garbacz (2009)	46 US States during the period 2001-2005	A 10% increase in broadband penetration is associated with 3.6% increase in efficiency
<b>OECD</b>	Czernich et al. (2009)	25 OECD countries between 1996 and 2007	The adoption of broadband raises per-capita GDP growth by 1.9-2.5 percentage points
	Koutroumpis (2009)	2002-2007 for 22 OECD countries	An increase in broadband penetration of 10% yields 0.25% increase in economic growth
<b>High Income Economies</b>	Qiang et al. (2009)	1980-2002 for a high income subset of 120 countries	10 % broadband penetration yielded an additional 1.21 percentage points of GDP growth
<b>Low and Middle income economies</b>	Qiang et al. (2009)	1980-2002 for the remaining 120 countries (low and middle income)	10 % broadband penetration yielded an additional 1.38 in economic growth

*Source: Compiled by the author*

As the data in table 3 indicates, most studies conclude that broadband penetration has an impact on GDP growth. However, one observes that such a contribution appears to vary widely, from 0.25 to 1.38 percent for every increase in 10 % of penetration<sup>5</sup>.

Explanations for this variance are manifold. Clearly, some of the discrepancies come from the usage of different datasets as well as model specifications. However, in some cases differences may be due to methodological shortfalls. For one, at very high levels of data aggregation, such as country data, the econometric models do not account for the wide discrepancy between regions that are caused by fixed effects. For example, a large portion of the variance in the study by Qiang et al. (2009) is explained by dummy variables for Africa and Latin America (nearly 10 times as much as the estimate given by Barro (1991) in the original formulation of the model). This probably suggests that the preferred method of analysis is to perform differences-in-differences. It also justifies the need to conduct the analysis at lower levels of aggregation such as states and, where data is available, even counties or postal codes.

Beyond the contribution to GDP growth, researchers have studied the impact of network externalities on employment variously categorized as "innovation", or "network effects" (Atkinson et al., 2009). The study of network externalities resulting from broadband penetration has led to the identification of numerous effects, such as 1) innovative applications and services, such as telemedicine, Internet search, e-commerce, online education and social networking (Atkinson et al., 2009), 2) new forms of commerce and financial intermediation (Atkinson et al., 2009), business revenue growth (Varian et al., 2002; Gillett et al, 2005), and growth in service industries (Crandall et al. (2007).

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<sup>5</sup> Or .36% if we make the standard assumption that 1% increase in productivity or efficiency results in 1% increase in GDP.



Most of the research regarding the impact of broadband externalities on employment has been conducted using US data. There are two types of studies of these effects: regression analyses and top down multipliers. The first ones attempt to identify the macro-economic variables that can impact employment<sup>6</sup>, while the second ones rely on top-down network effect multipliers. After examining the conclusions of the regression studies, the evidence regarding broadband employment externalities appears to be quite conclusive (see table 4).

**Table 4. Research results of Broadband Impact on Employment**

Country	Study	Data	Effect
United States	Crandall et al. (2007)	48 States of US for the period 2003-2005	For every 1 % point increase in broadband penetration in a state, employment is projected to increase by 0.2 to 0.3 percent per year "assuming the economy is not already at 'full employment'"
	Thompson and Garbacz (2009)	46 US States during the period 2001-2005	Positive employment generation effect varying by industry
	Gillett et al. (2006)	Zip codes for the US for the period 1999-2002	Broadband availability increases employment by 1.5%
	Shideler et al. (2007)	Disaggregated county data for state of Kentucky for 2003-4	An increase in broadband penetration of 1% contributes to total employment growth ranging from 0.14% to 5.32% depending on the industry

*Source: Compiled by the author*

Again, the impact of broadband on employment creation appears to be positive. However, as the data indicates, the impact on employment growth varies widely, from 0.2 % to 5.32 % for every increase in 1% of penetration. There are several explanations for this variance. As Crandall indicated, the overestimation of employment creation in his study is due to employment and migratory trends which existed at the time and biased the sample data. In the case of Gillett et al. (2006), researchers should be careful about analyzing local effects because zip codes are small enough areas that cross-zip code commuting might throw off estimates on the effect of broadband. For example, increased wages from broadband adoption in one zip code would probably raise rent levels in neighboring zip codes prompting some migration effects. Finally, the wide range of effects in the case of Shideler et al. (2007) is explained by the divergent effects among industry sectors.

Beyond regression studies, "network effect" multipliers have been used to assess the impact of broadband on job creation in a top down fashion. Within this group, key studies are Pociask (2002), Atkinson et al. (2009) and Liebenau et al. (2009). Pociask (2002) and Atkinson et al. (2009) studies relied on an estimated "network effect" multiplier, which is applied to the network construction employment estimates. For example, Pociask relied on two multiplier estimates (an IT multiplier of 1.5 to 2.0 attributed to a think tank and

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<sup>6</sup> In general, studies based on regression analysis do not differentiate between construction and spill-over effects.

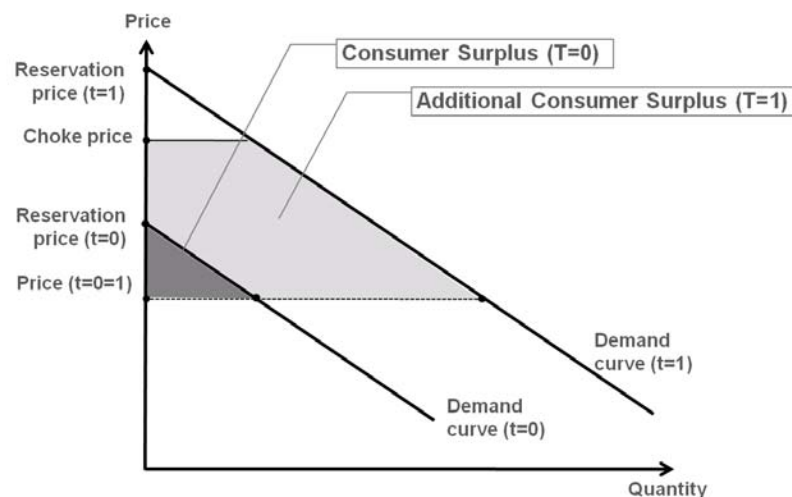
another multiplier of 6.7, attributed to Microsoft) and calculated an average of 4.1. Similarly, Atkinson et al. (2009) derived a multiplier of 1.17 from Crandall et al. (2003). Though the top-down approach allows estimation of the broadband impact, it does not have a strong theoretical basis. Network effects are not built on interrelationships between sectors. They refer to the impact of the technology on productivity, employment and innovation by industrial sector.

### 2.3. Creation of consumer surplus

This analysis allows estimating the utility gains of consumers generated through the rollout of broadband. Consumers have a utility gain because they can purchase a product at a lower price than they were willing to pay. To compare the gains in consumer surplus by an investment one has to compare the initial (before the investment) consumer surplus with the consumer surplus at the end of the investment. During an investment period consumer surplus may change because of two reasons. The first one is an outward-shift of the demand curve and the second is a price reduction. The shift of the demand curve can occur because of the broader penetration of high speed broadband. The price reduction is a result of productivity gains and competition. In the case of deployment of high speed broadband infrastructures, competition becomes effective at the applications layer. This development is responsible for an increase in consumer surplus in future periods compared to former periods.

Consumer surplus is the utility gain by consumers due to prices that are lower than their reservation prices. In figure 2 the consumer surplus is the area between the demand curve and the market price. Consumers gain utility because they can purchase a product at a lower price than they are willing to pay. The larger the area under the curve is, the more utility that consumers derive.

**Figure 2. Consumer surplus**



Consumer surplus may change because of two reasons. The first one is an outward-shift of the demand curve, and the second is a price reduction. The price reduction may result from productivity gains and competition. More competition and market saturation force producers to reduce prices. These two developments are responsible for increases in

consumer surplus. As indicated in figure 2, the dark grey area represents the initial consumer surplus at  $t = 0$ . The shift of the demand curve at  $t = 1$  results in an additional consumer surplus (light grey area). The whole consumer surplus in period 1 is the sum of the dark and light gray areas.

The estimation of consumer surplus resulting from broadband penetration is important, but this economic benefit is not captured by GDP. This approach has been utilized by Crandall and Jackson (2003) to estimate the US consumer surplus derived from new services like shopping, entertainment and telemedicine enabled by broadband infrastructure. Similarly, Lee and Lee (2006) relied on regression techniques to estimate the consumer surplus for the Korean telecommunications market.

Greenstein and McDevitt (2009) estimated the consumer surplus generated by broadband adoption in the United States. In their analysis for the period between 1999 and 2006, the authors determined that in 2006 the consumer surplus generated by broadband represented US \$ 7.5 billion (or 27 % of the total US \$ 28.0 billion in broadband surplus). This was calculated on the basis of what users would be willing to pay to adopt broadband and substitute narrowband access. The authors also recently estimated the surplus generated as a result of broadband adoption in Canada, United Kingdom, Spain, Mexico, Brazil and China (Greenstein & McDevitt, 2010). In this case, due to the data limitations, they restricted their analysis to the benefit derived from price declines, which necessarily underestimates its total impact.

Nevertheless, the researchers determined that for 2009, the total Brazilian broadband surplus represented US \$ 7.03 billion, of which 22 % should be considered to be consumer driven. In the case of Mexico, the total surplus is US \$ 2.30 billion, and the consumer portion was 8%. In general terms, the authors concluded that the total broadband surplus is directly related to broadband penetration.

Consumer surplus can also be conceptualized in terms of the benefits that broadband represents to the end user. The variables driving willingness to pay include the rapid and efficient access to information, savings in transportation for conducting transactions, and benefits in health and entertainment

### **3. METHODOLOGIES AND DATA UTILIZED IN MEASURING BROADBAND ECONOMIC IMPACT**

#### **3.1. Input/output analysis to measure multipliers of broadband deployment**

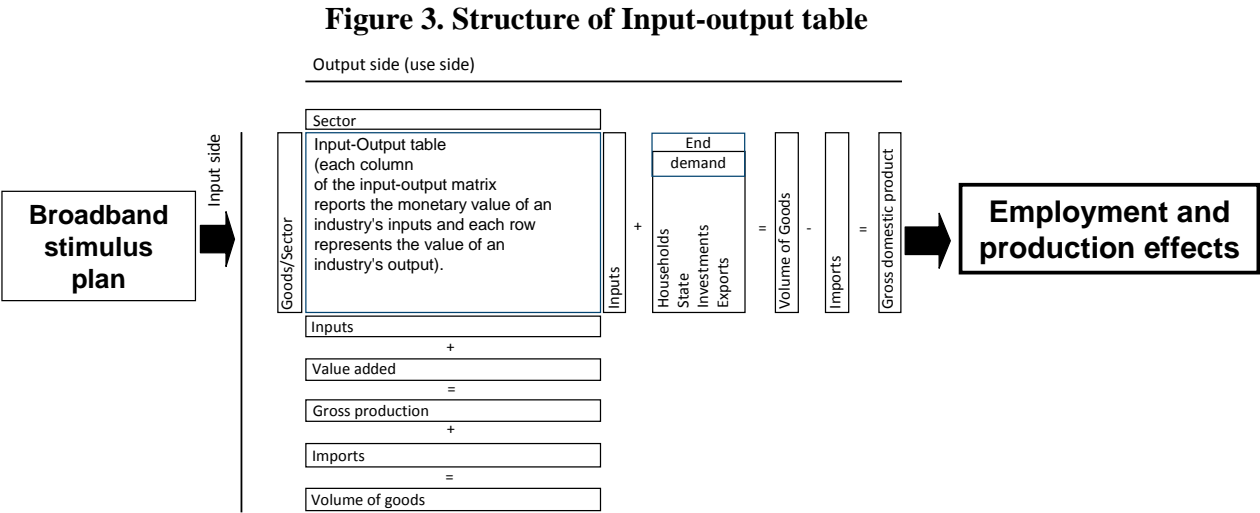
This approach focuses on determining how much value added and employment is generated through the national rollout of high speed broadband services in the access network. The importance of a sector can be measured by direct and indirect effects on the whole economy. The direct effects can be expressed in terms of indicators like the sector's contribution to total value added, growth or its importance as an employer. However, these single indicators do not represent the full importance of a stimulus program. Complex relationships develop between industries because each sector sources goods and services from other sectors. In consequence, investments in one sector trigger

demand indirectly in other sectors as well. These networked relationships mean that the effect of investment of a high speed broadband rollout program is greater than the direct effects would suggest. The indirect effect can be measured using parameters known as multipliers; they estimate the factor by which the direct effect must be multiplied to determine the total impact of investment in a single sector on the national economy. It is important to mention, however, that, in some cases, investment does not fully materialize in job creation. First, a portion of the investment can be "leaked" to other economies due to the fact that some intermediate inputs, such as equipment, are manufactured in other countries. Second, while the models might predict that investment leads to job creation in a fairly deterministic way, a number of institutional factors could stand in the way of this effect to happen. For example, the public funds could be available for investment but bureaucratic impediments act as obstacles for networks to be deployed.

Input-output tables enable the calculation of the impact of additional inputs in specific sectors on the economy as a whole. The relationships between the sectors at the inputs stage trigger additional demand and thus increase production in other sectors. The sum of all these effects is the multiplier for the total volume of goods. Multipliers can be calculated in several ways and also for several economic dimensions. There are, for example, goods-related multipliers for the total volume of goods in an economy, for the value of total production or for the value added. There are also multipliers for labor market parameters such as the size of the workforce or the number of hours worked.

### 3.1.1. Methodology:

The estimation of countercyclical effects comprises two steps: the estimation of investment required to fulfill the targets of the broadband stimulus plan, and the calculation of resulting economic effects through input-output analysis (see figure 3).

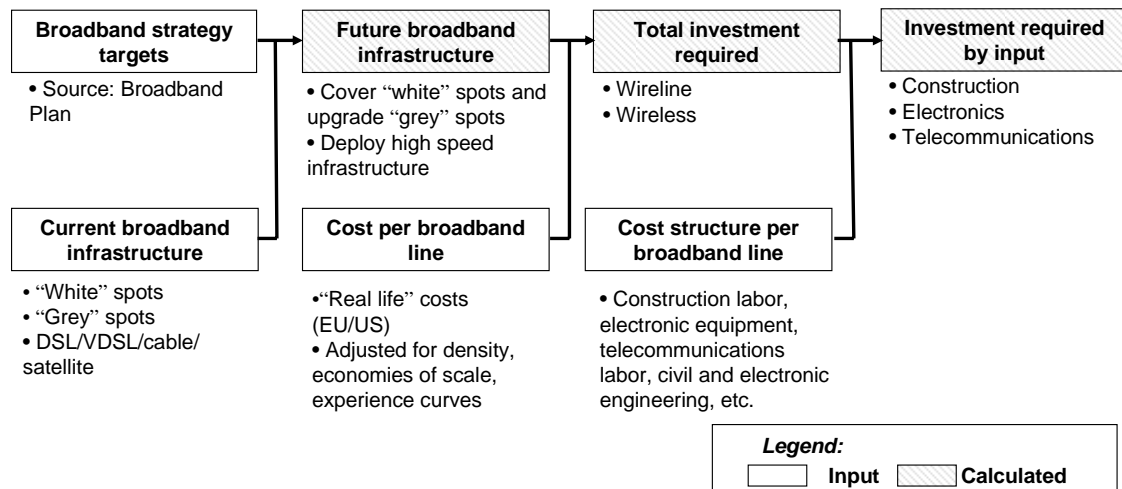


The coverage and service targets established by the broadband stimulus plan are used to estimate the investment required to deploy the broadband infrastructure. These targets were compared against the current situation of broadband deployment. The comparison

between the current situation and the targets allows estimating the deployment objectives in terms of number of lines to: 1) cover the "white" spots (unserved areas), 2) upgrade the "grey" spots (areas with inferior service measured by low access speeds), and 3) deploy additional lines for different type of platforms (wireless, DSL, VDSL and FTTH).

Once the number of lines by service target is estimated, they are multiplied by the costs per broadband line by type of platform. In order to determine the costs per line, the costs from deployment experience in Europe and the United States were relied upon, adjusted for factors such as urban density, economies of scale, and experience curve. This calculation yields the total investment required for wireless and wireline technologies. The total investment is then split according to three cost categories: 1) construction labor, 2) electronic equipment, and 3) telecommunications labor. These splits are based on cost allocations based on "real life" deployment data furnished by operators. The resulting process yielded the amount of total investment by cost category (see figure 4):

**Figure 4. Methodology for Estimating Broadband Deployment Costs**



Once the investment input is calculated, the estimation of employment and output effects can be done. Input-output tables help calculating the direct, indirect, and induced effects of broadband network construction on employment and production. The interrelationship of these three effects can be measured through multipliers, which estimate how one unit change on the input side affects total employment change throughout the economy. To calculate employment effects resulting broadband deployment, one relies on input-output matrices published by government census and Statistics departments (see below). However, in order to be utilized in this analysis, the input-output matrices need to be formatted to calculate the employment multipliers.

Once the table is reformatted, one calculates the multipliers. From the I/O-table it is possible to obtain multipliers for total industry supply and additional variables as value added and employment. The calculation of the multipliers for the total industry supply uses the direct requirement table which is also called Leontief-Inverse. The direct requirement table (DR) is calculated by the following formula:

$$DR = (I - A)^{-1}$$

with A = I/O-table / total industry supply (division of each cell of intermediate domestic supply by total industry supply)

I = Identity matrix

The sum of the columns per industry reflects the increase of the total industry supply by one additional unit of demand in this specific sector. A correction for the share of imports on total industry supply results in the total domestic production of the industries. The multiplying of the share of value added of total domestic industry production results in the value added multiplier. Using labor productivities it is possible to calculate the job effects now.

### 3.1.2. Data utilized for input/output analysis:

The following data sets are needed to conduct the input-output analysis (see Table 6):

**Table 6. Data utilized in input-output studies**

Data	Remarks	Availability	Rationale
Investment in broadband program	Breakdown of investment by sectors (i.e. manufacturing of electronic equipment, construction, telecommunication)	To be calculated based on benchmarks	This is the investment input that will trigger growth in output and/or jobs
Input-output-table		To be supplied by government statistical units and/or Central Banks	Required to understand inter-sectoral relationships
# of employed persons	In the same classification as the input-output-table	To be supplied by government statistical units	Required to calculate employment effects

To calculate investment inputs, data on current broadband coverage and service quality is required. Data on current coverage is typically difficult to find from public sources, although it is available through the service providers in each country<sup>7</sup>. In other cases, the regulatory authority might have information regarding broadband coverage.

Once the investment input is calculated based on the methodology described in section 3.1.1., one needs to move to measuring the broadband construction effect. The starting point is a make-use table from input-output statistics, from which imports are excluded to reflect domestic production. In addition, as mentioned above, the matrix might need to be consolidated in a more reduced number of industries to reflect sector codes of the country

<sup>7</sup> Some countries, however, have up to date information on broadband coverage. For example, Germany possesses the Broadband Atlas produced by the Federal Ministry of Economics and Technology (BMWi 2009). As part of its National Broadband Plan, the United States is conducting an effort at developing its broadband map.

being analyzed. For the US study, Katz and Suter (2008) relied on three original matrices and data sources:

- Bureau of Economic Analysis: Make table from 2002\_IOMakeUse\_summary.xls; Use table from 2002\_IOMakeUse\_summary.xls; Import Matrix from the 2002 Benchmark Input-Output Accounts
- Bureau of Labor Statistics: Employment by Industry ("Employment and Earnings Online," January 2008 issue)
- Oxford Economics: Sector share of employed persons by sector in the USA

The I/O-table was built based on the BEA make- and use-tables using a methodology from Chamberlain Economics LLC. To obtain an I/O-table that can be used to calculate multipliers that reflect domestic production it is necessary to exclude imports from the make-table. The resulting I/O-table from BEA data has the dimension of 133\*133 industries. Due to the fact that the employment data used for further calculations is in a NACE code with 28 industries the I/O-matrix is transformed to a 28\*28 industries matrix.

In their study of Germany, the input-output matrix supplied by Eurostat (Eurostat 2009), and originally developed by the Federal Statistical Office (Destatis 2009) was utilized.

Beyond developed countries, input-output matrices might not be available and therefore, the possibility of conducting this kind of analysis might be greatly limited.

### ***3.1.3. Advantages and disadvantages of input/output analysis:***

Input-output analysis to assess broadband deployment impact has certain advantages. Input-output tables are easy to communicate and are based on proven interlinks between sectors. The results of the analysis are particularly robust in terms of estimating short-term direct and indirect effects of broadband investment on employment and value added.

However, while input-output tables are a reliable tool for predicting investment impact, two words of caution need to be given. First, input-output tables are static models reflecting the interrelationship between economic sectors at a certain point in time. Therefore, they cannot measure dynamic processes of sectoral adjustment in response to changing demand. Since those interactions may change, the matrices may lead us to overestimate or underestimate the impact of network construction. For example, if the electronic equipment industry is outsourcing jobs overseas at a fast pace, the employment impact of broadband deployment will diminish over time and part of the counter-cyclical investment will "leak" overseas. Second, it is critical to break down employment effects at the three levels estimated by the input-out table in order to gauge the true direct impact of broadband deployment. Having said that, all these effects have been codified and therefore, with the caveat of the static nature of input-output tables, we believe that the results are quite reliable. Third, induced effects are calculated based on numerous assumptions, which need to be carefully formulated. For example, under close to full employment conditions, induced effects do not materialize.

### 3.2. Econometric analysis to measure externalities of broadband

This approach for measuring the impact of broadband on economic growth and job creation entails specifying regression models where GDP growth, employment and other output metrics are a function of broadband deployment and broadband penetration. A number of econometric studies have been generated to measure broadband's impact on GDP growth and employment. Because of limited data availability, most studies tend to focus on the developed countries (see table 7).

**Table 7. Econometric studies of broadband externalities**

Author	Year	Title	Area	Period	Aggregation
Crandall et al.	2007	The Effects of Broadband Deployment on Output and Employment	48 US States	2003-05, 04-05	State
Czernich et al.	2009	Broadband Infrastructure and Economic Growth	20 OECD	1996-07	National
Ford & Koutsky	2005	Broadband and Economic Development	Lake County, FL	1999-04	County
Katz et al.	2010	The Impact of Broadband on Jobs and the German Economy	Germany	2003-06	County
Kolko	2010	Does Broadband Boost Local Economic Development?	US	1992-06	Zip Code, County, Individual
Koutrompis	2009	The economic impact of broadband on growth: A simultaneous approach	22 OECD	2002-07	National
LECG	2009	Economic Impact of Broadband: An Empirical Study	15 OECD	1980-07	National
Gillett et al	2006	Measuring Broadband's Economic Impact	US States	1999-02	State/Zip
Qiang & Rossotto	2009	Economic Impacts of Broadband	120 Countries	1980-06	Country
Shiedeler, et al.	2007	The Economic Impact of Broadband Deployment in Kentucky	Kentucky Zips	2003-05	Zip Code
Thompson & Garbacz	2009	Broadband Impacts on State GDP: Direct and Indirect Impacts.	48 US States	2001-06	State
Waverman et al.	2005	The Impact of Telecoms on Economic Growth in Developing Countries	102 Countries	1980-03	Country
Katz	2010	The impact of broadband on the economy	Latin America	2004-09	Country
			Brazil	2006-07	State
			Chile	2003-08	Region
			India	2007-08	Telecom Circles
			Malaysia	2007-08	States
			S. Arabia	2007-08	Provinces

*Source: Compiled by the author*

#### 3.2.1. Methodology:

Econometric studies rely on regressions and therefore necessitate historical datasets to determine the effect of broadband on GDP, employment and other economic indicators. In order for these studies to investigate causal effects (rather than correlations), models are developed that account for factors, other than just broadband, that may influence economic indicators. In slightly more technical language, a regression is informed by the



historical levels of an economic indicator and the factors that influence it. Then, given a certain model, it assigns coefficients that maximize the amount of explained variance: that is to say it assigns the set of relationships between factors and the indicator that will cause the projected value of the indicator to most closely mimic what happened historically. For example, level of education in a given country drives GDP growth as well as broadband usage; thus it is important that this variable is present in a regression model, because if it does not, we may attribute the effects of education to broadband. In that vein, economists specify models that account for each of the factors that influence economic indicators. An optimal regression breaks up the variation of an indicator, such as GDP. It assigns a set of coefficients which measure how important each factor is in determining the indicator, or how much a change in each of the factors caused the economic indicator to change. Hence, we are left with the effects of broadband keeping other factors constant. This is why broadband effects are conceptualized in terms of, all other variables (education, fixed capital investment, infrastructure) being constant, the change in broadband penetration that would explain GDP growth.

There are three types of model estimation procedures used to assess the economic impact of broadband: cross-sectional regression; panel data and simultaneous equations. The cross-sectional procedure relies on one observation per unit (country, county, region, etc...) and in the case of studying change in variables; at least two points in time are needed. It includes independent variables such as broadband penetration, level of tertiary education, fixed capital investment (see below) and the dependent variables (such as GDP growth and employment and unemployment growth). This methodology is the most commonly used because it is rare the case when more than two years worth of data across variables is available. Given the issue of carefully estimating the direction of causality (what drives what), it is advisable to lag the variables collecting data for independent variables in year 1 and regressing them against dependent variables in year 2 or more.

Panel data and simultaneous equations are two techniques that further help econometric analyses study causation rather than correlation. They are among the most successful techniques that have been employed in the papers that analyze broadband's economic effects.

Panel data is a time series for multiple geographic areas, (i.e., it is both a time series and a cross-sectional dataset). This allows researchers to account for time fixed effects and geographical fixed effects. For example, if a dataset were confined only to 2008, it would be extremely difficult for researchers to separate the effects of the recession from their growth models. The reliance on the panel data approach is to allow unobserved differences in preferences and technology across regions or countries, differences that if were not taken into account in a cross-sectional regression could cause biased estimators (omitted variable bias). As these differences are not easily measurable, they can be treated as unobserved individual effects in the panel data regression framework. From an econometric point of view, the panel data model will correct the omitted variable bias, where the omitted variable captures the differences across countries. The panel data approach requires the compilation of time series for multiple geographic areas, (i.e., it is therefore, both a time series and a cross-sectional dataset).

The third methodology -simultaneous equations- is used to deal with endogeneity—or a cycle where factors cause the indicators to change and vice versa. This problem is particularly pronounced in the study of broadband's effect on GDP, GDP per capita and income. Research unilaterally agrees that broadband increases GDP and income. However, numerous studies on broadband demand have also shown that broadband is income elastic (or that an increase in income substantially increases broadband demand). Therefore, when we model the effect of broadband on income (or GDP, etc.) we must have a way to account this reverse effect (income elasticity), or our estimate will be biased. Simultaneous equations do just this: regressions are performed that simultaneously estimate broadband demand, supply and impact on income, solving the problem of endogeneity. The key disadvantage of this approach, particularly for developing countries, is the lack of data availability (particularly, prices and supply side variables).

### 3.2.2. Data utilized for econometric analysis:

The econometric methods require the gathering of data for both dependent and independent variables in terms of their rate of change in order to determine to what extent changes in broadband penetration affects the economy. The dependent variables that are required for this analysis are GDP per capita and employment or unemployment rate. In some cases, when it comes to regional studies, analysis has been conducted considering Gross sales (see table 8).

**Table 8. Data utilized in econometric studies**

Dependent Variables	Independent Variables	Control Variables
<ul style="list-style-type: none"> <li>• Annual or quarterly rate of change of GDP</li> <li>• Annual or quarterly rate of change of employment</li> <li>• Annual or quarterly rate of change of unemployment</li> <li>• <i>Annual number of SME's</i></li> </ul>	<ul style="list-style-type: none"> <li>• Annual or quarterly rate of change of broadband penetration</li> </ul>	<ul style="list-style-type: none"> <li>• GDP at starting time of period</li> <li>• Level of education: Percent of population with tertiary degrees; Illiteracy rate; Years of schooling; participation rate in secondary school</li> <li>• <i>Regional Investment as percentage of regional GDP</i></li> <li>• Percent of households with electricity or running water</li> <li>• Number of projects and added value of construction projects financed by the state</li> <li>• Number of hospitals per inhabitant; number of beds in hospitals per inhabitant</li> <li>• Access to financial services: Number of banking offices and bank credit per capita</li> <li>• Industry concentration: Contribution of financial services, commerce and manufacturing sectors to regional GDP</li> <li>• Importance of tourism in the region (number of domestic tourism trips)</li> <li>• Cost index for interstate trade costs</li> <li>• Cost to create new business</li> <li>• Regional Gini Coefficient</li> <li>• Percentage of people living in urban centers</li> <li>• Total road length per hundred sq. Km by area; Road development index</li> <li>• Population growth rate</li> <li>• Globalization Index; <i>Globalization Index per region</i></li> </ul>

A number of observations need to be made regarding this list:

- *Level of education:* in countries where the minimum level of education is secondary school, tertiary education is determining variable
- *Regional investment as percent of regional GDP:* It is critical to understand if the increase in employment or GDP is driven by investment other than broadband; this is why analyses consider several control variables that measure not only the pre-existing quality of infrastructure, but also the change in infrastructure deployment as a proxy of investment
- *Number of projects and added value of construction projects financed by the State:* In the case of countries where the economy is run by the government, it is imperative to introduce this variable as a way for not over-estimate the effect of broadband

Appendix A presents the variables utilized by the most important econometric studies.

### **3.2.3. Advantages and disadvantages of econometric analysis:**

The primary advantage of the econometric modeling is its capacity to link projections of broadband penetration, growth and productivity by relying on macro-economic causal models that rely on historical time series and cross-sectional analysis. More specifically, the methodology can provide estimates on employment growth and productivity based broadband network externalities, and generates results and identifies productivity and employment effects at the industry sector level.

On the disadvantage side, since the impact of investment on productivity is generally lagged, time series data sets need to be somewhat long for reliability. Furthermore, the analyses require data at a fairly granular level (e.g. postal code). Finally, it is more difficult to identify effects at the regional level, although this can be addressed with disaggregated data

### **3.3. Measuring consumer surplus of broadband**

The measurement of broadband consumer surplus is not as common as the econometric studies discussed above. Shane Greenstein and Ryan McDevitt, from Northwestern University, pioneered this methodology for the United States broadband sector and have recently replicated this analysis for a number of selected countries: Canada, the UK, Spain, Mexico, Brazil and China. The authors' theoretical framework is based on the notion that a new good (broadband) provides benefits that are additional to the old (dial-up access). The objective is, therefore, to calculate those benefits, which they call "the broadband bonus".

The approach the authors used was to rely on price declines to "trace out demand curve for broadband". In doing so, they assume constant/falling nominal prices (falling real prices), which explains growing use at households.

### ***3.3.1. Data utilized in measuring the consumer surplus of broadband:***

The data required for conducting the assessment of consumer surplus of broadband for the United States comprised the following sets:

- Number of broadband subscriptions
- CPI for Internet access
- Household use of dial-up and broadband
- Price of broadband service
- Estimation of revenues of household broadband services

In extending the analysis to other countries, the authors needed to gain access to data on number of broadband and dial-up subscribers broken down between residential and enterprise users extending back to at least 2002. In addition, residential and enterprise data series for the equivalent period is required.

### ***3.3.2. Methodology:***

The objective of this methodology is to calculate a metric similar to the estimate of the broadband bonus developed by Greenstein and McDevitt (2009) for the United States: consumer surplus and net gain in producer revenue (broadband revenue minus lost dial-up revenue), expressed in a single currency for comparability.

The first step is to calculate broadband revenues for the whole country. This is done by multiplying the number of subscribers by a price index for the given country, expressed in real terms for the last year of the series. Estimates are calculated for each year of the series.

The second step is to estimate the consumer surplus. The basic methodological premise in measuring consumer surplus is that a decline in real prices, resulting from the combination of general price inflation with flat or no growth in nominal prices generates consumer surplus. Such declines are common in all these economies for broadband. By analyzing the historical trend, one can observe the growth in consumer surplus, whose vector depends on the change in prices levels and change in revenue.

The third step adjusts the estimates for the replacement of dial-up by broadband, presuming that dial-up would have been used, had broadband never diffused. Since prices for dial-up service might not be available, Greenstein and McDevitt rely on estimates of cannibalized dialup revenue using OECD's figures for dial-up use and an estimate of the price of dial-up service, also from OECD, whose latest published number was for the year 2000. This allows seeing the size of dial-up revenue cannibalized by broadband. The calculation of the so-called "broadband bonus" is done by adding broadband revenue to consumer surplus and subtracting cannibalized dial-up revenue.

### ***3.3.3. Advantages and disadvantages:***

The model measuring consumer surplus originated from broadband services presumes a stable demand, since core factors shaping demand do not change substantially. In that sense, results are quite valid for the short run.

On the other hand, the analysis can yield conservative estimates. These might exclude gains to early adopters, shifts in demand linked to GDP growth, falling prices of PCs, greater capability of online system, and changing user willingness to pay. Furthermore, the methodology excludes indirect benefits. Having said that, the authors argue that given data availability internationally, there does not really exist an alternative approach for comparing countries.

#### **4. PROPOSED SET OF INDICATORS FOR MEASURING BROADBAND IMPACT**

The following chapter includes a proposed set of indicators for measuring the economic impact of broadband. Data requirements range from the aggregate macro-indicators to the micro-data that provide an indication of consumption patterns and user needs.

##### **4.1. Disaggregated data for ICT, broadband and economic indicators**

The foremost need is for data on all indicators to be disaggregated at the regional level within a country (county, canton, department, even postal code). The lower the level of aggregation is, the more data points there are and, with more data points, the effects of broadband can be estimated more precisely. In addition, the more variables that are used, the more points are needed to obtain an adequate level of precision. Since growth models rely on at least 5 or 6 variables, it is necessary to have a large number of observations (at least 30-40) to estimate the effects of broadband.

The second reason for disaggregated data needs is that it allows research to deal with local fixed effects. Even with a rich set of controls, it is hard to measure the effects of broadband using large levels of aggregation. All sorts of questions arise as to how comparable the data are. For example, it is difficult to compare penetration rates or education (which are two variables used in growth models), across countries, or even between cities and rural areas. Quality may differ tremendously between countries, therefore two people with the number of years of education or both with broadband internet may be getting very different services if one is in a developed and another is in a developing country. Therefore, the lower the level of aggregation is, the more accurate results will be.

##### **4.2. Quarterly data**

Quarterly data is another way to increase the number of observations and thus the accuracy of estimations of broadband effects. In many countries employment is reported on a quarterly basis. Therefore, if broadband subscriptions are also reported quarterly, it will be possible to estimate the relationship between broadband and employment more accurately.

For one, the amount of time required for broadband to impact employment will be known with greater specificity. At the moment, research indicates that there is a lag period between network construction and the moment where indirect employment effects kick in. However, whether this lag is one quarter or two years long is currently unknown. Quarterly data is the only way to observe this phenomenon. More accurate estimations of the effect of broadband on employment are also needed because the relationship is complex and also subtler than that of broadband on GDP. While employment is clearly raised by network construction, the long-term effects on employment are less clear. For example, broadband may enable outsourcing or online shopping could hurt employment at local commercial businesses.

From an economic point of view, in the short-run, increases in labor productivity may lead businesses to substitute capital for labor. While there are also many positive effects of broadband on employment, the relationship is very subtle and more precise estimates are needed to quantify it; as of now the results of research vary, some papers find no relationship, (the negative and positive effects are balanced), while others find a positive effect. Quarterly data will allow for more precision, which will go a long way towards solving this problem.

Finally, growth models necessitate data from at least two points in time per country, state or other unit of observation. Therefore, if data is collected quarterly, research may be conducted as soon as one year after regulators begin releasing new time series. However, with annual data, two years is the absolute minimum needed for researchers to use new data.

### **4.3. Range of broadband download speed**

Policy makers and researchers agree that the speed of internet access matters. So far, research has proven that the move from dial-up to broadband (be it DSL or cable modem) has a positive impact on productivity. However, it is yet unclear whether there is a linear relationship between speeds and economic impact. The question is: at how much speed should broadband be offered in order to maximize economic impact?

In order to answer this question, regulators need to keep data on the number of subscriptions by speed. For one, this would greatly facilitate cross-country comparisons. It is unrealistic to assume that the average broadband customer in a developed country has the same service quality as his counterpart in a developing nation. Yet, because these data are not available economic studies are forced to make this assumption. This may have created a large range of problems. For example, studies disagree whether broadband is more useful to urban areas and developed countries. However, more developed countries often offer faster broadband services, so it is difficult to tell whether the effects increase because the impact of increasing access speeds is very large or developed countries can more successfully use broadband services. Data compiled on the number of subscriptions by range of speed will help researchers quantify the marginal returns on speed. In turn, this will help countries optimize their broadband plans. For example, it will become clear whether policy should focus on the development of new technologies

(such as fiber to the home deployment) or increasing coverage of basic technologies. There is no point in investing in 100 MB services if they don't offer any socio-economic gains relative to 10 MB services.

#### **4.4. Data on wireless broadband Internet**

Wireless Internet represents the platform of choice for meeting the demand for broadband in developing countries. It is also increasingly important for developed countries in terms of the shift to wireless of a great deal of broadband usage. Wireless data plans are becoming increasingly sophisticated and as a result their speeds and capabilities are comparable to fixed-line broadband plans. In light of the surge in wireless data plans, (which is expected to continue through the next few years), developed countries will experience a substantial increase in broadband subscriptions, even though the fixed line market is in some cases saturated. Without data on wireless data plans, socio-economic benefits will be wrongly accounted for. This problem is only exacerbated in developing countries, where, due to lack of infrastructure, the majority of Internet connections are through wireless networks. Fixed-line broadband and wireless data subscriptions simultaneously increasing and therefore without data on mobile broadband subscriptions the economic benefits will be attributed solely to fixed line broadband. This will severely influence estimations on the importance of broadband, because mobile data plans are just as if not more important than fixed lines.

#### **4.5. Data measuring the demand gap**

There is much debate over the short-term and long-term effects of broadband networks. From an econometric point of view homes passed allows us to differentiate between direct effects of roll out and other effects. At the moment econometric models have a great amount of difficulty measuring direct effects because if subscribers rise during one year it is usually as a result of construction in the previous year. However, we tend to measure the effects of subscriber gains on the next year. Because homes passed are a more accurate measure of network construction, the confounding effect would be solved if this data were collected. Differentiating between short-term and long-term effects would be especially useful for understanding the relationship between broadband and employment. As mentioned above, the long term effects of employment are the most controversial. However, when the both short and long term effects are measured at the same time, we risk overlooking the subtleties of the long term effects.

In addition, homes passed would allow researchers to gauge the demand gap, defined as the population that could subscribe to broadband but do not. This is critical since in many cases, broadband policies are primarily focused on supply stimulation (e.g. how to stimulate further investment in unserved and underserved regions) when the first and easiest problem to be tackled to increase penetration would be the demand side (e.g. what type of education programs, digital literacy campaigns, and potential subsidies could be implemented to stimulate adoption).

In that sense, it is critical to gather data in terms of coverage, quality and speed by region of a given country. In addition, survey data on household and enterprise broadband utilization should be extremely useful to determine policies tackling the demand gap.

#### **4.6. Variables for income endogeneity**

There is good reason to believe that, like most other goods, broadband is income elastic. That is to say broadband not only drives income growth, but income also drives broadband demand. This two-way relationship is termed endogeneity and is very difficult for researchers to deal with. It may severely impact estimations of the impact of broadband on GDP. The most convincing econometric tool to deal with this is to rely on a system of equations. However, this process is not feasible for most countries because of data availability. The following variables would greatly enhance researcher's capabilities for using systems of equations. They allow the estimation of broadband supply and demand, which solves the problem of income endogeneity.

##### ***4.6.1. Prices/competition:***

Both supply and demand are functions of price. Therefore, in order to make use of simultaneous equations, it is necessary to have a measure of price (such as average or median price paid), for each geographical unit of observation. Though it is far less desirable, if price is unavailable, competition can be used as a proxy. This can be measured by the number of providers serving a certain area (however this is obviously only useful at small levels of aggregation such as the zip code or county). Competition is also useful because it can be used as a proxy for subscription rates. For example FCC only collects data on the number of firms that offer broadband in a given zip code, not the penetration level.

##### ***4.6.2. Government incentives/investment:***

A large amount of broadband ventures are supported by government. This share is so large that is problematic to broadband supply without government incentives. Government surplus is not a good enough proxy - in fact it is misleading. One would think that governments with greater surpluses would be able to offer more incentives, but research such as Koutrompis (2009) has observed the opposite effect in OECD countries. It would seem that large deficits are indicative of big spenders. However, it is very likely that this would not hold up if we analyzed developing countries where broadband plans might be the first to be cut in a situation of financial need. Clearly, in order to adequately describe supply, researchers need direct data on government incentives and investment.

## **5. CONCLUSION**

The assessment of economic impact of broadband technology should be considered an emerging area of research, which is critical in providing evidence in defining policies. The broadband policy arena has been advancing very rapidly since the inception of the technology prompted by the shift of information flows to data communications from



voice, and the consequent growing amount of investment from the private sector. Unfortunately, it would be fair to say that economic impact studies have not developed at a step commensurate to that of the policy development domain. Yet, triggered by the growing availability of data series, new studies have been completed recently, shedding some light on under which conditions, and to what extent, can broadband contribute to economic growth and job creation. At the same time, the studies have allowed to identify the gaps in data availability. Governments, especially regulatory authorities, should emphasize the gathering of data in order to facilitate the analysis of economic impact, a key cornerstone of policy making.

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## APPENDIX A. VARIABLES UTILIZED IN ECONOMETRIC ANALYSES

**Table A.1. Dependent Variables in econometric studies**

Author	Employment	GDPC
Crandall et al.	Yearly Growth Rate	Wages
Czernich et al.	-	GDPC
Katz et al. (2010)	Period Growth Rate	-
Kolko	Period Growth	Median Income
Koutrompis (2009)	-	GDPC
LECG	-	-
Lehr et al	Period Growth of Employment Rate, and Number Employed 1994-98	Average Salary and Median Income
Qiang & Rossotto	-	-
Shiedeler et al.	Yearly Growth Rate	-
Thompson & Garbacz	Yearly Growth Rate	-
Waverman et al.	-	Income
Katz (2010) – Latam		
Katz (2010) – Brazil	Yearly Unemployment Growth 07/06	Growth Rate Regional GDPC 07/06
Katz (2010) – Chile	Quarterly Rate 09/02	Growth Rate Regional GDPC 08/09
Katz (2010) – India	Yearly Growth Rate	Growth Rate Regional GDPC 07/08
Katz (2010) – Malaysia		
Katz (2010) – S. Arabia	Yearly Unemployment Growth 08/07	

On the independent variables side, in addition to change in broadband penetration, a number of variables are utilized both in the economic and technology domain (see tables A.2 and A.3).

**Table A.2. Economic Independent Variables in Econometric Studies**

Author	GDP	Establishments	Investment	Labor Force
Crandall et al.	Growth Rate 05/03 or 05/04	-	-	-
Czernich et al.	GDPC	-	-	Working Age Population
Ford & Koutsy	Gross Sales (Monthly) as a proxy	-	-	Population
Katz et al.	Period Growth Rate	-	-	Pop. Growth 2000-6
Kolko	-	Average Size	-	Pop. Density
Koutrompis	Millions \$	-	-	Employed Pop age 15-64
LECG	Per Hour Growth Rate	-	-	-
Lehr et al	-	Period Growth (99-02) and also 94-98 growth for General, ICT and Small	-	Number Employed
Qiang & Rossotto	Period Growth Rate	-	Period Average	Working Age

				Population
Shiedeler et al.	-	-	-	-
Thompson & Garbacz	Yearly Growth Rate	-	-	per Capita Participation
Waverman et al.	Period Growth Rate	-	Period Average	Working Age Pop
Katz (2010) – Latam	Growth Rate 06/04 or 09/07		Avg Invest. 03/01 or 06/04	
Katz (2010) – Brazil				
Katz (2010) – Chile				
Katz (2010) – India				
Katz (2010) – Malaysia	Growth Rate 08/07			
Katz (2010) – S. Arabia				

**Table A.3. ICT Independent Variables in Econometric Studies**

Author	Broadband	BB Saturation	Telephone Penetration	Cable Penetration	PC Penetration
Crandall	Lines Per Capita	-	-	-	-
Czernich et al.	Yes or No (Dummy)	-	1996	1996	-
Ford & Koutsky	Yes or No Availability	-	-	-	-
	Dummy, 2002				
Katz et al	Penetration Growth 02-03	-	-	-	-
Kolko	Number of Providers (Proxy for Penetration) 2006, 1999	-	-	-	-
Koutrompis	Penetration	-	-	-	-
LECG	2007 Penetration	-	2007-1980	-	2007 Penetration
Lehr et al	Zip: Yes or No Availability Dummy, 1999 also State: Penetration	Square Penetration (State)	-	-	-
Qiang & Rossotto	Broadband subscribers per 100 people, Internet users per 100 people	-	Period Average Penetration, mobile and fixed	-	-
Shiedeler et al	Coverage Area/Total	BB squared	-	-	-
Thompson & Garbacz	Lines Per Thousand People	-	-	-	-
Waverman et al.	-	-	Period Avg. Penetration, mobile and fixed	-	-
Katz (2010) – Latam	Penetration Growth 03-06				
Katz (2010) – Brazil	Penetration Growth 05-06				

Katz (2010) – Chile	Penetration Growth 03-07				
Katz (2010) – India	Penetration Growth 07-08				
Katz (2010) – Malaysia	Penetration Growth 06-07				
Katz (2010) – S. Arabia	Penetration Growth 07-08				

Among control variables, the following are being utilized (see Table A.4).

Author	Education	Union Membership	Climate	Roads	Dummys	Rent	Country Size	Time Trend	Urbaniz at.	Racial Compos	Other
Crandall et al	College Grads/ Pop	Union Share of Employment	Temperat. (mean) 1971-01	-	Census Regions	-	-	-	-	-	-
Czernich et al.	Years	-	-	-	-	-	-	-	-	-	-
Ford & Koutsky	-	-	-	-	-	-	-	-	-	-	-
Katz et al.	-	-	-	-	-	-	-	-	-	-	-
Kolko	Bachelor's Degree Percent	-	Climate Index	Densit y	-	-	-	-	Metrop olitan Pop	Dummy Black	Vacat. houses, Terrain slope, Family Structure, Age
Koutrompis	% GDP spent on education	-	-	-	-	-	-	-	% pop living in areas with 500+ people/s q km	-	Regulation, Research and Developme nt, Competitio n (HH Index), Broadband Investment, Industry shares
LECG	-	-	-	-	-	2002 Median	-	-	-	-	-
Lehr et al	College Grads/ Pop	-	-	-	-	2000 Median	-	-	Dummy (local), also Percentage State	-	-
Qiang & Rossotto	Primary Education in 1980	-	-	-	Latam and Sub Saharan Africa	-	-	-	-	-	-
Shiedeler, et al.	College Grads/ Pop	-	-	-	Rural	-	-	-	-	-	-

Thompson & Garbacz	High School	-	-	-	-	-	-	-	2000, % pop living in urban areas	% Black	-
Waverman et al.	Primary Education in 1980	-	-	-	-	-	-	Yes	-	-	Rule of Law
Katz (2010) - Latam	Tertiary education in 2002										Globalizat ion Index, Populatio n Growth,
Katz (2010) - Brazil	Illiteracy Rate in 2002, Years of schooling										Gini, Interstate trade costs, Cost to create new business, Pop Growth
Katz (2010) - Chile	Schooling Years, population with some level of tertiary education						Region populati on as a percent of country populati on		People living in urban centers by region		Contributi on of Mining, finance, agricultur al and trade sectors, Pop Growth
Katz (2010) -India	Participati on rate in secondary schooling		Total road length per hundred sq. Km by area								Number of enterprise s, banking offices, Pop Growth
Katz (2010) -Malaysia	Literacy Rate		Road developm ent Index								Hospital, beds in hospital, Constructi on projects,
Katz (2010) -S. Arabia											Facilities authorized to provide health services, Tourism, Access to potable water, Number

										and value of projects funded by Gov.,
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**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 3*

**Document C/6-S  
16 November 2010**

**Spanish**

**SOURCE:** Departamento Administrativo Nacional de Estadística, Colombia

**TITLE:** La medición de la sociedad de la información en Colombia mediante la producción de indicadores básicos sobre penetración y uso de TIC en hogares y por parte de individuos



# La medición de la sociedad de la información en Colombia mediante la producción de indicadores básicos sobre penetración y uso de TIC en hogares y por parte de individuos

Eduardo E. Freire<sup>1</sup>

Alejandro Hernández<sup>2</sup>

Durante la última década y gracias a la cooperación internacional y a sus propios esfuerzos técnicos y organizativos, el Departamento Administrativo Nacional de Estadística de Colombia (DANE) ha actualizado oportunamente sus operaciones para producir información estadística sobre el uso y acceso a las TIC por parte de las empresas, hogares e individuos, de acuerdo con los parámetros internacionales de calidad, oportunidad y comparabilidad internacional.

La incorporación de la medición de la penetración y uso de las TIC responde a las necesidades de monitoreo del desarrollo de la sociedad de la información en Colombia, en contexto de la cual las TIC reúnen que las convierten en poderosos motores de desarrollo socioeconómico y en el puente natural con el que mediante el cual la denominada “brecha digital” con los países más desarrollados tecnológicamente puede ser reducida.

En el informe 2007-2008, la UNCTAD, *Ciencia y tecnología para el desarrollo: el nuevo paradigma de las TIC*, reconoce que la mayor influencia económica de las TIC consiste en introducir un nuevo paradigma en la configuración de las actividades económicas y señala, entre las bondades principales de este nuevo paradigma: una nueva manera de organizar la producción y el consumo, que permite transacciones a menor costo y una comunicación más veloz y efectiva; una democratización del acceso y uso de la información incluso en los países de menores recursos; la creación de nuevos servicios entre los que cuentan el comercio electrónico, los financieros y el gobierno en línea; la necesidad de nuevas competencias educativas y capacitación entre la población; y la aparición de nuevas pautas de intercambio de conocimientos y de producción social de ideas nuevas ideas .

En América Latina y el Caribe existen varias instancias con las que el DANE ha establecido relaciones de cooperación a favor de la armonización y articulación de la información estadística producida sobre las TIC en los países de la región<sup>3</sup>. El DANE ha recibido aportes valiosos a la incorporación y mejora de las técnicas de medición de las TIC, mediante el acceso a sitios Web de consulta, la producción de compendios de prácticas, manuales técnicos,

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<sup>1</sup> Director de Producción y Metodología Estadística, Departamento Administrativo Nacional de Estadística - DANE, Colombia

<sup>2</sup> Coordinador Temático sobre Desarrollo Tecnológico e Innovación, DANE, Colombia

<sup>3</sup> Notablemente: el Observatorio para la Sociedad de la Información en Latinoamérica y el Caribe (OSILAC) de la CEPAL y del ICA-IDRC, junto con el Grupo de trabajo sobre estadísticas de TIC de la Conferencia Estadística de las Américas (CEA), también de la CEPAL; el Centro Andino de Altos Estudios (CANDANE) y la el Comité Andino de Estadística de la Comunidad Andina de Naciones (CAN); y el Comité de Estadísticas de la Comunidad del Caribe (CARICOM).

estudios y documentos de análisis y la organización de talleres y cursos regionales de capacitación.

Entre el año 2000 y 2011, el DANE realizó algunos ejercicios piloto de medición sobre el acceso y uso de las TIC en distintos sectores económicos y sociales. Tal es el caso del sector manufacturero, el sector de comercio y servicios, los servicios de informática, postales y correos, los micro - establecimientos y el sector de educación. Si bien estos datos fueron un primer paso hacia la incorporación de las técnicas de medición de TIC en Colombia, su perfeccionamiento aún estaba por lograrse.

En 2003, en el marco de la Agenda de Conectividad del gobierno colombiano, el DANE afianza el modelo de medición estadística de las TIC para Colombia. Este documento ofreció una primera aproximación integrada a los aspectos conceptuales, metodológicos y de interpretación de resultados más relevantes para el país, donde se destaca la propuesta de los principales indicadores sobre TIC para los sectores productivo, educativo y de Estado y comunidad.

A partir de 2006, las recomendaciones internacionales más importantes sobre la medición de TIC en empresas, hogares e individuos fueron adaptadas por el DANE a modo de módulos incluidos en las principales operaciones estadísticas de temática económica y social, para garantizar que su producción se realizara de manera periódica y sistemática.

Las encuestas anuales Industrial Manufacturera (EAM), de Comercio (EAC) y de Servicios (EAS) incluyen desde entonces preguntas relacionadas con el grado de acceso y tipos de uso que de las empresas colombianas hacen sobre en relación con las tecnologías de la información y la comunicación en el desarrollo normal de sus negocios. Asimismo, la Encuesta Nacional de Calidad de Vida y la Gran Encuesta Integrada de Hogares (GEIH) realizadas en 2008 incluyeron preguntas relativas a las TIC.

En el caso particular de la GEIH, esta encuesta tiene como objetivo general proporcionar información básica sobre el tamaño y estructura de la fuerza de trabajo (empleo, desempleo e inactividad) de la población de Colombia y de algunas variables socio-demográficas. Por ser ésta una encuesta de propósitos múltiples permite la inclusión de módulos para medir fenómenos específicos, tales como la penetración y uso de las TIC.

La GEIH tiene una cobertura total 24 ciudades y áreas metropolitanas que comprenden 13 áreas iniciales del estudio<sup>4</sup> y 11 nuevas ciudades (Tunja, Florencia, Popayán, Valledupar, Quibdó, Neiva, Riohacha, Santa Marta, Armenia, Sincelejo, San Andrés). Sin embargo la GEIH no incluye la población de los nuevos departamentos (Constitución de 1991), en los cuales reside aproximadamente el 4 % de la población del país.

La GEIH y su respectivo módulo TIC, se aplicó en el año 2009 en los cuatro trimestres del año. Sin embargo, los resultados que se presentan a continuación evidencian el comportamiento de

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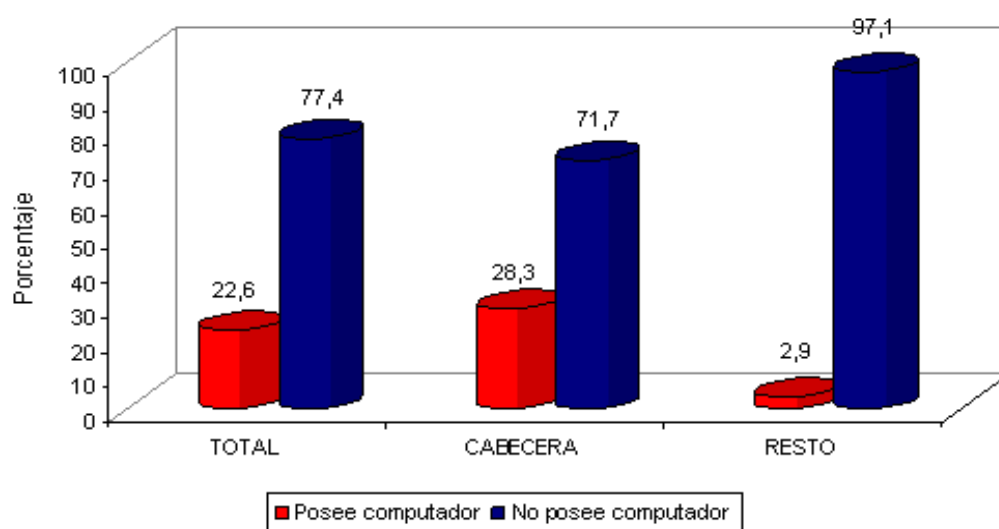
<sup>4</sup> Bogotá, D.C.; Medellín - Valle de Aburrá; Cali – Yumbo; Barranquilla – Soledad; Bucaramanga - Girón, Piedecuesta y Floridablanca; Manizales - Villa María; Pasto; Pereira - Dos Quebradas y La Virginia; Cúcuta - Villa del Rosario, Los Patios y El Zulia; Ibagué; Montería; Cartagena y Villavicencio.

los indicadores TIC para el año 2009. Estos son representativos para las 24 principales ciudades.

Los resultados que se presentan a continuación corresponden a los indicadores básicos sobre el uso y penetración de TIC en los hogares y personas de 5 años de edad y más.

La GEIH y su respectivo módulo TIC, se aplicó en el año 2009 en los cuatro (4) trimestres del año. Sin embargo, los resultados evidencian el comportamiento de los indicadores TIC para el año 2009. Estos son representativos para las 24 principales ciudades.

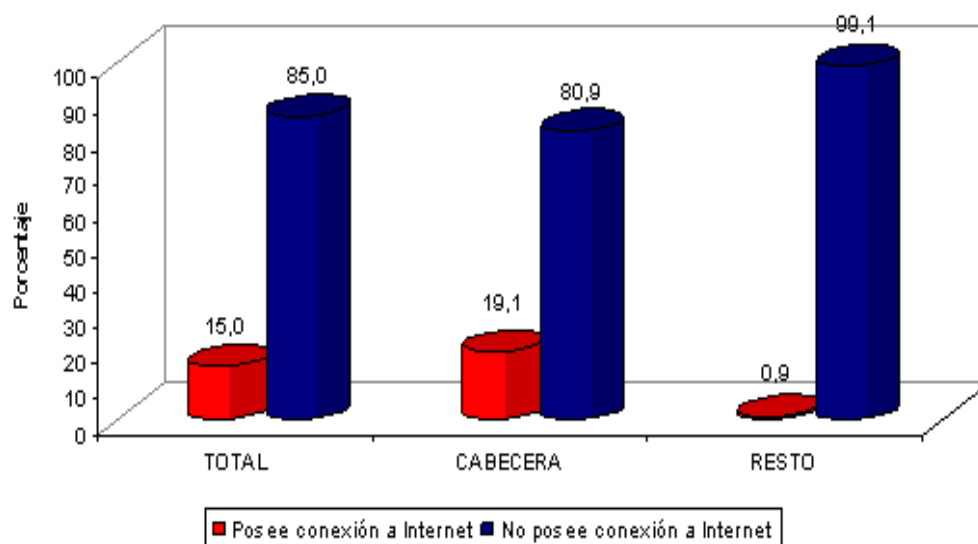
En el Total Nacional en 2009, el 22,6% de los hogares poseía computador, mientras que el 77,4% no tenía acceso en su hogar a esta herramienta TIC. En la cabecera en 2009, el 28,3% de los hogares tenían computador, mientras que el 71,7% no tenía acceso a él. En el resto, la tenencia de computador por parte de los hogares fue de 2,9%, lo cual significa que el 97,1% no tenía computador.



Porcentaje de hogares que poseen computador. Total nacional, cabecera y resto.

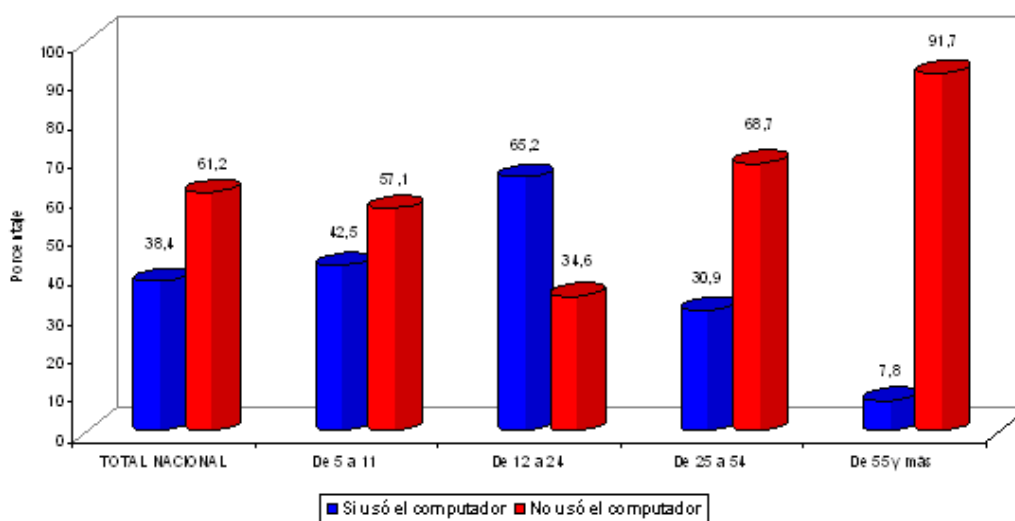
Fuente: DANE- Gran Encuesta Integrada de Hogares (GEIH) 2009.

Para el Total Nacional en 2009, el 15,0% de los hogares poseía conexión a Internet, mientras que el 85,0% no tenía conexión a este servicio. En la cabecera en 2009, el 19,1% de los hogares tenían conexión a Internet y el 80,9% no la tenían. En el resto, la tenencia de conexión a Internet por parte de los hogares fue de 0,9%, lo cual significa que el 99,1% no tenía este servicio en su hogar.



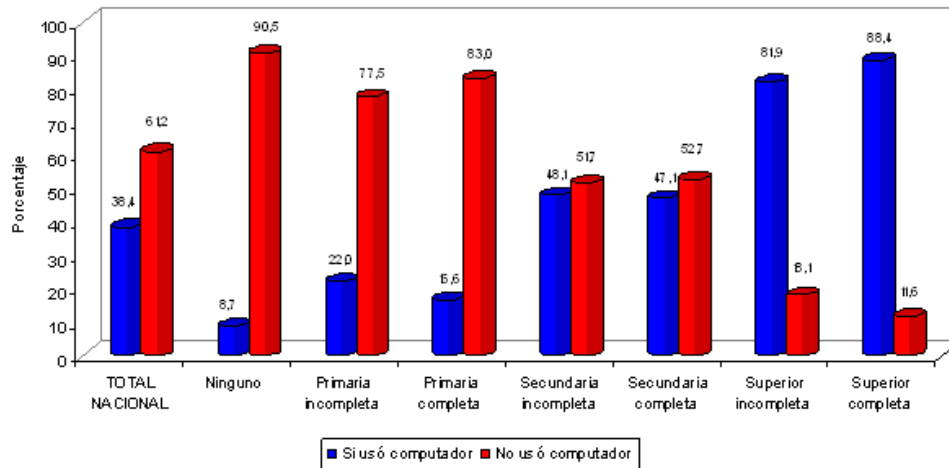
Porcentaje de hogares que poseen conexión a Internet. Total nacional, cabecera y resto. 2009

Las personas que más utilizaron computador (en cualquier lugar) en los últimos 12 meses, fueron las personas entre 12 y 24 años de edad. Cabe resaltar que el grupo de edad de 5 a 11 años utiliza más el computador (42,5%) que el grupo de edad de 25 a 54 años (30,9%), mientras que el grupo de personas de 55 años de edad y más presenta la menor tasa de utilización de computador con un 7,8%.



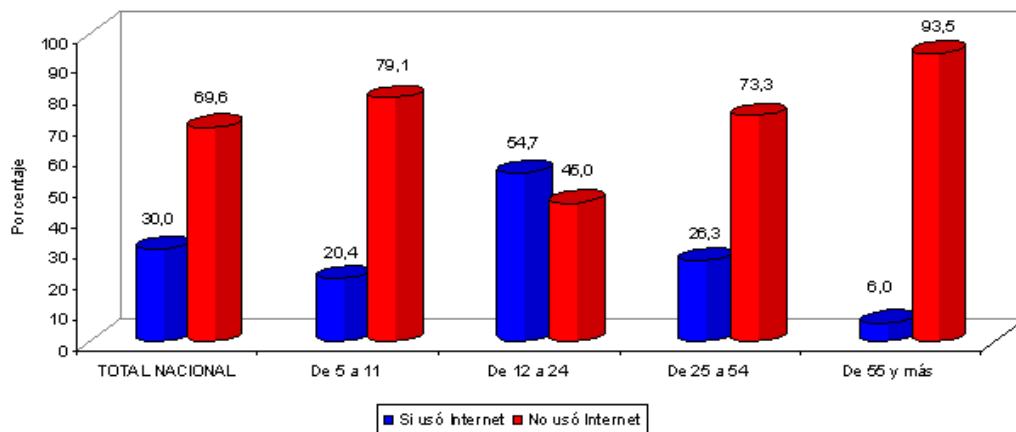
Caracterización de las personas que usaron / no usaron computador por rangos de edad. Total nacional. 2009

Por nivel educativo, se observa que para el total nacional, las personas que alcanzan el nivel superior incompleto y completo, tienen el mayor porcentaje de uso de computador con 81,9% y 88,4% respectivamente. En contraste el nivel de utilización más bajo lo obtuvo el nivel educativo "ninguno" con el 8,7%.



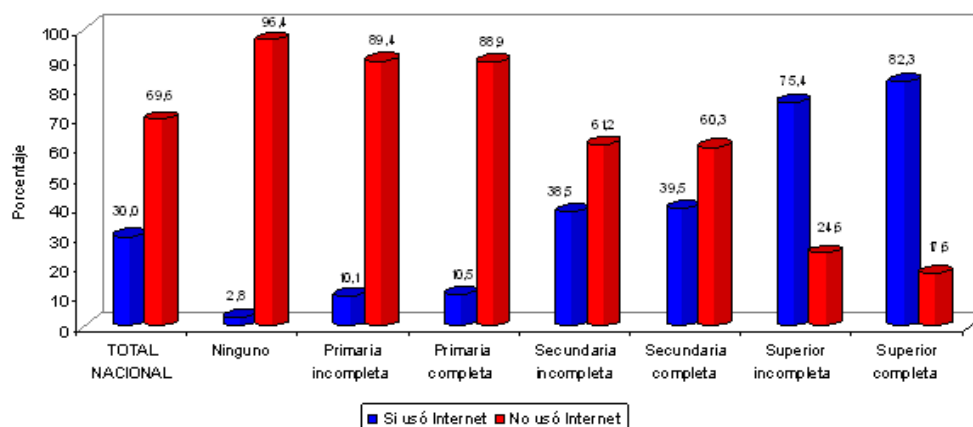
Caracterización de las personas que usaron / no usaron computador por nivel educativo. Total nacional.  
2009

Las personas del grupo de edad de 12 a 24 años fueron las que más usaron Internet con 54,7%. En contraste, las personas del grupo de edad de 55 años y más fueron las que menos utilizaron este servicio con el 6,0%.



Caracterización de las personas que usaron / no usaron Internet por rangos de edad. Total nacional.  
2009

Al igual que el uso de computador por niveles educativos, se observa que las personas con mayor nivel educativo son las que mayor uso hacen de Internet; en contraste las personas que no tienen ningún nivel educativo, son las que menos utilizan Internet, el uso por parte de ellas tan solo es de 2,8%.



Caracterización de las personas que usaron / no usaron Internet por nivel educativo. Total nacional.  
2009

A continuación, puede apreciarse la evolución de los principales indicadores básicos sobre penetración y uso de las TIC en los hogares y por parte de individuos para el periodo 2008-2009. Los resultados tienen carácter preliminar.

INDICADORES - TIC (Hogares y Personas mayores a 5 años)		
INDICADOR	PROPORCIÓN	
	2008	2009
TENENCIA DE BIENES TIC		
Hogares con tenencia de computador	33,0	34,2
Hogares con tenencia de TV	95,1	95,7
Hogares con tenencia de telefonía fija	66,6	63,6
Hogares con tenencia de teléfono celular	84,0	89,8
Hogares con conexión a Internet	22,2	24,4
USO DE HERREMIENTAS TIC		
Proporción de individuos que utilizan computador	46,3	47,6
Proporción de individuos que utilizan Internet	37,5	40,1
LUGAR DE USO DE INTERNET		
Hogar	43,8	46,7
CAP (Costo)	47,1	46,6
CAP (gratis)	4,1	3,9
Instituciones educativas	26,6	26,1
Trabajo	24,5	24,2
Casa de otra persona	16,2	17,4

USO DE INTERNET SEGÚN ACTIVIDAD		
Obtener información	92,0	78,8
Comunicación	80,2	81,1
Actividades de entretenimiento	52,1	44,1
Educación y aprendizaje	50,6	62,2
Banca electrónica y otros servicios	10,8	12,1
Otro	9,5	7,4
Comprar/ordenar Bs y Ss	5,9	6,2
Transacciones con OG	3,2	3,9
FRECUENCIA DE USO		
Al menos una vez al día	47,4	47,2
Al menos una vez a la semana, pero no cada día	42,3	43,1
Al menos una vez al mes, pero no cada semana	8,3	7,8
Al menos una vez al mes	1,8	1,9

Fuente: DANE - Gran Encuesta Integrada de Hogares 2008 y 2009.

**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 3*

**Document C/10-E  
17 November 2010**

**English**

**SOURCE:** National Statistical Office, Thailand

**TITLE:** Measuring the Information Society in Thailand



# Measuring the Information Society in Thailand

The 8<sup>th</sup> World Telecommunication/ICT Indicators Meeting

Geneva, Switzerland

24 – 26 November 2010

Ms. Sureerat Santipaporn

Ms. Daungdao Kiatpisansakun

Thailand

## Contents

	Page
Abstract	3
Introduction	3
ICT Statistics and Policy Making	3
Status of ICT Development in Thailand	5
Measuring Household ICT Access and Individual Use	7
Data Limitations	13
Conclusion	13
Annexes	15

# Measuring the Information Society in Thailand

## Abstract

The structure of the Thai society has been changed in many aspects over the past 10 years. There have been many changes in contemporary Thai society, remarkably, the transformation into information society. Thai people and youth are increasing their use of technology in their daily life. This can be seen in the number of computer and internet users increase slightly while mobile telephone has rapidly increased.

The use of technology is considered an important opportunity and threat facing Thai society. The increasing use of technology can be considered a good opportunity which will allow Thai citizens to access more information and knowledge more quickly and to apply it towards improving their lives. On the other hand, it can also be a threat if the use of technology is not appropriate.

In response to the social changes, the ICT survey conducted by the National Statistical Office will be mechanisms for measuring the information society and driving towards the appropriate information in Thailand.

## Introduction

Measuring statistically the access to and use of ICTs has become an important element of the national ICT policy. Producing ICT indicators is considered key to monitoring and assessing progress in the implementation of national ICT plans, to compare ICT developments in Thailand with other countries and to help in future policy making (Smutkupt and Pooparadai, 2005). As established in the national ICT plan, the National Statistical Office under the Ministry of Information and Communication Technology has conducted the direct ICT survey and ICT indicators to support and create policies and plans, as well as to monitor and evaluate the development of Information and Communication Technology from the First and the Second ICT Master Plan. The survey shows the accessibility and use of ICT in households and individuals, the use of ICT in establishments and e-Commerce business and the use of ICT in educational institution. This paper, however, highlight only measuring society on access to and use of ICT by households and individuals.

## ICT Statistics and Policy making

Currently, Thailand's national ICT policy is based on the Second ICT Master plan (2009-2013). This ICT Master Plan carries forward policies from the IT 2010 policy framework and the First ICT Master Plan. At the same time, it puts in place new policies and sharpens the focus on certain key area, in response to technological, economic and social change that have presented both opportunities and challenges to Thailand. It addresses exiting weaknesses and builds up on existing strengths, so that Thailand can maximize benefits from ICT in social and economic development in the most efficient and effective manner, in order to achieve the development goals laid out in the National Economic and Social Development Plan. It had the general goal of fostering Thailand's development through ICT and focused on six main objectives: The strategies can be described as follows:

### Strategy 1: Develop ICT professionals and general population to be information literate

The aim of this strategy is to accelerate the development of personnel of adequate quantity and quality to support the development of Thailand into a knowledge and innovation-based society. Both ICT professionals as well as personnel in other fields, along with youth, the disadvantaged, the people with disabilities and citizens at all levels should have the knowledge and skills to be information literate. More specifically, they should have the knowledge and skills to create, produce, and use ICT in an efficient, effective, ethical and considerate manner.

### Strategy 2: Strengthen National ICT governance

This strategy aims to improve mechanisms and processes of ICT management and monitoring to achieve good governance framework by emphasizing on ensuring operational unity, efficient use of resources and participation from all sectors.

### Strategy 3: Develop ICT infrastructure

This strategy aims to develop and manage ICT infrastructure in order to provide universal access to businesses and citizens around the country, including the disadvantaged and people with disabilities. It will encourage businesses to put in place infrastructure that can keep up with technological evolution, in order to meet increasing consumer demand. The infrastructure should support multimedia services, e-Commerce and other services that are useful for modern lifestyles in a knowledge-based society. At the same time, this strategy also focuses on reducing the digital divide which will then lead to a peaceful and happy society where people enjoy a better quality of life.

### Strategy 4: Use of ICT to support good governance in public administration and services

Government agencies should use ICT to improve governance in administration and services. A citizen-centric approach should be adopted to provide services in an efficient, effective, transparent and just manner. Participation from all relevant sectors should be encouraged.

### Strategy 5: Upgrade competitive capacity of the ICT industry to add value and increase earnings

This strategy seeks to upgrade competitiveness of Thai ICT businesses by promoting research, development and innovation by the public sector, academic sector and private sector to upgrade technological capability of the Thai ICT businesses to more upstream technology. Technology transfer of research outputs to businesses should be encouraged. The businesses environment should also be improved. The priority sectors are software industry and digital content production industry, with the aim to increase the sector's contribution to national economy and earnings. For other industries that have potential, such as the electronics industry (embedded systems or advanced electronic design) and the telecommunications equipment industry, the focus will be on research and development to build upstream capacity. This will allow them to be developed into income generating industries in the future.

### Strategy 6: Use ICT to build sustainable competitiveness for Thai industries

This strategy aims to promote access and use of ICT in the production of goods and services in all sectors to enhance competitiveness by increasing domestic value-added and at the same time being environmentally friendly. This will help prepare businesses to compete under global free trade regimes in the future. Special emphasis will be given to sectors in which Thailand has comparative

advantage and potential to compete, such as agriculture, health services and tourism. Small and medium enterprises (SMEs) as well as community enterprises will also be targeted for development

## Status of ICT Development in Thailand

In the global context, the development of ICT in Thailand can be considered average, when measured against worldwide indices such as the “Networked Readiness Ranking” and “e-Readiness Ranking” indices. However, when Thailand is compared to other countries in Asia, especially with neighboring countries such as Singapore and Malaysia, it turned out that they are more developed than Thailand in all indices. The main factor holding back the development of ICT in Thailand in all indices is the readiness of the information and communication infrastructure, which is still not widely available and accessible.

According to the study of current status of ICT infrastructure in form of broadcasting, Thai households have accessed to public television and radio thoroughly. The proportion of households with a radio had decreased from 63.6% in 2004 to 58.0% in 2009 while the proportion of households with a television had increased from 93% in 2004 to 96.3% in 2009. Moreover, it was also observed that all regions had quite the same rate.

For the fixed line phone in Thailand, the service was primarily in the city and not thoroughly distributed to rural areas. In the present, the use of fixed line telephone is likely to continuously decrease: the proportion of households with of fixed line telephone in 2005 was 25% and decreased to 21.4 % in 2009. Since population prefers to use mobile phones rather than fixed line telephones.

**Table 1 Change in household level of access to ICT: 2004 - 2009**

Indicator	2004	2005	2006	2007	2008	2009
Proportion of households with a radio						
Total	63.6	na	60.8	60.3	58.5	58.0
Urban	68.7	na	68.0	70.4	64.5	61.8
Rural	58.5	na	56.6	56.3	56.1	56.2
Proportion of households with a television						
Total	93.0	na	94.0	95.3	96.1	96.3
Urban	95.2	na	95.9	96.4	97.0	97.5
Rural	92.2	na	93.2	94.7	95.6	96.0
Proportion of households with fixed line telephone						
Total	na	25.0	23.4	23.4	22.6	21.4
Urban	na	47.8	44.5	44.4	43.1	41.1
Rural	na	14.0	13.6	13.6	13.1	12.0

Source: 1/ Household Socio-Economic Survey, National Statistical Office.

2/ ICT Household Survey, National Statistical Office.

According to the statistics related to the development of ICT human resources, data from the Labor Force Survey 2009 revealed that the total number of ICT employed persons was 416.9 thousand persons from 37.7 million persons or 1.11%. The proportion of ICT employed persons increased very slightly from 0.88% in 2001 to 1.11% in 2009. However, the proportion of ICT employed persons is likely to continually increase because of various reasons; for example, people are more aware of and emphasize the ICT Professional, there are vivid policies to encourage ICT professional as mentioned in strategy 1 of the 2<sup>nd</sup> ICT Master Plan.

**Table 2 Proportion of ICT personnel per total employed persons: 2001 – 2009**

Item	2001	2002	2003	2004	2005	2006	2007	2008	2009
ICT Personnel (thousand persons)									
	282.6	303.1	320.0	339.6	348.1	359.3	365.3	403.8	416.9
Total Employed Persons (million persons)									
	32.1	33.1	33.8	34.7	35.3	35.7	36.3	37.2	37.7
Proportion of ICT Personnel per Total Employed Persons (%)									
	0.88	0.92	0.95	0.98	0.99	1.01	1.01	1.09	1.11

*Source: Labor Force Survey, National Statistical Office.*

## Measuring household ICT access and individual use

### Background

The Thai NSO compile The Information and Communication Technology Survey (Household) since 2001 in accordance with the international statistical guidelines. Since 2003, the survey has been conducted annually by attaching the questionnaire with the Labor Force Survey. However, because the demand of using statistics about information and communication technology has significantly increased, since 2005 the questionnaire has been separated from the Labor Force Survey in order to add more questions to serve demand of users. For this year, the survey was conducted in the 1st quarter (January – March). The survey has the same sample as the Labor Force survey, consisting of private households and special household selected as sample households at the total number of 79,560 households. The data was collected by viewing heads of households and members of households 6 years old and over.

### Objective

1. To know the number of persons using computer and internet, mobile phone, fixed line telephone and related device.
2. To know the number of household having information and communication technology device including fixed line telephone, computer, fax and internet access in household.
3. To know the detail of the use of computer, internet, mobile phone of persons such as location of use, activity of use, time of use, and budget for purchasing.

### Benefit of the survey

1. The survey informs the development of the use of technology in terms of computer, internet and mobile phone used by persons.
2. The survey informs the number of information and communication technology devices in household as well as the detail of related devices used.
3. The survey results can be used as indicators of the country's development of information and communication technology.

### Survey methodology

This survey adopted Stratified Two-Stage Sampling; province is strata. The primary sampling units were blocks in municipal areas and villages in non-municipal areas and the secondary sampling units were private households and persons in special households. In practice, the Household ICT Survey used the sampling households as the Labor Force Survey that is conducted monthly and has the sample size of 26,520 households. For this Household ICT Survey, the survey conducted in only 1 quarter and combine data from 3 months to present results in province level.

## Collected data

The survey has questions for both household and individual levels. The household-level data consist of the possession of Information and Communication Technology devices in various type including fixed line telephone, computers, fax and internet access in households as well as other related questions. The individual-level data consist of the use of computer, internet, mobile and the detail of computer, internet and mobile use such as location, activity, frequency, internet-use expense per month, goods and services ordered via internet, type of the goods and services bought via internet, and the payment method for goods and services bought via internet, the reason not to buy goods and services and other related questions.

## Data Dissemination

1. Hardcopy publication,
2. Electronic publication (on website [www.nso.go.th](http://www.nso.go.th))
3. CD ROM
4. Geographic Information Systems (GIS)

## ICT Usage in Thailand

Data from the ICT Household Survey in 2009 revealed that the popularity of mobile phone among Thai population has rapidly increased from 28.2% in 2004 to 56.8% in 2009. However, the use of computer and internet increase slightly; from 2004-2009 the proportion of computer use increased from 21.4% to 29.3% and internet from 11.9% to 20.1%, because of the expansion in ICT infrastructure of the country. Moreover, internet access of household increased at the low proportion from 5.7% in 2004 to 9.5% in 2009, broadband internet access increased from 52.8% in 2006 to 55.8% in 2009.

**Table 3** Penetration and usage on ICT Devices; 2004 – 2009 (Population age 6 years and over)

Using ICT	2004	2005	2006	2007	2008	2009
Proportion of individuals who used a mobile phone	28.2	36.7	41.6	47.3	52.8	56.8
Proportion of individuals who used a computer	21.4	24.5	25.9	26.8	28.2	29.3
Proportion of individuals who used the Internet	11.9	12.0	14.2	15.5	18.2	20.1
Proportion of households with Internet access	5.7	6.2	7.2	7.6	8.6	9.5
Proportion of households with access to the Internet by type of access						
Narrowband	-	-	26.3	21.7	22.8	24.0
Fixed broadband	-	-	52.8	58.0	48.7	55.8
Mobile broadband	-	-	-	-	4.6	7.7

*Source: ICT Household Survey, National Statistical Office.*



According to the ICT Household Survey in 2009, The proportion of internet users in urban area was higher than that in rural area (32.7% and 14.5%, respectively). The proportions of internet use of male and female were 19.8% and 20.4%, respectively. Considering the rate of using internet in each age group, persons age group 15 – 24 years had the highest proportion of using internet at 47.3%, followed by age group 6 – 14 years at 29.0% and age group 25 – 34 years at 21.5%.

Educational institution was the location that people use internet the most at 46.8%, home at 33.4% and office at 29.0%. For the activity, the majority of people used internet to search for information or read news at 80.6%, secondly playing game at 23.8% and sending or receiving email at 18.6%. For frequency of internet use, more than a half of internet users used internet quite frequently (1-4 days per week) at 59.8% and secondly used frequently (5-7 days per week) at 25.4%. Among internet users, only 3.3% reserve or purchase goods or services via internet and primarily they were in 25-34 age group at 38.2%. Type of goods or services purchased via internet was e-Ticket at 17.4%, fashion/jewelry at 14.7%, books at 14.5%, and entertainment goods/sport utilities/stationeries at 13.7%. The main payment method was debit/credit card at 36.3%, bank transfer at 29.2%, deducting from saving account at 13.0% and cash at 8.9%.

**Table 4 Proportion of population aged 6 years and over who used internet by area, sex, age: 2004 - 2009**

Area, sex and age group	2004	2005	2006	2007	2008	2009
Area	11.9	12.0	14.2	15.5	18.2	20.1
Urban	21.4	21.2	23.4	24.8	29.0	32.7
Rural	7.2	8.0	10.2	11.4	13.4	14.5
Sex	11.9	12.0	14.2	15.5	18.2	20.1
Male	11.3	11.8	13.9	15.2	17.9	19.8
Female	12.4	12.2	14.6	15.9	18.5	20.4
Age group	11.9	12.0	14.2	15.5	18.2	20.1
6 - 14	7.2	11.8	15.5	19.3	23.6	29.0
15 - 24	32.1	31.0	36.5	39.7	44.6	47.3
25 - 34	12.2	12.4	15.2	15.9	19.4	21.5
35 - 49	7.4	7.1	8.0	8.4	10.3	11.9
50 year & over	1.9	2.0	2.5	2.9	3.4	4.0

*Source: ICT Household Survey, National Statistical Office.*

**Table 5 Individuals who used a computer, internet and mobile cellular telephone in the last 12 months: 2009**

Indicators	Computer		Internet		Mobile cellular telephone	
	Male	Female	Male	Female	Male	Female
Total	29.4	29.1	19.8	20.4	58.3	55.4
Urban	43.0	41.0	33.4	32.2	70.7	67.2
Rural	23.6	23.6	14.0	15.0	53.0	50.0
Age						
6-14	65.1	65.7	28.2	29.7	15.1	72.5
15-24	52.0	59.2	43.8	51.0	70.2	74.9
25-59	18.2	18.3	13.6	14.0	71.7	67.6
60+	2.0	0.7	1.4	0.5	34.4	21.3
Education						
Primary and lower secondary education	22.0	20.1	12.8	12.3	48.5	44.4
Upper secondary or post-secondary non-tertiary	38.3	41.4	29.5	32.6	84.4	85.2
Tertiary education	73.0	76.7	61.3	65.5	95.0	95.7
Labor force status						
Employed	17.4	20.1	12.8	15.5	69.7	67.1
Unemployed	39.0	52.2	31.0	39.2	64.8	80.5
Not in the labor force	5.2	29.6	42.4	25.9	52.3	50.4

Source: ICT Household Survey, National Statistical Office.

**Table 6 Proportion of Internet users by locations: 2004 - 2009**

Location <sup>1/</sup>	2004	2005	2006	2007	2008	2009
Home	24.9	32.5	33.5	31.5	34.1	33.4
Office	22.9	28.0	28.4	28.2	29.6	29.0
Place of education	31.4	42.6	45.6	48.2	46.4	46.8
Commercial Internet access facility	19.0	17.8	17.3	15.8	18.8	21.8
Community Internet access facility	<u>2/</u>	0.3	0.3	0.3	0.6	0.6
Another person's home	1.3	1.4	1.5	1.3	2.4	2.1
Any place via a mobile cellular telephones	0.1	0.1	0.2	0.4	0.3	<u>2/</u>

Source: ICT Household Survey, National Statistical Office.

Note: <sup>1/</sup> Answer only up to two choices

<sup>2/</sup> Do not classify activities

**Table 7 Proportion of Internet user by activity to use: 2004 - 2009**

Activity to use <sup>1/</sup>	2004	2005	2006	2007	2008	2009
Sending or receiving e-mail	8.4	19.5	19.0	18.4	22.6	18.6
Game	17.0	22.1	21.5	22.7	24.5	23.8
Search data or News	59.6	81.2	83.3	84.8	81.9	80.6
e-Commerce	9.4	2.7	2.9	1.4	2.8	2.5
Download	2.1	4.0	5.1	5.1	7.7	7.6
Chatroom or Webboard	0.3	5.2	4.2	3.2	1.8	1.7
e-Learning	<u>2/</u>	4.9	3.6	<u>2/</u>	3.2	3.1
Tel-abroad	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	0.2	0.2
Chat	2.3	<u>2/</u>	<u>2/</u>	<u>2/</u>	3.0	3.8
E-banking	<u>2/</u>	0.8	1.1	3.0	0.6	3.1

Source: ICT Household Survey, National Statistical Office.

Note: <sup>1/</sup> Answer only up to two choices

<sup>2/</sup> Do not classify activities

**Table 8 Proportion of online purchaser by type of goods and services to buy: 2007 - 2009**

Type of goods and services <sup>1/</sup>	2007	2008	2009
Fashion or jewelry	10.5	18.1	14.7
Book or magazine	13.7	17.7	14.5
Technology, mobile or camera	13.0	14.0	11.3
Electric	8.8	6.7	6.1
Food, drink or health	6.8	4.2	12.6
Entertainment goods, sport utilities, stationery	11.9	11.4	13.7
Furniture or office product	5.1	7.5	5.3
e-Ticket	<u>2/</u>	14.5	17.4
Reserved	8.0	7.9	8.6
Toys or gift, Games	4.8	3.1	3.3
Software	4.8	6.5	6.3
Computer games	<u>2/</u>	2.8	3.3

Source: ICT Household Survey, National Statistical Office.

Note: <sup>1/</sup> Answer only up to two choices

<sup>2/</sup> Do not classify activities

## Data Limitations

### Reliability

Because the National Statistical Office has many household surveys in every year, it is required to reduce budget by using the same sample of ICT household Survey with the Labor Force Survey. Accordingly, the results are possibly slightly incorrect due to sampling error and non-sampling error; for example, interviewees do not give real data, questionnaires are not complete, and there are errors in coding, or recording. However, the National Statistical office has tried to control data quality in order to have the least mistake. Moreover, the post enumeration survey was conducted after compiling the data of ICT Household Survey.

### Comparability

By “standards” we are referring to concepts, units, scope, definitions, indicators, classifications and model question by using the core ICT indicators. Moreover, after conducting the Population and Housing Census in 2010 survey, the NSO will revised the classifications of Occupation for household survey based on ISCO-2008 and classifications of Economic Activity based on Thailand Standard Industrial Classification (TSIC) 2009 which was applied from International Standard Industrial Classification (ISIC rev.4), ASEAN Common Industrial Classification (ACIC) and East Asia Manufacturing Industrial Classification (EAMIC) Ver.1.

### Completeness

At the level of international comparison, it was found that some indicators were not collected or double collected. As a result, the Ministry of ICT has arranged many conferences to make an agreement among public and private agencies for their responsibility in collecting ICT data.

## Conclusion

ICT Statistics are necessary for planning, monitoring and evaluating ICT Master Plan. At present, there are many agencies collecting ICT statistics in Thailand. As a result, some duplicated indicators were collected. For measuring the information society, National Statistical Office has collected the annually ICT household survey since 2001 and ad hoc survey of ICT educational institution in 2008. For measuring the information economy, National Statistical Office has collected the annually ICT business survey since 2004 and e-Commerce survey since 2007. Moreover, the questions on ICT are also included in this round of national population census in 2010 which will be benefit for planning ICT development both in national and local levels.

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## Annexes

### Annex 1 : Questionnaire Design

Topic	Population
Section 1 : Individual characteristics	
Relationship to head of household	All individuals
Sex	All individuals
Age	All individuals
Marital Status	All individuals
Section 2 : Educational Attainment	
Level of education	Individual aged 6 years
Section 3 : Activity Status	
Employment status (last 12 months)	Individual aged 15 years <sup>+</sup>
Occupation (last 12 months)	Individual aged 15 years <sup>+</sup>
Industry (last 12 months)	Individual aged 15 years <sup>+</sup>
Work status (last 12 months)	Individual aged 15 years <sup>+</sup>
Section 4 : Computer Usage	
Computer use (last 12 months)	Individual aged 6 years <sup>+</sup>
Type of computer use (last 12 months)	Individual aged 6 years <sup>+</sup>
Location of computer use (last 12 months)	Individual aged 6 years <sup>+</sup>
Computer activities undertaken (last 12 months)	Individual aged 6 years <sup>+</sup>
Frequently of computer use (last 12 months)	Individual aged 6 years <sup>+</sup>
Number of hours of using computer (last 12 months)	Individual aged 6 years <sup>+</sup>
Section 5 : The Internet Usage	
Internet use (last 12 months)	Individual aged 6 years <sup>+</sup>
Location of internet use (last 12 months)	Individual aged 6 years <sup>+</sup>
Device of connect to internet (last 12 months)	Individual aged 6 years <sup>+</sup>

## Questionnaire Design (continued)

Topic	Population
Time of using internet (last 12 months)	Individual aged 6 years <sup>+</sup>
Frequently of internet use (last 12 months)	Individual aged 6 years <sup>+</sup>
Number of hours of using internet (last 12 months)	Individual aged 6 years <sup>+</sup>
Internet activities undertaken (last 12 months)	Individual aged 6 years <sup>+</sup>
Purchasing goods or services via internet (last 12 months)	Individual aged 6 years <sup>+</sup>
Type of goods or services purchased via internet (last 12 months)	Individual aged 6 years <sup>+</sup>
Monetary value for purchasing goods or services via internet (last 12 months)	Individual aged 6 years <sup>+</sup>
Reasons for not purchasing via internet (last 12 months)	Individual aged 6 years <sup>+</sup>
Section 6 : Mobile phone ownership	
Mobile phones use (last 12 months)	Individual aged 6 years <sup>+</sup>
Number of mobile phone	Individual aged 6 years <sup>+</sup>
Average for mobile phone per month	Individual aged 6 years <sup>+</sup>
Type of services via mobile phone	Individual aged 6 years <sup>+</sup>
Mobile phone activities undertaken (last 12 months)	Individual aged 6 years <sup>+</sup>
Section 7 : Household access to ICT	
Number of fixed line telephone	Head of household or representative
Number of facsimile machine	Head of household or representative
Reasons for not having computer/PDA	Head of household or representative
Household bought equipment (last 12 months)	Head of household or representative
Volume of expenditure for computer equipment (last 12 months)	Head of household or representative
Household access to the Internet	Head of household or representative
Type of Internet access services	Head of household or representative
Household needed government regulate ICT	Head of household or representative
Planning to connect the broadband	Head of household or representative
Average income of household	Head of household or representative



## Annex 2 : Sources and ICT Indicators in Thailand

Basic Core Indicators on Access to, and Use of, ICT by Households and Individuals  
(Concordance With Indicators Listed in Partnership on Measuring ICT for Development)

Core Indicators	Proportion	Source
HH1 Proportion of households with a <u>radio</u>	58.0	a
HH2 Proportion of households with a <u>TV</u>	96.3	a
HH3 Proportion of households with a <u>telephone</u>		b
Fixed telephone only	1.7	
Mobile cellular telephone only	67.8	
Both fixed and mobile cellular telephone	19.7	
HH3 Proportion of households with a <u>computer</u>	20.3	b
HH 5 Proportion of individuals who <u>used a computer (from any location) in the last 12 months</u>	29.3	b
HH6 Proportion of households with <u>Internet access at home</u>	9.5	b
HH7 Proportion of individuals who <u>used the Internet</u> (from any location) in the last 12 months	20.1	b
HH8 <u>Location of individuals who use of the Internet in the last 12 months:</u>		b, c
Home	33.4	
Work	29.0	
Place of education	46.8	
Another person's home	2.1	
Community Internet access facility	0.6	
Commercial Internet access facility	21.8	
Any place via a mobile cellular telephone	-	
Any place via other mobile access devices	-	
HH9 <u>Internet activities undertaken by individuals in the last 12 months (from any location) :</u>		b, c
Getting information about foods or services	2.5	
Getting information related to health or health services	-	
Getting information from general government organizations	80.6	
Interaction with general government organizations	-	
Sending or receiving e-mail	18.6	
Telephoning over the Internet/VoIP	0.2	
Posting information or instant messaging	5.4	
Purchasing or ordering goods or services	3.1	
Internet banking	-	
Education or learning activities	3.1	
Playing or downloading video games or computer games	23.8	
Downloading movies images, music, watching TV or video, or listening to radio or music	5.7	
Reading or downloading online newspapers or magazines, electronic books	7.6	

HH10 Proportion of individuals with <u>use of a mobile cellular telephone</u>	56.8	b
HH11 Proportion of households with access to the <u>internet by type of access</u> (narrowband, broadband fixed, mobile)		b, d
Narrowband	2.3 (24.0)	
Fixed broadband	2.3 (55.8)	
Mobile broadband	0.7 (7.7)	
HH12 Frequency of individual use of the internet the last 12 months (from any location) :		b
At least once a day	25.4	
At least once a week but not every day	59.8	
Less than once a week	14.8	
HHR1 Proportion of households with electricity	98.8	a

Note: a. Household Socio-Economic Survey in 2009

b. ICT Household Survey in 2009

c. Answer only up to two choices

d. Household can answer one access service

in ( ) is divided by households with internet access

HH8, HH9, HH12 The denominator is number of internet user

**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 8*

**Document C/11-E  
18 November 2010  
English**

**SOURCE:** ITU/BDT

**TITLE:** Child Online Protection: Statistical Framework and Indicators 2010

# Child Online Protection

Statistical Framework and Indicators 2010



ITU-D





# **CHILD ONLINE PROTECTION**

## **STATISTICAL FRAMEWORK AND INDICATORS**



Original language of publication: English  
© 2010 ITU

International Telecommunication Union  
Place des Nations  
CH-1211 Geneva, Switzerland

## Foreword

The dramatic change associated with the spread of information and communication technologies offers unprecedented opportunities for economic growth and social development in all countries, including in the developing world. At the same time, it also brings new risks and threats to safety and security – especially for children, who are among the most vulnerable members of our societies. With continued growth of the Internet and the Web itself, action needs to be taken to enable future generations of the world’s children to grow up safely using the new technologies.

The outcomes of the Geneva and Tunis phases of the World Summit on the Information Society included strong commitments to the protection of children in cyberspace. The Geneva Declaration of Principles stated “We are also committed to ensuring that the development of ICT applications and operation of services respects the rights of children as well as their protection and well-being.” The Tunis Agenda declared “We will strengthen action to protect children from abuse and defend their rights in the context of ICTs. In that context, we emphasize that the best interests of the child are a primary consideration.”

The ITU Child Online Protection (COP) initiative is a response to those and similar commitments. It is an international collaborative effort led by ITU within the framework of its Global Cybersecurity Agenda (GCA). The COP initiative was launched in 2008 and endorsed by UN Secretary-General, Heads of State, Ministers and heads of international organizations from around the world. It aims to promote global awareness on the importance of child safety in the online world, develop practical tools to assist governments, industry and educators and share their experiences in working to ensure a safe and secure online experience for children everywhere.

This report considers the measurement aspects of child online protection. For the first time, an attempt has been made to provide an overall statistical framework related to the measurement of child online protection with a particular emphasis on measures that are suitable for international comparison. Most importantly, the report recommends a list of indicators related to measuring COP, along with their definitions and suggestions for data collection. The proposed indicators will enable Member States to assess the status of child online safety in their country, and identify aspects of child online protection that may require further effort. The report has been prepared with the objective to reliably measure the problem and monitor the solutions and therefore provides useful guidance to all countries, especially the developing countries, that are interested in monitoring child online safety issues.

The report, which was prepared as an input to the COP initiative and the ITU Council Working Group on Child Online Protection, draws on the experience of countries that have piloted work on measuring COP. It will be subject to regular review as the experience in the measurement of child online protection grows. I am convinced that it will be a useful document for all Member States interested in tackling effectively the subject of child online protection.



Sami Al Basheer Al Morshid  
Director, Telecommunication Development Bureau



## Acknowledgements

This report was prepared by Sheridan Roberts, consultant to the Market Information and Statistics Division of ITU's Telecommunication Development Bureau, under the supervision of Susan Teltscher. Useful comments and/or material were provided by Susan Teltscher, Esperanza Magpantay, Vanessa Gray, Cristina Bueti, Souheil Marine and Aeree Baik of ITU; John Carr, Secretary of the Children's Charities' Coalition on Internet Safety; Laurent Bernat of the OECD; Kristina Irion, from the Central European University, Budapest; staff of the International Centre for Missing & Exploited Children (ICMEC); staff of the Ministry of Communications and Information Technology (MCIT), Egypt; and Siddharta De of the Australian Bureau of Statistics.

A recent pilot survey of Internet safety issues conducted by Egypt used an earlier draft of this document and collected many of the indicators recommended in this report. Details of the pilot survey are described in chapters 5 and 6.

The desktop publishing was carried out by Nathalie Rollet, and the cover was designed by Nicolas Stauble.

## Table of contents

Foreword .....	iii
Acknowledgements .....	iv
Table of contents .....	v
List of examples .....	viii
List of tables .....	viii
<b>Chapter 1. Introduction .....</b>	<b>1</b>
<i>Child online protection: why is this subject important?</i> .....	1
World Summit on the Information Society (2003 and 2005) .....	1
World Congress III against Sexual Exploitation of Children and Adolescents (2008) .....	1
World Telecommunication and Information Society Day 2009 .....	2
<i>Worldwide effort: the Child Online Protection (COP) initiative</i> .....	2
History and scope .....	2
Guidelines on child online protection .....	3
Internet Governance Forum (2009) .....	5
<i>Regional efforts</i> .....	5
OECD .....	5
European Commission .....	6
APEC .....	6
NGOs .....	6
Individual countries .....	6
<i>ITU's statistical work on ICT and telecommunications</i> .....	6
<i>Content and structure of this publication</i> .....	7
<b>Chapter 2. Statistical framework for child online protection .....</b>	<b>9</b>
<i>What is a statistical framework?</i> .....	9
<i>Conceptual overview of child online protection</i> .....	9
<b>Figure 1. Child online protection: conceptual overview .....</b>	<b>9</b>
<i>Existing statistical frameworks for child online protection</i> .....	10
<i>Scope</i> .....	10
<i>Actors and units</i> .....	11
Children .....	11
Parents and guardians .....	11
Educators .....	11
Governments .....	11
Industry .....	12
Perpetrators .....	12
Other actors .....	12
<i>Classifying actors</i> .....	12
<i>Statistical standards for context elements of the framework</i> .....	13

<i>General classifications</i> .....	14
Age .....	15
Gender .....	15
Industry .....	15
Other classifications .....	16
<i>Defining and classifying online safety elements</i> .....	16
Children's risk-prone behaviour .....	16
Online threats and incidents .....	19
Children's responses to incidents .....	23
Preventive measures .....	23
<i>Indicator groups</i> .....	28
Context .....	28
The subjective aspects of child online protection .....	29
Children's risk-prone behaviour, incidents and children's responses .....	29
Preventive actions .....	29
<i>Data collection models and methods</i> .....	29
Surveys .....	29
Byproduct data .....	30
Other .....	30
<b>Chapter 3. Child online protection: measuring the context</b> .....	<b>33</b>
<i>Internet access and use</i> .....	33
Internet subscriptions .....	33
Access to, and use of, the Internet by households and individuals .....	34
School access to the Internet .....	35
Changes in means of accessing the Internet .....	35
Children's use of the Internet .....	36
<i>Growth of the Web</i> .....	37
<i>Recommendations</i> .....	40
<b>Chapter 4. Measuring the subjective aspects of child online protection</b> .....	<b>43</b>
<i>Survey data</i> .....	43
<i>Recommendations</i> .....	45
<b>Chapter 5. Measuring children's risk-prone behaviour, incidents and children's responses</b> .....	<b>49</b>
<i>Risk-prone behaviour</i> .....	49
Survey data .....	49
Social networking registrations by age of user .....	53
<i>Incidents and responses</i> .....	54
Survey data .....	54
Crime statistics .....	58
Helpline, hotline and tipline statistics .....	59
<i>Recommendations</i> .....	60
Risk-prone behaviour .....	60
Incidents and responses .....	63

<b>Chapter 6. Measuring preventive actions .....</b>	<b>69</b>
<i>Preventive measures by parents and children .....</i>	<i>69</i>
Survey data .....	69
<i>Measuring the policy response .....</i>	<i>72</i>
Survey data .....	72
<i>Industry measures.....</i>	<i>73</i>
Action by social networking websites.....	73
Action by ISPs.....	73
<i>Other actions by the information industry.....</i>	<i>74</i>
<i>Recommendations .....</i>	<i>74</i>
<b>Chapter 7. Statistical challenges.....</b>	<b>79</b>
<i>Data availability.....</i>	<i>79</i>
<i>International comparability.....</i>	<i>79</i>
<i>Data interpretation.....</i>	<i>80</i>
<i>Change over time.....</i>	<i>80</i>
<i>Data quality .....</i>	<i>81</i>
<i>Methodology and data collection.....</i>	<i>81</i>
<b>Chapter 8. Conclusions and summary of recommendations.....</b>	<b>85</b>
<i>Conclusions .....</i>	<i>85</i>
<i>Summary of recommendations.....</i>	<i>85</i>
<b>Annex 1: Recommended indicators for child online protection.....</b>	<b>88</b>
<b>Annex 2: Examples of measurement categories used in child online protection surveys and output .....</b>	<b>91</b>
<i>Children’s risk-prone behaviour .....</i>	<i>91</i>
<i>Online threats and incidents.....</i>	<i>94</i>
<i>Children’s responses to incidents.....</i>	<i>97</i>
<i>Preventive measures.....</i>	<i>98</i>
<b>Bibliography .....</b>	<b>103</b>

## List of examples

Example 1.	Growth between 2003 and 2009: Internet subscriptions (A3, A4 and A5) .....	34
Example 2.	Children's use of the Internet: findings from ITU, 2008 .....	36
Example 3.	Proportion of Internet users, children under 15 and total population (HH7) .....	37
Example 4.	Growth in global IP traffic.....	38
Example 5.	Growth in social networking, audience aged 15+, home and work locations, 2007 to 2008.....	39
Example 6.	Comparison of global rankings of websites, January and February 2010 .....	39
Example 7.	Growth in the number of <i>Facebook</i> users, worldwide .....	40
Example 8.	Risk-prone online activities of children and young people, Singapore, 2008.....	50
Example 9.	SNS usage by type, gender and age, Republic of Korea, 2009.....	51
Example 10.	Some findings from Pew surveys, US .....	51
Example 11.	Weekly average Internet usage hours, by age, Republic of Korea, 2009 .....	53
Example 12.	<i>Facebook</i> users by age and sex, United States, March 2010.....	54
Example 13.	YISS: Trends in Online Victimization by Age and Gender, United States.....	55
Example 14.	Some findings from the National Juvenile Online Victimization Study, US, 2006 .....	58
Example 15.	INHOPE statistics .....	59
Example 16.	Eurobarometer 2008: Percentage of parents not allowing at least one activity, EU27 .....	70
Example 17.	UK Children Go Online, What parents do when child is using the Internet .....	71
Example 18.	Pew findings US teenagers' management of their online identities, 2006 .....	72
Example 19.	Some findings from ITU's Child Online Protection Initiative National Survey, 2009 .....	72
Example 20.	ISPs with over 1 000 active subscribers, selected services offered, Australia, 2007 to 2009.....	73

## List of tables

Table 1.	Recommended context indicators for child online protection.....	41
Table 2.	Recommended indicators for risk-prone behaviour and incidents .....	66
Table 3.	Recommended indicators for preventive actions .....	77

## Chapter 1. Introduction

### Child online protection: why is this subject important?

1. The Internet has changed how much of the world's population works, learns, plays and communicates. While this dramatic change has provided great opportunities, it also brings threats to safety and security – especially for children. Dangers include grooming for sexual purposes and cyberbullying. While online, children may be victims of racism and online fraud, and can be exposed to pornographic and violent images. They may also become addicted to spending time online, with the risks and lost opportunities that this entails. With continued growth of Internet penetration and the Web itself, it is likely that without intervention, the situation will worsen.

2. The UN Convention on the Rights of the Child was approved by the United Nations General Assembly in 1989 and spells out the human rights to which the world's children are entitled. In particular, Article 17 refers to access to information by children and protection from “information and material injurious to his or her well-being” (UN General Assembly, 1989).

### World Summit on the Information Society (2003 and 2005)

3. In respect of protection of children in cyberspace, the Geneva and Tunis phases of the World Summit on the Information Society (WSIS) resulted in strong commitments. The Geneva *Declaration of Principles* stated “We are also committed to ensuring that the development of ICT applications and operation of services respects the rights of children as well as their protection and well-being.” (ITU, 2005)

4. Paragraph 24 of the *Tunis Commitment* (ITU, 2005) recognized “... the role of ICTs in the protection of children and in enhancing the development of children.” The commitment continued “We will strengthen action to protect children from abuse and defend their rights in the context of ICTs. In that context, we emphasize that the best interests of the child are a primary consideration.”

5. Paragraph 90 of the *Tunis Agenda for the Information Society* (ITU, 2005) dealt with use of information and communication technology (ICT) to achieve internationally agreed development goals and objectives by, among other things, “Incorporating regulatory, self-regulatory, and other effective policies and frameworks to protect children and young people from abuse and exploitation through ICTs into national plans of action and e-strategies.”

### World Congress III against Sexual Exploitation of Children and Adolescents (2008)

6. The *Adolescent Declaration* from the World Congress III against Sexual Exploitation of Children and Adolescents, held in Brazil in 2008 sought “... strong cyber safety rules which are well propagated on both the websites and within the communities” and called for “... increased development of children's, teachers', parents' and family manuals which address the threats of the internet in addition to providing supplemental information about Sexual Exploitation of Children.” (World Congress III against Sexual Exploitation of Children and Adolescents, 2008).

### World Telecommunication and Information Society Day 2009

7. The theme of the 2009 World Telecommunication and Information Society Day (WTISD) was protecting children in cyberspace.<sup>1</sup> The International Telecommunication Union (ITU) called upon policy makers, regulators, operators and industry "... to promote the adoption of policies and strategies that will protect children in cyberspace and promote their safe access to online resources."<sup>2</sup> ITU asked its Member States and Sector Members to:

- Create public awareness;
- Identify policies, best practices, tools and resources for adaptation/use in their countries;
- Support ongoing work aimed at developing guidelines for policy makers and regulators;
- Identify risks and vulnerabilities;
- Build resource repositories for common use; and
- Promote capacity building aimed at strengthening the global response.<sup>2</sup>

8. More than 40 countries and organizations have responded to this Call for Action. Additional information can be found at <http://www.itu.int/wtisd/2009/initiatives.html>.

### Worldwide effort: the Child Online Protection (COP) initiative

#### History and scope

9. The Child Online Protection initiative ([www.itu.int/cop](http://www.itu.int/cop)) is a specialized programme within the ITU Global Cybersecurity Agenda. It was presented to the ITU Council in 2008 and endorsed by the UN Secretary-General, Heads of State, Ministers and heads of international organizations from around the world.

10. The COP initiative was launched at the end of 2008 and is an international collaboration promoting the online protection of children worldwide. Among other things, it aims to address legal, technical, organizational and procedural issues relevant to protecting children online. Its members are:<sup>3</sup>

- ITU;
- Children's Charities' Coalition on Internet Safety;
- Child Helpline International;
- Cyber Peace Initiative;
- ECPAT International;
- European Network and Information Security Agency;
- European Broadcasting Union;
- European Commission Safer Internet Programme;
- European NGO Alliance for Child Safety Online;
- eWWG;
- Family Online Safety Institute;

- GSM Association;
- iKeepSafe;
- International Criminal Police Organization (Interpol);
- International Centre for Missing & Exploited Children;
- Optenet;
- Microsoft;
- Telecom Italia;
- Telefónica;
- Save the Children;
- United Nations Children's Fund;
- United Nations Office on Drugs and Crime;
- United Nations Interregional Crime and Justice Research Institute;
- United Nations Institute for Disarmament Research; and
- Vodafone Group.

### **Guidelines on child online protection**

11. An important aspect of the COP initiative is a set of guidelines on child online protection. The guidelines were prepared by ITU and a team of contributing authors from the ICT sector and institutions active in child online safety issues. There are four sets of guidelines: for children; parents, guardians and educators, industry and policy makers. They are described below.

#### **Children**

12. The *Guidelines for Children on Child Online Protection* are split by age group. Children aged 5-7 are unlikely to be able to apply the *Guidelines* so it is recommended that adults closely supervise their Internet usage using the *Guidelines for Parents, Guardians and Educators on Child Online Protection*. The guidelines for children aged 8-12 use the themes of chatting online and netiquette (being kind and polite), playing online games, reacting to bullying, protecting personal details and identity, and reacting to offensive or illegal content. Children aged 13 or over are characterized by IT proficiency, curiosity and independence. The themes for this group are harmful and illegal content, grooming, bullying, defending privacy, respecting copyright and purchasing online. The *Guidelines* are summarized in the form of contracts (for parents and children) at Appendix 1 (ITU, 2009a).

#### **Parents, guardians and educators**

13. The *Guidelines for Parents, Guardians and Educators on Child Online Protection* (ITU, 2009b) attempt to educate on the risks, which are described in some detail. The role of parents and guardians includes communication, educating the child about Internet safety, checking the suitability of websites, being involved in the child's Internet activity, and being aware of different behaviours of the child when online. It also recommends that parents need to teach themselves about online culture in order to carry out their role. The role of educators includes teaching children, setting rules and providing a safe environment at the place of education.



14. The *Guidelines* are presented as themes with one or more 'key areas for consideration'. For parents, guardians and educators, the themes are:

- Safety and security of your personal computer;
- Rules;
- Parents', guardians' and teachers' education;
- Internet sites features review (includes use of filtering and blocking or monitoring programmes);
- Children's education;
- Internet sites safe usage review; and
- Communication.

15. For educators, there are additional themes as follows:

- Safety and security as part of child protection strategies;
- Rules and policies;
- Be inclusive;
- Technological solutions; and
- Internet safety policy.

### **Industry**

16. The *Guidelines for Industry on Child Online Protection* (ITU, 2009c) present a number of case studies. The *Guidelines* are presented as key areas for consideration for the industry segments, ICT industry as a whole, broadcasters, Internet industry and Internet service providers (ISPs), and mobile operators. The key areas for the whole ICT industry cover coordination, cooperation, interoperability and codes of conduct by segment.

17. For broadcasters, the key areas include common complaint rules, common standards and parental consent procedures.

18. Key areas for the Internet industry and ISPs include restricting access to harmful or illegal content; equipping children and their parents with information and easy-to-use tools; using clear and relevant language regarding their services and terms and conditions; responding to and reporting offending content; and evaluating technologies that identify and verify the age of customers.

19. Key areas for mobile operators include ensuring that content is classified in line with national expectations; providing tools that allow access to content to be controlled by the user or a parent/caregiver; clearly signposting the nature of content and services offered; supporting parents and educating consumers; having a clear position on the misuse of services to store or share child sexual abuse content; and supporting law enforcement.

### **Policy makers**

20. The *Guidelines for Policy Makers on Child Online Protection* (ITU, 2009d) present a set of key areas for consideration in the areas of legislation (framework, law enforcement and reporting); national coordination and regulatory policy; and education and awareness (including technical tools such as filtering programmes). A national checklist associated with the key areas for consideration is provided.

21. For the purposes of developing a statistical framework, the *Guidelines* are a useful source of information about the nature of children's Internet use and associated online risks. They describe and define a number of aspects of the topic, such as *social networking sites* and *child abuse material*. They also list and define the key online risks in the following areas: content, contact, conduct, commerce, excessive use and societal. In addition, they describe the stakeholders (known as 'actors' in the statistical framework presented in the report).

### **Internet Governance Forum (2009)**

22. The 2009 Internet Governance Forum (IGF) was hosted by the Arab Republic of Egypt and held at Sharm El Sheikh, Egypt, in November 2009. An important theme of the meeting was the safety of children and young people on the Internet. The meeting discussed measurement issues during the workshop "Child On-line Safety Indicators: Measuring the Un-measurable". The workshop involved panelists from ITU, OECD, Council of Europe, ECPAT International, UK Children's Charities Coalition on Internet Safety and the Ministry of Communications and Information Technology (MCIT), Egypt. Participants discussed current statistical work in the area of child online protection. The workshop concluded that there is a need for standardized data collection and for indicators to monitor efforts in this area.<sup>4</sup>

### **Regional efforts<sup>5</sup>**

#### **OECD**

23. The Organisation for Economic Co-operation and Development (OECD) is currently preparing a report on the protection of children online (OECD, 2010). The main objectives of the work are to: enhance mutual understanding of policy approaches to the protection of children online; provide a comparative analysis of those policies; and explore how international co-operation could enhance protection of children online.

24. The report reviews several classifications of online risks and discusses the complexities of a typology. It presents a classification of online risks for children in three broad categories: children as Internet users; children targeted as consumers; and information privacy and security risks. The report includes an overview of policy measures taken by individual members and some non-member countries. Finally, the report discusses characteristics of sound policy-making in this area.

25. OECD held a joint meeting with the Asia-Pacific Economic Cooperation (APEC)<sup>6</sup> in April 2009 on promoting a safer Internet environment for children.<sup>7</sup> Responses from a survey of policymakers on the subject of safe Internet for children were presented. Responses were

provided by Australia, Canada, Philippines, Thailand, US, Denmark, Egypt, EU, Finland, Germany, Hungary, Italy, Korea (Republic of), Mexico, Netherlands, Slovak Republic, Spain, Sweden, Switzerland and Japan (APEC, 2009).

### European Commission

26. The European Commission (EC) has developed a policy framework to protect children online. The EC's *Safer Internet Programme* "aims at empowering and protecting children and young people online by awareness-raising initiatives and by fighting illegal and harmful online content and conduct."<sup>8</sup> The Programme adopts and funds a multi-stakeholder approach, including NGOs active in child welfare online, law enforcement bodies working in the field and researchers who collect information about online technologies and children.

27. Of particular interest for this report, the EC *Safer Internet Plus Programme* funded a large research programme, *EU Kids Online* from 2006-2009 (and its successor *EU Kids Online II* from 2009). The findings of the programme are discussed in subsequent chapters.

### APEC

28. The Asia-Pacific Economic Cooperation (APEC) has a Telecommunications and Information Working Group (APECTEL), established in 1990.<sup>9</sup> It has a steering group on Security and Prosperity (SPSG), responsible for promoting security and trust in ICT. The joint meeting with OECD was a project of the SPSG.

### NGOs

29. There are a number of non-governmental organizations (NGOs) active in the field of COP. They include networks such as INSAFE (the European network of awareness centres) and INHOPE (the International Association of Internet Hotlines, partly funded by the EC Safer Internet Plus Programme).

### Individual countries

30. A number of individual countries are actively promoting a safe Internet environment for children. The efforts of OECD member, and some non-member, countries are described in OECD (2010) and include results from a survey of policy makers presented to a joint APEC-OECD meeting held in 2009 (see APEC, 2009). The ITU's Child Online Protection Initiative National Survey was run in 2009 and was directed to national governments (ITU, 2010a). It collected data on the COP initiatives of many developed and developing countries. The APEC-OECD and ITU surveys are described in Chapter 6. The efforts of individual countries in measuring child online protection are described in subsequent chapters.

### ITU's statistical work on ICT and telecommunications

31. The International Telecommunication Union collects a range of data on telecommunication/ICT infrastructure, ICT access in households and ICT use by individuals. The resulting indicators, some of which go back as far as 1960, are published in the World Telecommunication/ICT Indicators Database (ITU, 2009e).

32. The telecommunication/ICT infrastructure data are collected from several sources but mainly through an annual survey of ICT ministries and telecommunication authorities. Additional data are obtained from reports provided by telecommunication regulatory authorities, ministries and operators. In some cases, estimates are derived from ITU background documents or other references.

33. Because these data are collected from providers rather than users, they are widely available for both developed and developing countries. They are defined in ITU's *Telecommunication/ICT Indicators Handbook* (ITU, 2010b).

34. Because the area of telecommunications and ICT is rapidly changing, the indicators are updated regularly. Changes are discussed, and revised indicators adopted, at ITU's World Telecommunication/ICT Indicators meeting (WTIM), which is organized regularly.

35. As a member of the Partnership on Measuring ICT for Development, ITU is responsible for a set of core indicators on *Access to, and use of, ICT by households and individuals*. Data are collected from national statistical offices (NSOs) through an annual survey. A major input to the *Partnership's* work is ITU's *Manual for Measuring ICT Access and Use by Households and Individuals* (ITU, 2009f). More information on the *Partnership*, and its role in standard setting for ICT statistics, may be found in chapters 2 and 3.

## Content and structure of this publication

36. Chapter 2 describes a proposed statistical framework for measuring child online protection. It covers scope, actors (*e.g.* children, parents), definitions, classifications, indicators and data collection models. Some of the detail is shown in Annex 2.

37. Chapter 3 looks at measuring the context in which online threats to children arise. An important element of the context is the Internet and the rapid growth in its content and use.

38. Chapters 4, 5 and 6 consider measurement of aspects of the statistical framework as follows: awareness, concerns and attitudes; risk-prone behaviour of children; incidents and children's responses; and, preventive actions. The chapters include recommendations for indicators and measurement approaches.

39. Chapter 7 looks at the statistical challenges involved in measuring child online protection, while Chapter 8 presents conclusions and summarizes the recommendations presented in the report.

40. Annex 1 presents a table showing all the indicators recommended for measuring child online protection at the international level.

41. Annex 2 provides examples of categories used in child online protection surveys and output.

## Endnotes

- <sup>1</sup> <http://www.itu.int/wtisd/2009/index.html>. Her Highness Queen Silvia was the Patron of the WTISD 2009.
- <sup>2</sup> <http://www.itu.int/wtisd/2009/call-for-action.html>.
- <sup>3</sup> <http://www.itu.int/osg/csd/cybersecurity/gca/cop/together.html>.
- <sup>4</sup> The workshop report was written by Amal Nasralla and can be found at:  
<http://www.intgovforum.org/cms/index.php/component/chronocontact/?chronoformname=Workshopsreports2009View&curr=1&wr=28>.
- <sup>5</sup> Note that this list is not exhaustive.
- <sup>6</sup> The Asia-Pacific Economic Cooperation is a forum for Pacific Rim countries.
- <sup>7</sup> APEC-OECD Joint Symposium on Initiatives among Member Economies Promoting a Safer Internet Environment for Children, [http://www.oecd.org/document/17/0,3343,en\\_2649\\_34255\\_43301457\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/17/0,3343,en_2649_34255_43301457_1_1_1_1,00.html).
- <sup>8</sup> [http://ec.europa.eu/information\\_society/activities/sip/index\\_en.htm](http://ec.europa.eu/information_society/activities/sip/index_en.htm).
- <sup>9</sup> <http://www.apectelwg.org/>.

## Chapter 2. Statistical framework for child online protection

### What is a statistical framework?

42. A statistical framework describes a particular field of statistics in terms of its content and scope, actors and units, concepts and definitions, classifications, relationships between elements and links to other statistical frameworks. It may also include indicators, sources, methods and/or model surveys.

43. A statistical framework enables the production of accurate and comparable statistics by setting consistent and feasible standards.

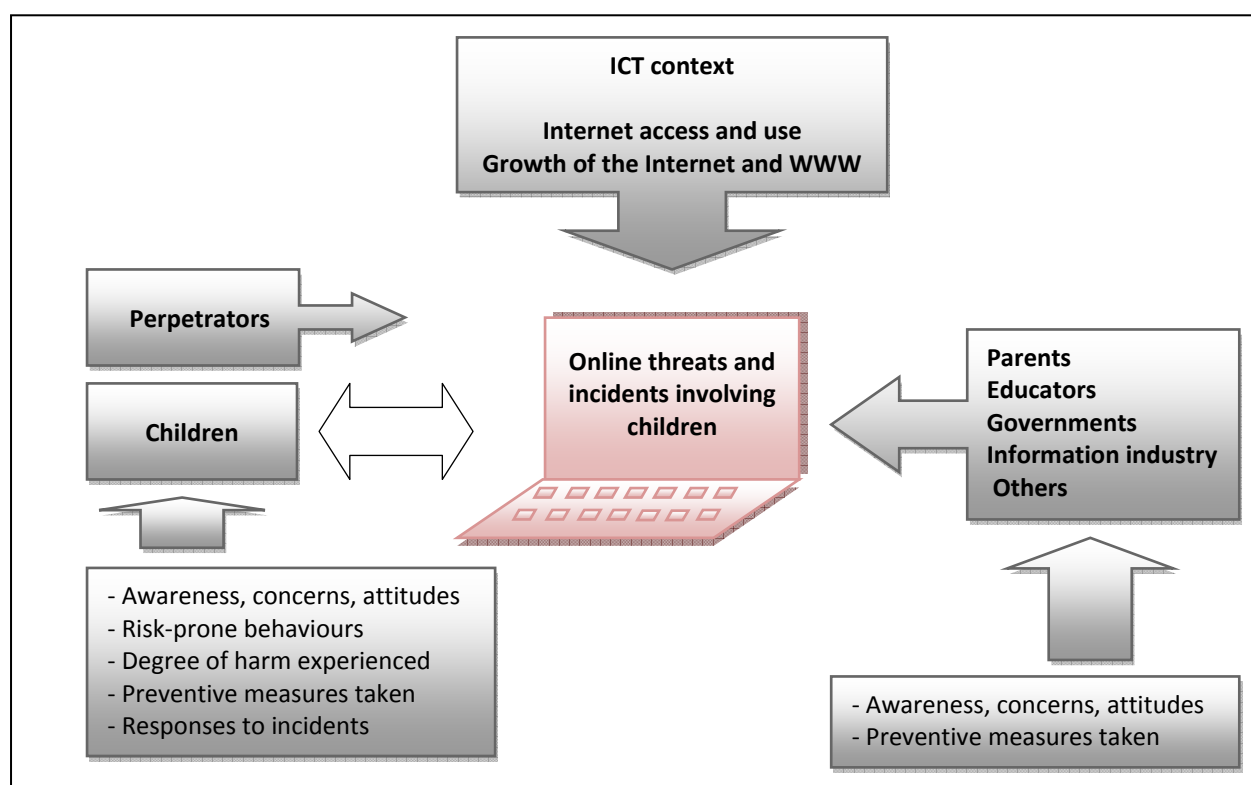
44. This chapter examines existing work and describes a set of statistical standards that covers most of the elements outlined above. Some of the detailed material has been included in Annex 2 for readers wanting more information.

45. The following chapters look more closely at indicators and how they might be collected.

### Conceptual overview of child online protection

46. A conceptual overview of child online protection is shown in Figure 1. The overview is highly simplified but shows a broad picture of the measurement coverage for this statistical field. The various elements are further described below.

Figure 1. Child online protection: conceptual overview



## Existing statistical frameworks for child online protection

47. While a number of surveys and studies have been carried out on the topic of child online protection, there appears to have been relatively little work done in articulating a statistical framework. The main exception is the EU Kids Online Project funded by the European Commission's (EC) Safer Internet Plus Programme from 2006 to 2009.<sup>1</sup> *EU Kids Online* (Phase 1) was a thematic network designed to co-ordinate research carried out in European countries<sup>2</sup> on how people, especially children and young people, use new media. The research was carried out by the London School of Economics under contract to the EC. It presents a significant body of work in the statistical field with an approach defined by four C's – comparative, contextual, child-centred and critical (Livingstone and Haddon, 2009a). There are a number of outputs from the project including comparative data, policy recommendations, a data repository and best practice and methodology guides.<sup>3</sup>

48. A conceptual view of the topic is articulated in the final *EU Kids Online* report. It is in the form of a matrix showing opportunities and risks for each of three modes of online communication. The matrix is used to analyse available research findings so could also be interpreted as a way of organizing the topic for analytical purposes. Opportunities are split into four areas and risks into another four areas. Modes of communication are Content (child as recipient), Contact (child as participant) and Conduct (child as actor) (Livingstone and Haddon, 2009b). Other elements of the framework are Internet access and use, positive and negative consequences, and contextual elements (market, cultural, educational and political) described in Hasebrink *et al.* (2009).

## Scope

49. The proposed scope of this field of statistics is broad and follows the scope covered by the COP guidelines, presented in Chapter 1. The scope is limited to the *Internet*, however it is accessed. Note that many organizations working in, or measuring, this field use a narrower scope, for instance, a focus on the sexual aspects of child safety online. The proposed scope is shown below.

Content – illegal and age inappropriate content on the Internet
Contact – exposure to sexual predators via the Internet
Children's conduct – facilitation by the Internet of risky sexual interactions, posting compromising content, exposure to bullying and opportunity to bully others
Commerce – Internet-enabled acquisition of age-inappropriate goods and services, exposure to scams, identity theft, fraud and similar threats that are economic in nature or are rooted in inadequate data protection or privacy laws.
Excessive use – Internet facilitated excessive use or obsessive behaviour <i>e.g.</i> gaming online.
Societal – Internet digital divide, exacerbation of existing disadvantage.
<i>Source:</i> ITU (2009d), Chapter 4.

## Actors and units

50. Actors in the proposed statistical framework are generally defined in accordance with the COP guidelines (where they are referred to as “stakeholders”). It is suggested, for some actors, that the concept be broadened to include systems, for instance, educational systems.

51. Units, in a statistical context, can be viewed in several ways. For example, reporting units provide statistical information and statistical units are the units about which information is gathered and tabulated. The relationship between statistical units and actors is explored below.

## Children

52. Article 1 of the UN Convention on the Rights of the Child defines a child as “... every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier.” That definition is adopted here.

53. In terms of units, the child will also be a statistical unit, though will often not be a reporting unit (a parent or older sibling might have that role). There are often complexities involved in collecting information from and about children. For example, there may be legal or ethical prohibitions on interviewing children below a certain age.<sup>4</sup> The usual alternative to interviewing a child, that is, asking someone else about the activities and experiences of the child, will not always succeed as the respondent may not have the knowledge to respond accurately. The UK study, *UK Children Go Online*, interviewed both parents and children on issues such as preventive measures taken by parents; they found significantly different responses (Livingstone and Bober, 2005).

## Parents and guardians

54. Following the COP guidelines, “parent” refers to the natural mother and/or father of a child. A “guardian” is a person to whom guardianship has been granted. As statistical units, parents and guardians do not usually present difficulties. As mentioned above, they will often report in respect of the child/ren for whom they are responsible.

## Educators

55. The COP guidelines consider the role of educators to be a broad one, going beyond those who teach in classrooms to include informal educators. It is useful to consider educators in a broader context as well and include the whole education system. The statistical units for educators will vary and include government departments responsible for education, schools and teachers.

## Governments

56. Governments have an integral role in many aspects of child online protection. They coordinate stakeholders, undertake education and awareness-raising, legislate and enforce legislation, establish regulatory and self-regulatory regimes, design and implement reporting mechanisms, provide the services required to support victims, and contribute to and adhere to international initiatives and rules. In terms of defining units, government organizations may be



problematic given their range of functions and often hierarchical nature. For a discussion on the challenges presented by measurement of government, see Chapter 8 of OECD (2009a).

### Industry

57. “Industry” refers to the elements of the ICT sector that are relevant to discussion of this topic. The COP industry guidelines recognize four industry groups: the ICT industry as a whole, broadcasters, Internet industry and ISPs, and mobile cellular operators. Businesses in these industries are providers of products to the market but can also have a role in how those products are used by children and others. For example, they may undertake awareness-raising, implement technical solutions and engage with Government. In terms of units, these will usually be individual businesses but may also be representatives of businesses, such as industry associations.

### Perpetrators

58. Perpetrators are not defined in the COP guidelines and will vary depending on the type of threat they pose. In cases of sexual solicitation, perpetrators will generally be individuals (or networks of like-minded individuals). In cases of consumer fraud, they may be individuals or businesses. Individuals will vary with age, gender, socio-economic status etc. For some online threats, such as bullying and harassment, children themselves are often the main perpetrators.

### Other actors

59. Other actors are diverse and include academia, NGOs and international organizations. While their role can be vitally important in preventing online harm to children, in a statistical framework, it is less clear how they should be treated. Some actors will themselves be involved in statistical measurement, others will be involved in direct action and awareness-raising. International organizations, such as ITU, the OECD and the European Commission have several roles in this field. Their activities were discussed in Chapter 1.

### Classifying actors

60. Actors are defined above and may be classified in a number of ways. Some classifications may be specific to measurement of child online protection, though most will be general classifications, such as age, gender, industry and geographic classifications, which are presented later in this chapter.

61. An example of a specific COP classification could be one of perpetrators, who could be classified in terms of the nature of their activity (*e.g.* online/offline sexual predator) and/or their relationship to their child victim. The youth questionnaire for the second US Youth Internet Safety Survey (YISS-2)<sup>5</sup> asks a number of questions about the victim’s relationship with perpetrators that suggest a *relationship* classification for individual perpetrators as follows:

<b>Someone the victim knew before the incident</b>
Friend or acquaintance from school
Friend or acquaintance from someplace else
Romantic partner (or ex-)
Adult family member
Family member under 18
Someone from work
Neighbour
Other
<b>Someone the victim did not know before the incident</b>
Someone the victim met on the Internet
Someone who had started to feel like a friend
Someone who had started to feel like a close friend
Someone the victim had a romantic online relationship with
Other

62. A perpetrator activity classification will tend to mirror a threats classification though may be more detailed, for example, the YISS-2 youth questionnaire,<sup>6</sup> probes respondents on what the perpetrator did, such as sending sexual pictures of themselves, asking the child to send sexual pictures, calling on the phone, asking to meet with the child, giving gifts etc. Perpetrators' characteristics might also be obtained through crime statistics,<sup>7</sup> for example, Wolak *et al.* (2009) suggest a characteristics classification for US "online predators" as: age, gender, race, substance abuse, history of violence, prior arrests-sex, prior arrests-non sex and whether possessed child pornography.

### Statistical standards for context elements of the framework

63. As the conceptual overview in Figure 1 shows, an important part of the statistical field is the prevailing ICT context applying at the national, regional and international level. This report splits the ICT context into two main areas as follows:

- Internet access and use generally, and
- Growth of the Internet and Web.

64. In measurement terms, much of this area has been well articulated, with an established body of concepts, definitions, classifications, indicators and model questions. It is recommended that the field of COP statistics adopts those statistical standards where they are available. It is beyond the scope of this report to suggest standards for ICT context elements where they do not already exist.

65. Available ICT statistics standards are articulated in various publications, including those of the Partnership on Measuring ICT for Development, ITU, the OECD and the UNESCO Institute for Statistics. These can be described briefly as follows:

- The Partnership on Measuring ICT for Development was launched in June 2004, following the first phase of the World Summit on the Information Society (WSIS).<sup>8</sup> The *Partnership* has established a core list of ICT indicators and associated statistical standards to be used by all countries with the aim of providing reliable and internationally comparable ICT statistics. The main reference of relevance to this report is *Core ICT Indicators (Partnership, 2010)*, which articulates a set of indicators and associated standards across the areas: ICT infrastructure and access; access to, and use of, ICTs by households and individuals; use of ICTs by businesses; the ICT sector; trade in ICT goods; and ICT in education.
- ITU is responsible for standard-setting and data collection for the core indicators on *ICT infrastructure and access* and *Access to, and use of, ICTs by households and individuals*. More information on these activities can be found in Chapter 1. As an input to the *Partnership*, ITU has developed a manual for collection of data on access to, and use of, ICT by households and individuals (see ITU, 2009f).
- The OECD is a leader in establishing standards for measuring the information society. OECD's *Guide to Measuring the Information Society* (2005, 2009a) brings these standards together.
- The UNESCO Institute for Statistics (UIS) is responsible for the core indicators on ICT in education. In late 2009, it released *Guide to Measuring Information and Communication Technologies (ICT) in Education*, which articulates these and other ICT in education indicators (UIS, 2009).

66. Eurostat and its Member States are active in measuring access to, and use of, ICT through the annual community surveys on ICT usage in households and by individuals. This work involves the development of concepts and classifications suitable for questions on household surveys. Eurostat produces a methodological manual for its household and business ICT use surveys (for example, see Eurostat, 2009a).

67. The United Nations Conference on Trade and Development (UNCTAD) is responsible for the economic indicators covering business use of ICT, the ICT sector and trade in ICT goods. These areas are less pertinent to this report, although for completeness, a reference to UNCTAD's work is included (see UNCTAD, 2009).

68. Indicators and data sources for ICT context elements are proposed in Chapter 3.

### General classifications

69. Existing general classifications can be applied to elements of the framework. For instance, human actors can be classified by age and gender, incidents can be classified by region or country level of development. There is a large number of such classifications that could be used. A minimal set, likely to be applicable to all countries, is proposed in this report.

70. General classifications recommended for child online protection measurement should be defined in terms of existing statistical frameworks, most of which are articulated by the United Nations. The recommended classifications are as follows:

## Age

71. An age classification can be applied to children, parents and perpetrators. It is recommended that age ranges be consistent with the 5-year age ranges adopted by UNSD (2008a) for population censuses. ITU (2009f) proposes the following ranges for measuring use of ICT by individuals: 1 to 4, 5 to 9, 10 to 14, 15 to 24; 25 to 34; 35 to 44; 45 to 54; 55 to 64; 65 to 74, 75 or over. Given that the definition of a child adopted in this report is someone under the age of 18, it will be necessary to depart from the existing guidelines and split the 15-24 age group (into 15-17 and 18-24) if at all possible (or, if not, at least into 15-19 and 20-24 years in accordance with UNSD age ranges). In addition, it may be of value to further split the age range 10-14, reflecting rapid development by children in this age group.

## Gender

72. The gender classification is male/female and can be applied to children, parents and perpetrators.

## Industry

73. An industry classification can be applied to industry actors. It is recommended that the internationally recognized definitions of the *ICT* and *Content and media* sectors be used for this field of study where an industry classification is needed. The *ICT sector* has been defined by the OECD according to the standard international industrial classification, ISIC. Details may be found in OECD (2009a) and *Partnership* (2010). OECD has also defined a *Content and media sector* based on ISIC, Revision 4 (OECD, 2009a). The ICT sector and the Content and media sector as defined by OECD are recognized as alternative aggregations in ISIC Rev. 4 (UNSD, 2008b).

74. The *ICT industry* detailed in the COP industry guidelines includes elements of the OECD's ICT sector and Content and media sector. The elements in the *Guidelines* are: the ICT industry as a whole, broadcasters, the Internet industry and ISPs, and mobile operators. In terms of ISIC Rev. 4, these elements can be defined and further split as follows:

- Broadcasters are included in the Content and media sector. In ISIC Rev. 4, their activities are in Division 60, Programming and broadcasting activities. This division is split into Radio broadcasting and Television programming and broadcasting activities.
- ISPs and mobile operators are in the ICT sector and are included in ISIC Rev. 4 Division 61, Telecommunications. The division is dissected according to the nature of the technology used (wired/wireless/satellite/other telecommunications activities). Mobile operators are included in class 6120, Wireless telecommunications activities. ISPs may be included in any of the classes of Division 61, depending on the nature and ownership of the technology infrastructure used. ISPs that are not operators of telecommunications infrastructure are included in 6190, Other telecommunications activities.
- The "Internet industry", per the COP guidelines, is a little harder to define in terms of ISIC Rev. 4. A number of activities may be conducted over the Internet or in other ways. In ISIC Rev. 4, these tend to be classified according to the activity (*e.g.* retailing, education) rather than the medium (Internet). In particular, Internet publishing activities are included in ISIC Rev. 4, Division 58, Publishing activities, which is part of the Content and media sector.

Broadcasting activities may also occur over the Internet (*e.g.* Internet radio stations). Within the ICT sector, the activities of providing Internet search facilities and operating websites that act as portals to the Internet are included in Division 63, Information service activities. Provision of Internet advertising is included in Division 73, Advertising and market research. It can be seen that the “Internet industry” can be viewed in terms of provision of infrastructure and content. Both are likely to be relevant to the topic of child online protection.

### Other classifications

75. A number of other general classifications are possible. They include classifications that compare countries (region and level of development), socio-economic status (for instance, Livingstone and Haddon, 2009b), urban/rural splits, income (for instance, household income) and whether or not a child belongs to a high-risk category. Because these classifications are of less relevance, or difficult to define or collect, they are not recommended for this statistical framework.<sup>9</sup>

### Defining and classifying online safety elements

76. Central to standards for measuring child online protection is the definition and classification of online safety elements of the framework. For the purposes of this report, these are:

- Children’s risk-prone behaviour (activities and time spent online);
- Online threats and incidents;
- Children’s responses to those incidents; and
- Preventive measures.

77. At the outset, it should be understood that a classification for presenting output or for analysing data will not necessarily be the same as one used for collecting data. In this report, we therefore distinguish *output* and *input* classifications. In addition, a classification used for statistical purposes will generally have some rules that make it suitable for that purpose. These include being comprehensive and having no overlapping categories. Some of the classifications presented below do not comply with those rules.

### Children’s risk-prone behaviour

78. Some of the online behaviour of children and young people may be considered ‘risky’ in terms of exposure to online threats. For the purposes of this report, risk-prone behaviour includes certain activities that could increase risk and the amount of time spent online.<sup>10</sup> A number of surveys and studies have examined these activities, which broadly include:

- Propensity to generate content (called user-created/generated content, Web 2.0 and participative web). OECD (2008) discusses user-created content (UCC), which it characterizes as publicly available over the Internet, non-commercial and reflecting creative effort. UCC activities include social networking, virtual worlds, blogs, wikis,

feedback, sharing photos, videos etc. OECD notes the relationship between UCC and the protection of children and expects UCC to grow due to new drivers such as the increased use of mobile phones to access the Internet and mobile content (OECD, 2008);

- Communicating online via email, instant messaging, chat sites and online forums etc. The child may not know some of those with whom they are communicating. This could pose a particular threat (such as ‘online grooming’<sup>11</sup>);
- Time spent online (measuring excessive use of the Internet); and
- Other risk-prone behaviours per the recommended scope of COP measurement include online gaming and use of the Internet to acquire goods and services.

79. Various surveys have effectively created classifications of risk-prone behaviours by asking about those behaviours in questionnaires. These are described below and more information can be found in Annex 2.

- A major objective of the National Teen Internet surveys of 2006 and 2007 (US) conducted by Cox Communications (2007) was to measure online teenagers’ (13-17 year olds) tendency to exhibit potentially risky behavior via the Internet and other forms of virtual communication (such as, text, email, and instant messaging). Risky behaviours included whether teens had posted a fake age online, created online profiles, created public online profiles, and posted personal information or photos of themselves online.
- The Eurobarometer 2007 Survey (Safer Internet for children) was a qualitative study of 29 European countries, aimed at children aged 9-10 and 12-14. Among other things, the study asked about various activities, some of which could be considered risky (EC, 2007).
- The Crimes against Children Research Center (US) ran studies in 2000 and 2005 (YISS-1 and YISS-2) (Wolak *et al.*, 2006). They conducted telephone interviews with national samples of Internet users aged 10 to 17 and asked about various risky activities.
- Some national statistical offices also collect information on risk-prone Internet activities. They include the European countries (through the Eurostat model survey), Singapore (IDA), Australia (ABS), Thailand (National Statistical Office of Thailand) and the Republic of Korea (NIDA).
- Thailand, in its 2007 and 2008-09 ICT Household Survey, asked about Internet activities of respondents (including children) and included the categories “Chatroom & Webboard” and “Game” (National Statistical Office of Thailand, 2007; 2010).
- The Republic of Korea conducted a survey specifically on SNS (social networking service) usage by individuals in 2009. Services were categorized as: Online club/community, Blog/minihompy, Instant messenger, Personal networking site and Virtual reality service (NIDA, 2009). More information on this survey is presented in Chapter 5.
- EU Kids Online II will also collect information from children aged 9-16 about their Internet activities. Its categories include activities similar to those described above but, in addition, the questionnaire asks children about posting videos online, virtual worlds and whether an avatar had been created. It also probes children on the type of online communication they undertake, asks details of social networking site profiles and risky online activities such as: looking for new friends, giving personal information to those met online, pretending to be different and sending photos or videos of him/herself to online contacts.<sup>12</sup>

80. Several different types of surveys can be used to measure the time that individuals spend online. They include time use surveys, ICT use surveys and surveys dealing specifically with child online protection. For a statistical framework, the classifications and definitions used in such surveys are of interest. Statistical standards for time use surveys are provided by the United Nations Statistics Division (UNSD), which provides a time use activity classification (the *International Classification of Activities for Time-Use Statistics*). It is not particularly useful for measuring COP as it only has one ICT category (using mass media – computer technology). Other ICT-specific surveys may also include questions on time spent online. They include household ICT use surveys and COP surveys. They ask a variety of questions and tend to group responses by age group. More information on these surveys can be found in Chapter 4.

### Recommendations

Recommended classification, with definitions, for a minimal set of risk-prone behaviours	Source
<b>Purchasing or ordering goods or services</b> <i>Purchase orders placed via the Internet whether or not payment was made online. Orders that were cancelled or not completed are excluded. Includes purchasing of products such as music, travel and accommodation via the Internet (Partnership, 2010).</i>	HH9
<b>Playing or downloading video games or computer games</b> <i>Includes file sharing games and playing games online, either paid or free of charge (Partnership, 2010).</i>	HH9
<b>Downloading movies, images, music, watching TV or video, or listening to radio or music, split into:</b>	HH9
<b>Downloading movies, videos, images, TV programmes or music</b> <i>Includes file sharing (Partnership, 2010).</i>	Split
<b>Watching TV or video, or listening to radio or music</b> <i>Includes using web radio or web television (Partnership, 2010).</i>	Split
<b>Posting information or instant messaging, split into:</b>	HH9
<b>Posting messages to chat sites, social networking sites, blogs, newsgroups and other online discussion forums; use of instant messaging</b> <i>A <u>chat site</u> (also called a chatroom) can be defined as a virtual room, where participants have a chat session. <u>Social networking sites</u> (e.g. MySpace, Facebook) are mostly used for uploading and sharing of audio and video content, they also allow posting of messages and participation in forums on specific topics of interest. A <u>blog</u> (weblog) is a website where entries are made such as in a journal or diary. A typical <u>blog</u> combines text, images, and links to other blogs, web pages, and other media related to the topic of interest and can allow the posting of messages from others. <u>Newsgroups and other online discussion forums</u> cover a variety of interests. The members of a newsgroup view and post messages via a news server on the Internet. <u>Instant messaging</u> means real-time communication between people on the basis of typed text (adapted from Eurostat Methodological Manual, Eurostat 2009a).</i>	Eurostat 2010
<b>Uploading self-created content (text, images, photos, videos, music etc.) to any website to be shared<sup>13</sup></b> <i>This can involve uploading of own produced content to own website or to any other website with the purpose of sharing it with others (Eurostat Methodological Manual, Eurostat 2009a).</i>	Eurostat 2010

81. A minimal and reasonably broad classification of risk-prone activities is recommended and shown above. It is based on several of the existing activities in the *Partnership's* core ICT indicator, HH9, *Internet activities undertaken by individuals in the last 12 months* and Eurostat's 2010 model questionnaire for the Community Survey on ICT usage in Households and by Individuals. Countries wishing to split categories further or add categories can do so.<sup>14</sup> Of particular interest may be the addition of categories on whether the child has one or more online profiles on a social networking site and what kind of information is publicly available (e.g.



real name, contact details). Split categories could show details of information posted *e.g.* photographs.

82. Regarding measurement of time spent online, more standardization of the types of questions asked and the age ranges would be very useful. It is suggested that the best vehicle for such questions is a national ICT household survey. Time use surveys are not recommended as they are directed to adults and there are complications in measuring time spent using ICT (necessitating a secondary classification of 'technology used' to carry out a particular activity).

### Online threats and incidents

83. Online threats (or risks) and incidents are treated together because they are closely related in a definitional and classification sense.

84. There are a number of classification models that have been articulated for online threats and incidents. Some are not statistical in nature and are often implied rather than articulated as a classification. Some have been developed to present or analyse data (output classifications) and others for use on questionnaires (input classifications). These are also often implied. A selection of classifications is presented below and in Annex 2.

85. The COP Guidelines are not statistical in nature and contain implicit definitions and a classification of threats and incidents. In particular, the *Guidelines for Policy Makers on Child Online Protection* describe key risks as shown below.

<b>Content</b>
The Internet's ability to expose children and young people to illegal content, <i>e.g.</i> child abuse material (CAM)
The Internet's ability to expose children and young people to legal but age inappropriate material <i>e.g.</i> very violent imagery.
<b>Contact</b>
The Internet's ability to expose children and young people to sexual predators, be they adults or other minors.
The way in which the Internet may expose children to harmful online communities such as sites that encourage anorexia, self-harm or suicide – as well as sources of political influence espousing violence, hate and political extremism.
<b>Conduct</b>
The way in which the Internet facilitates and can promote risky sexual interactions between children themselves, including encouraging them to take and post pictures of themselves or others (sexting) which, aside from being harmful, may also be illegal.
The way in which some aspects of the Internet encourage children to place in the public domain information about themselves, or post pictures or videos or text which might compromise their personal safety or jeopardize a number of career options for them in the future.
The Internet's ability to expose children and young people to bullying and to allow or promote an environment in which children and young people are encouraged to bully others.
<b>Commerce</b>
The ways in which the Internet has enabled children to access or acquire age inappropriate goods and services, typically goods and services that they could not purchase in person from a shop.
The Internet's ability to expose children and young people to scams, identity theft, fraud and similar threats that are economic in nature or are rooted in inadequate data protection or privacy laws.



<b>Excessive use</b>
The way the Internet seems, with some children and young people, to have encouraged forms of obsessive behavior or excessive use which may have deleterious effects on children's and young people's health or social skills, or both. Games and gaming over the Internet often feature in this type of online behavior, which may be referred to as a form of addiction.
<b>Societal</b>
The way the Internet has opened up a new digital divide among children and young people, both in terms of those who have ready and convenient access to it at home, school and elsewhere, and those who do not; between those who are confident and proficient users of it and those who are not. This divide threatens to entrench or widen existing patterns of advantage and disadvantage or perhaps create new divides.
The potential of the Internet to compound and even magnify the existing vulnerabilities of particular children and young people and add to adversities that they may face in the offline world.

86. The EU Kids Online Project has suggested four groups of risks cross-classified by the mode of communication: child as recipient, child as participant and child as actor (Livingstone and Haddon, 2009b). This results in 12 areas of risk, considered to comprise an *output classification*, as follows:

Risks	Child as recipient	Child as participant	Child as actor
<b>Commercial</b>	Advertising, spam, sponsorship	Tracking/harvesting personal information	Gambling, illegal downloads, hacking
<b>Aggressive</b>	Violent/gruesome/hateful content	Being bullied, harassed or stalked	Bullying or harassing another
<b>Sexual</b>	Pornographic/harmful sexual content	Meeting strangers, being groomed	Creating/uploading pornographic material
<b>Values</b>	Racist, biased info/ advice (e.g. drugs)	Self-harm, unwelcome persuasion	Providing advice e.g. suicide/pro-anorexia

87. OECD (2010) has reviewed several existing classifications and describes the complex nature of such a classification (which it calls a *typology*). OECD suggests other possible criteria for inclusion in a classification of risks, such as whether the child is interacting with a human or a machine and which actors are involved in the risky interaction, for example, between children or between a child and an adult (OECD, 2010). The scope of OECD remit in the topic of child online protection excludes issues related to online child pornography and sexual exploitation (as these are to be addressed in a contribution from the Council of Europe). OECD proposes a typology of online risks for children, with definitions and categories as follows:

Broad category	Second level	Third level
Children as Internet users (Internet as medium of child's exposure to content or child's interaction with others)	Content risks	Illegal and harmful content, harmful advice
	Contact risks	Cybergrooming, online harassment, illegal interaction, problematic content sharing
Children targeted as consumers online	Online marketing	Child inappropriate online marketing, online marketing for illegal or regulated products, unhealthy food and drinks
	Overspending	
	Fraudulent transactions	Online fraud, online scams, identity theft
Information privacy and security risks (risks that all Internet users face but where children are particularly vulnerable)	Information privacy	Personal data, oversharing, unforeseen and long term consequences
	Information security	Malicious code, commercial spyware, online scams, identity theft

88. Various surveys and reports have created or used classifications of online risks and incidents. These are described below and details can be found in Annex 2.

89. INHOPE, the International Association of Internet Hotlines, is a NGO umbrella group. It represents 36 hotlines in 31 countries, covering 21 of the 27 EU member states, as well as Australia, Canada, Iceland, Japan, Russia, South Africa, Korea (Republic of), Taiwan (Province of China) and the United States. Each national hotline deals with what is considered to be illegal content in that country.

90. INHOPE statistics classify and measure processed reports. Their classification of reports (an *output classification*) uses illegality under national law as a defining characteristic of some categories. The classification can be found in Annex 2.

91. One could also devise classifications based on the severity of risk. *EU Kids Online* classifies the overall level of risk as low, medium and high (Livingstone and Haddon, 2009b). Other approaches may rate some threats to children as more serious than others. For instance, paedophile crimes might be considered more serious than risks to children's development arising from time spent playing games online.

92. It is fairly obvious that the task of devising a classification of online risks and incidents suitable for statistical purposes will not be straightforward. While the subject is inherently complex and multi-dimensional, for statistical purposes, simpler or more limited *input classifications* are likely to be required where they are to be included on a questionnaire. In this context, it is useful to look at some classifications that have been used on questionnaires.

93. The Child Online Protection Initiative National Survey was run by ITU in 2009. It was an online survey directed to national governments, using tickbox responses. The first block of questions, ("The problems"), constitutes an input classification at a broad level and is shown in Annex 2.

94. Perhaps the most internationally comparable surveys in this area are those conducted by Eurobarometer and covering the European countries. Eurobarometer 2008 (*Towards a safer use of the Internet for children in the EU – a parents' perspective*) asked parents about situations on the Internet that children could not handle. The classification of *situations* is shown in Annex 2 (EC, 2008).

95. The Eurobarometer 2005 Survey (EC, 2006) asked a yes/no question of parents "Do you think your child has ever encountered harmful or illegal content on the Internet?" A follow-up question asked where the incident occurred.

96. Eurostat's 2010 country questionnaire for the Community Survey on ICT Usage in Households and by Individuals, includes a module on Internet security. The security related problems asked about include "Children accessing inappropriate web-sites or connecting with potentially dangerous persons from a computer within the household" (Eurostat, 2009b).

97. The second US Youth Internet Safety Survey (YISS-2) (Wolak *et al.*, 2006) asked about three kinds of victimization – sexual solicitation and approaches, unwanted exposure to sexual material, and harassment, with follow up questions on what activity the respondents were

doing when the incident occurred. Classifications of incidents and activities can be constructed from the question wording, as shown in Annex 2.<sup>15</sup>

98. In 2009, the Australian Bureau of Statistics (ABS) conducted a Children's Participation in Cultural and Leisure Activities (CPCLA) Survey. As in previous years, the survey included a number of questions on the use of ICT by children aged between 5 and 14. In 2009, the survey asked several questions relevant to child online protection, covering the Internet and mobile phones. The list of Internet problems experienced is shown in Annex 2.

99. The UK Children Go Online Project was undertaken between 2003 and 2005. It involved a face-to-face survey of 1 511 children and young people aged 9-19, together with a survey administered to 906 of their parents.<sup>16</sup> There was also a series of focus group interviews and observations exploring children's use of the Internet. The study is useful because it enabled contrast between the views of children and their parents with regard to online risks and threats. Both the child and parent questionnaires suggest classifications of online threats, as shown in Annex 2.

100. EU Kids Online II will collect information from children about their online experiences. The questionnaire will ask about bullying activities (the child as victim and perpetrator), pornography seen, offline meetings, and sexual messages received and sent.<sup>12</sup>

101. One could also devise classifications based on the severity of risk. In respect of questionnaires, this is likely to be determined subjectively, for example, the YISS-2 youth questionnaire<sup>17</sup> probed the level of distress caused by individual incidents.

### Recommendations

102. The recommendations are limited to input classifications of online threats and incidents, that is, classifications that could be included on questionnaires. For analytical purposes, useful output classifications from OECD and *EU Kids Online* were described above.

103. Input classifications of online threats and incidents may differ depending on the data collection methodology and who the respondents are. In Chapter 5, it is suggested that children be asked about online incidents that they have experienced. Because there is a subjective element to this, it is also suggested that surveys ask about threats and incidents that are simple and not open to different interpretation, as well as being policy relevant. Several questions based on those of the UK Children Go Online Survey are provided in Chapter 5.<sup>16</sup>

104. The implied classification is:

Online encounters resulting in offline meetings – whether the child has ever met anyone face to face that s/he first met on the Internet <sup>18</sup>
Pornography – whether the child has ever ended up on a porn site accidentally when looking for something else
Pornography – whether the child has ever received pornographic junk mail by email/instant messaging
Pornography – whether the child has ever been sent porn from someone s/he met on the Internet
Hate sites – whether the child has ever ended up accidentally on a site that was hostile or hateful to a group of people
Violent or gruesome images – whether the child has ever ended up accidentally on a site with violent or gruesome pictures

### Children's responses to incidents

105. Some surveys collect information about how children have responded to online threats. For instance, the UK Children Go Online Survey asked children about their responses to the threats, *unwelcome sexual comments* and *nasty or hurtful things*. The questions and set of responses are shown in Annex 2.

106. The YISS-2 youth questionnaire<sup>17</sup> asked a number of response questions as follow up questions on incidents. They included questions on:

- Reactions to requests to send sexual pictures;
- Whether the child had returned to chat rooms where incidents had occurred;
- Whether the child had met online acquaintances in person;
- Whether after incidents, the child or his/her family had installed any blocking, filtering or monitoring software on the computer;
- Whether the child talked to anyone about the incident; and
- Whether the incident was reported to an Internet service provider, the police, or any other place to be investigated.

107. EU Kids Online II will ask children about responses and reactions to bullying, pornographic images, offline meetings and sexual messages.<sup>12</sup>

### Recommendations

108. Few surveys appear to have asked about children's responses to an online threat or incident. Examples from the UK Children Go Online Survey child questionnaire and the YISS-2 youth questionnaire are shown in Annex 2. This report does not recommend any particular classification of responses as they are very dependent on the preceding 'incidents' questions. They may also be prone to mis-reporting for reasons discussed in Chapter 5. The EU Kids Online II questionnaire may present a good model for questions about responses. The survey is being conducted during 2010; survey materials and the first findings are expected to be released later in 2010.

### Preventive measures

109. A number of guidelines and surveys contain implied classifications of preventive measures. The COP Guidelines for children have proforma contracts for parents and children that are lists of things they promise to do to ensure child safety on the Internet. A number of items on these lists are preventive measures, which can be presented as a classification as follows:<sup>19</sup>

<b>Parent preventive measures (per parent contract)</b>
I will get to know the services and websites my child uses.
I will set reasonable rules and guidelines for computer use by my children and I will discuss these rules and post them near the computer as a reminder.
I will try to get to know my child's "online friends" and Buddy List contacts just as I try to get to know his or her other friends.
I will try to provide close support and supervision of my younger children's use of the Internet, for example by trying to keep their computer in a family area
I will report suspicious and illegal activity and sites to the proper authorities.
I will make or find a list of recommended sites for children.
I will frequently check to see where my kids have visited on the Internet.
I will seek options for filtering and blocking inappropriate Internet material from my children.
I will talk to my kids about their online explorations and take online adventures with them as often as I can.
<b>Child preventive measures (per child contract)</b>
Wherever possible I will choose a safe and sensible screen name for myself that will not broadcast any personal information about my family or me.
I will keep all of my passwords private.
I will discuss with my parents all of the different programmes and applications I use on my computer and on the Internet, and talk to them about the sites I visit. Before I download or load a new programme or join a new site I will check with my parents first to make sure they approve.
When considering signing up to a new online service I will avoid those which demand too much personal information and try to opt for those which ask for less.
I will always take steps to find out what personal information about me will be published by the service by default in my profile and will always opt for the maximum degree of privacy.
I will not share my personal information, or that of my parents or any other family member, in any way, shape or form, online or with someone I meet online. This includes, but is not limited to name, address, telephone number, age or school name.
I will treat others the way I want to be treated.
I will use good manners when I'm online, including good language and respect. I will not pick fights or use threatening or mean words.
I will make my own personal safety my priority, since I know there are some people who might be online and pretend to be someone they're not.
I will be honest with my parents about people I meet online and will tell them, without always being asked, about these people. I won't answer any e-mails or instant messages from anyone my parents have not approved.
If I see or read things that are bad, icky or mean, I will log off and tell my parents so they can try to make sure it never happens again.
I will tell my parents if I receive pictures, links to bad sites, e-mail or instant messages with bad language or if I'm in a chat room where people are using swear words or mean and hateful language.
I will not send anything in the post to anyone I've met online, without my parents' okay. If I get something in the post from someone I've met online, I'll tell my parents immediately (because that means they have my private information).
I will not do anything online that someone asks me to if it makes me feel uncomfortable, especially if I know it's something my parents would not be happy about or approve of.

110. The COP *Guidelines for parents, guardians and educators* suggest a number of actions that could also be used as a classification of preventive measures, as follows:

<b>Parents, guardians and educators</b>	
Safety & security of your personal computer	Keep the computer in a common room
	Install firewall and antivirus software
Rules	Agree house rules about using the Internet and personal devices
	Agree rules for mobile use
Education	Parents should become familiar with the Internet sites used by their children and have a good understanding of how children spend their time online
	Investigate online resources for further information about online safety and how to use the Internet in a positive way
	Understand how children use other personal devices such as mobile phones, games consoles, MP3 players and PDAs
Internet sites features review	Consider whether filtering and blocking or monitoring programmes can help support or underpin children's and young people's safe use of the Internet and personal devices. If you use such software explain what it does and why you are using it to your children. Keep confidential any relevant passwords linked to these programmes. (includes use of filtering and blocking or monitoring programmes)
	Parental consent
	Control use of credit cards and other payment mechanisms
	Ensure age verification is implemented when purchasing goods and services online
	Check if the Internet site uses moderation
	Block access to undesirable content or services
	Check contractual flexibility
	Look at the service scope
	Observe advertising, and report inappropriate advertising
Children's education	Educate your children
	Explain to children to never arrange to meet in person someone they first met online
	Prevent children from sharing personally identifiable information
	Ensure children understand what it means to post photographs on the Internet, including the use of webcams
	Warn children about expressing emotions to strangers
Internet sites safe usage review	Check your child's page or profile
	Ensure children follow age limits of the Internet site
	Ensure children do not use full names
Communication	Communicate with your children about their experiences
<b>Educators</b>	
Safety and security as part of child protection strategies	Use a whole-establishment approach towards responsibility for e-safety
	Develop an acceptable use policy (AUP)
Rules and policies	Sample AUPs are available both online and via local authorities
	Link AUPs with other school policies
	Single point-of-contact
	Need for leadership

Be inclusive	Maintain awareness amongst young people
	Support resiliency
	Encourage disclosure of harms and responsibility taking
Technological solutions	Audit practice
Internet safety policy	Educate teachers on Internet safety policy
	Teach students to never give out personal information when communicating with others
	Require students to search for specific information only
	Preview or test websites before sending links to students

111. A number of household surveys have asked questions about preventive measures. These can be used to construct implied *input* classifications. The surveys are described below, with more information shown in Annex 2.

- Eurobarometer 2008 (Towards a safer use of the Internet for children in the EU – a parents' perspective) asked parents a number of questions on the actions they took to ensure online safety of their children (EC, 2008).
- Eurostat's questionnaire for the 2010 Community Survey on ICT usage in Households and by Individuals includes an Internet security module, which has a question on whether a parental control or a web filtering software is used.
- The UK Children Go Online Project included surveys of children and their parents.<sup>16</sup> The child questionnaire included a number of questions about online security, including appropriate computer software, whether particular sites or activities are blocked or filtered on their home computer, what parents do when the child is on the Internet (e.g. expect you to tell them whenever you go online) and other questions about parents (e.g. whether they know how to check which websites the child has visited). Children were also asked about rules.
- The UK Children Go Online parent questionnaire included similar questions, including whether they used the rules that were asked about in the child questionnaire.
- The Australian 2009 survey, Children's Participation in Cultural and Leisure Activities (CPCLA) (ABS, 2009a) asked about actions taken for personal safety and security in home Internet use and mobile phone use.
- The Japanese Telecommunications Usage Trend Survey of 2007 asked households with children under 18 about their use, and awareness of, filtering software (on a PC) and services (on a mobile phone) (Ministry of Internal Affairs and Communications, Japan, 2008).
- The YISS-2 parent questionnaire<sup>20</sup> asks "at any time in the past year, has there been software on the computer your child uses at home that filters, blocks, or monitors what your child does or sees online?" It then asks about various blocking, filtering or monitoring software measures (see Annex 2 for details).
- The EU Kids Online II questionnaire will include some questions asked of children about mediation of parents, peers and teachers, as well as safety advice received from others (including ISPs, websites and the media). Parents will also be asked about preventive actions they take.<sup>12</sup>

112. The COP guidelines for industry also contain a number of recommended actions, which could be used to construct classifications for each industry. Actions that could be (and are) taken by industry are discussed in Chapter 6.

113. A very important aspect of prevention covers the measures employed by governments. The COP guidelines for policy makers contain a number of recommended actions. There are two known surveys directed to governments that ask about policy responses to the problem. The first is the Child Online Protection Initiative National Survey that was run by ITU in 2009 (ITU, 2009g). Apart from the questions on problems (discussed above), the questions constitute a broad classification of preventive measures, with tickbox responses forming the detailed categories (see Annex 2).<sup>21</sup>

114. The second survey directed to governments is the APEC Children Protection Project Survey, which asked member countries open-ended questions about policy responses as shown in Annex 2.

### **Recommendations**

115. As indicated above, and in Chapter 6, there are a large number of potential preventive measures and they can be taken by various actors in the statistical framework. The most common form of measurement is using household surveys to ask questions directed at parents (or other adult respondents) about rules and actions they take to protect children under their care. However, other actors, such as governments, ISPs and children themselves, have also been included in surveys.

116. As discussed in Chapter 6, measurement of preventive actions taken by parents and actions taken by governments seem to be the most likely candidates for creating a set of internationally comparable data. Therefore, classifications dealing with those measures are proposed here.

117. Concerning measures taken by parents, existing questions cover three broad areas: rules for children's Internet use, measures taken by parents at home and use of software. A minimal classification is proposed below (based on questions from Eurobarometer 2008, CPCLA and UKCGO). As with online incidents, options that appear to be simple, not open to interpretation and policy-relevant have been selected. Countries may add to, or further split, the categories using the examples presented above and in Annex 2.<sup>14</sup>

118. EU Kids Online II may present a model for asking children about preventive actions taken by peers and teachers (as well as parents). More information, including results and survey material, will be available from later in 2010.

119. Concerning measures taken by governments, ITU's Child Online Protection Initiative National Survey categories are presented in Annex 2. Subject to further analysis on the usefulness of those categories, it is suggested that they be considered as a classification for the preventive measures of governments in the area of child online protection.



<b>Parents' rules applying to children's Internet use – things that s/he is not allowed to do (at home or elsewhere)</b>
Give out personal information
Buy goods or services online
Talk to people they don't know in real life
Spend a lot of time online
Create a profile in an online community
Use chat rooms
Download movies, videos, images, TV programmes or music
Download or play games
<b>Protective measures taken by parents at home</b>
Placing the computer in a public area of the house
Talking to the child about what s/he is doing or did online
Sitting with your child when s/he is on the Internet
<b>Use of software</b>
Installing Internet filter software on the computer the child uses at home
Installing monitoring software on the computer the child uses at home

## **Indicator groups**

120. It is perhaps helpful to include indicator groupings in a statistical framework. While not necessarily an element of a statistical framework, it could help to visualize the topic in statistical terms. The indicator groups proposed are outlined below and detailed in the chapters following.

### **Context**

121. For this report, context indicators are those that show the background conditions to the subject being measured. Chapter 3 examines a number of context indicators in the following sub-groups.

#### ***Internet access and use***

122. These indicators use available data to show the extent of, and growth in, Internet access and use. Indicators include Internet subscribers (broadband and narrowband); access to, and use of the Internet by households, individuals and schools; and means of Internet access (including mobile access). Indicators on use of the Internet by individuals can be classified by age, thus giving indicators for children. However, not all countries collect data in respect of children.

#### ***Growth of the Web***

123. Data include growth in the number of websites, Internet traffic and the growth in registrations on social networking sites.

### **The subjective aspects of child online protection**

124. A number of surveys ask respondents questions designed to gauge subjective information such as their awareness (*e.g.* of Internet risks), their concerns (*e.g.* about those risks) and their attitudes (*e.g.* what should be done about those risks). These subjective elements are examined in detail in Chapter 4.

### **Children's risk-prone behaviour, incidents and children's responses**

125. Perhaps the central areas of measurement for the field, child online protection, is to measure what children are doing that expose them to online threats, what incidents result from that behaviour and how children respond to those incidents. These aspects are examined in Chapter 5.

### **Preventive actions**

126. Preventive measures are examined in Chapter 6. Such measures may be taken at a number of levels and by a number of actors. In this report, we mainly consider preventive measures taken by governments (the policy response) and those taken by children and their parents. The possibility of collecting information from ISPs is also explored.<sup>22</sup>

### **Data collection models and methods**

127. Reflecting the diversity and complexity of the topic, data collection models and methods are varied. The main approaches are outlined below.

#### **Surveys**

128. Much of the available data on this topic are collected by surveys of households and individuals. Respondents are usually adults but may be children (though this is less common). Household surveys can be conducted in a number of ways, including face-to-face interview, telephone interview and online. For more information on household surveys on ICT topics, see ITU (2009f).

129. Other surveys include those of governments (two examples are outlined above) and of the ICT sector (for instance, surveys of ISP businesses).

130. Surveys of individuals are often distinguished by whether they are qualitative or quantitative. In some cases, both types are used within an individual study. The differences and merits of each kind of survey have been discussed in several publications, including Lobe *et al.* (2008), EC (2008) and the final report from the Internet Safety Technical Taskforce (2008). The latter explains the differences as follows "Some research questions are better answered by a certain methodology or research design. For example, questions that begin with "why" or "how" are often more adequately addressed through qualitative approaches than quantitative ones. Qualitative scholarship is better suited for providing a topological map of the issues, and quantitative scholarship can account for frequency, correlation, and the interplay of variables."

131. Our main interest in this report is studies that are quantitative, thereby enabling comparison of results over time and between countries. However, smaller qualitative studies that form part of the design of larger scale quantitative surveys may be very valuable (the “combined approach” described by Lobe *et al.*, 2008).

### **Byproduct data**

132. This refers to data collection where statistics are a byproduct of a non-statistical activity. In the area of child online protection, a major activity is that of helplines/hotlines/tiplines. Statistics are available from some of these services. The aim of data collection is to report on the volume and nature of contacts and to focus policy makers on particular problems. While useful information can be obtained from this source, its major failing for statistical purposes is that it is biased. This issue is explored further in Chapter 5, where the use of these sources for measuring incidents is described and assessed.

### **Other**

133. There are various measures of the Internet, including estimates of its size and the number of websites in existence.

## Endnotes

- <sup>1</sup> EU Kids Online is currently in a second phase which will run from 2009 to 2011, see <http://www.lse.ac.uk/collections/EUKidsOnline/>. EU Kids Online II includes a quantitative survey across European countries, to be conducted in 2010.
- <sup>2</sup> Community Member States and additional European Economic Area countries.
- <sup>3</sup> All outputs of the project are available from <http://www.lse.ac.uk/collections/EUKidsOnline/Default.htm>.
- <sup>4</sup> See Lobe *et al* (2008) for a discussion on interviewing children about COP topics.
- <sup>5</sup> Conducted by the Crimes against Children Research Center (CCRC) at the University of New Hampshire. The youth questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq_YISS2.pdf).
- <sup>6</sup> The YISS-2 youth questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq_YISS2.pdf).
- <sup>7</sup> See Chapter 5 for a discussion on the limitations of such statistics.
- <sup>8</sup> Its current members are Eurostat, the International Telecommunication Union (ITU), the Organisation for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development UNCTAD, the United Nations Department of Economic and Social Affairs (UNDESA), the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS), the World Bank, and four United Nations Regional Commissions (the UN Economic Commission for Africa, the UN Economic Commission for Latin America and the Caribbean, the UN Economic and Social Commission for Asia and the Pacific, and the UN Economic and Social Commission for Western Asia). For further information on the objectives and activities of the *Partnership*, see <http://www.itu.int/ict/partnership>.
- <sup>9</sup> For a discussion of the statistical challenges of such classifications, see ITU (2009f).
- <sup>10</sup> There are also positive aspects to these activities, though these are not a focus of this report. The final report from the EU Kids Online project (Livingstone and Haddon, 2009b) explores both risks and opportunities associated with Internet use and recommends policies that minimise risks and maximise opportunities.
- <sup>11</sup> Online grooming has been described in United Kingdom legislation. Section 15 of the Sexual Offences Act 2003 makes it an offence for "... an adult who has established contact with a child on at least two occasions to meet, or travel with the intention of meeting a child, with intent to commit a sexual offence against that child." See [http://www.fkbko.co.uk/root/Parents/cyberwellness/Sexual\\_health/Grooming1.htm](http://www.fkbko.co.uk/root/Parents/cyberwellness/Sexual_health/Grooming1.htm) for further information.
- <sup>12</sup> Overview of question areas, <http://www.lse.ac.uk/collections/EUKidsOnline/Questionnaireoverview1.3.10.pdf>.
- <sup>13</sup> The last response item, if collected in a dedicated COP survey, could be supplemented with questions on who the content is being shared with. If information about the activities is collected in an ICT household survey, such probing may not be possible.
- <sup>14</sup> The advice offered in ITU (2009f) on avoiding bias when splitting or adding categories should be considered.
- <sup>15</sup> This is not the exact question wording.
- <sup>16</sup> The UKCGO child questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO\\_ChildQuestionnaire.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO_ChildQuestionnaire.pdf). The parent questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%20Questionnaire.pdf).
- <sup>17</sup> The YISS-2 youth questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq_YISS2.pdf).

<sup>18</sup> Such incidents may also be positive. Chapter 5 proposes questions on offline meetings that include an evaluation question on the offline meeting.

<sup>19</sup> Please note the comments earlier in the chapter about some classifications not complying with the rules generally pertaining to statistical classifications.

<sup>20</sup> The YISS-2 parent questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Parentq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Parentq_YISS2.pdf).

<sup>21</sup> The wording has been changed in a number of places to better illustrate the classification inherent in the questions.

<sup>22</sup> A small number of countries run surveys of ISPs. Were this more widespread, then it could be feasible to ask whether they have mechanisms in place to limit children's exposure to Internet threats.

## Chapter 3. Child online protection: measuring the context

134. This chapter proposes a number of statistical indicators that describe the context in which online threats to children arise and makes recommendations for a set of statistical indicators that apply across countries. Important elements of the context are growth in Internet access and use, and the proliferation of websites and web content. Useful discussions of the history of the Internet and developments since the early 1990's may be found in ITU (2008).

### Internet access and use

135. The work of the Partnership on Measuring ICT for Development was briefly described in Chapter 2. A number of the core ICT indicators defined by the *Partnership* are useful context indicators for child online protection. The core indicators are defined in *Core ICT Indicators* (*Partnership*, 2010). Their availability across countries was described in *Partnership* (2008) and has increased since. At the international level, the data are collected and disseminated by the ITU through its World Telecommunication/ICT Indicators database, and by the UNESCO Institute for Statistics (UIS).

136. The indicators of relevance for this report are in the sets:

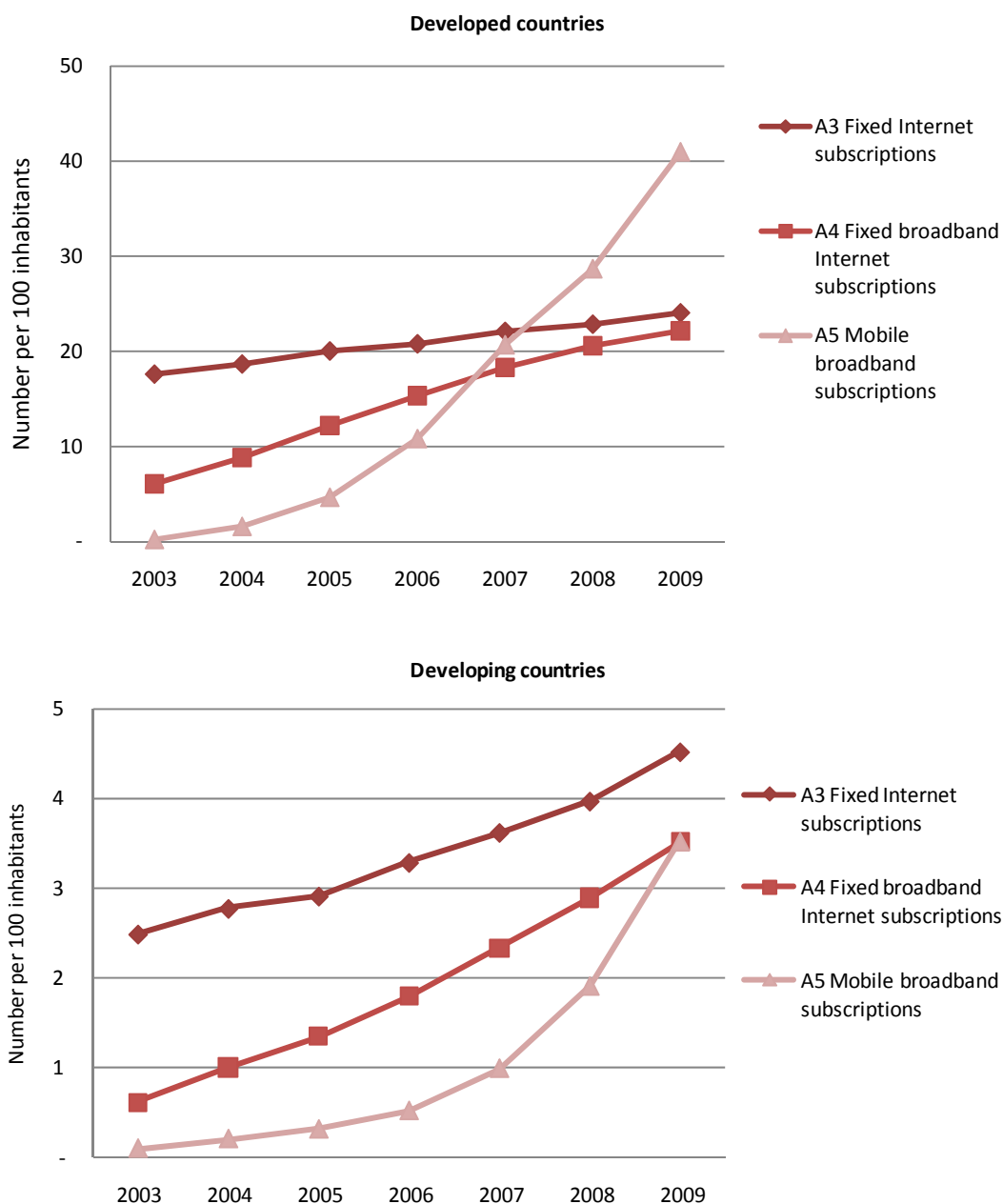
- ICT infrastructure and access;
- Access to, and use of, ICT by households and individuals; and
- ICT in education.

### Internet subscriptions

137. Core ICT infrastructure and access indicators A3, A4 and A5 are shown below. They provide a good overview of growth in the number of Internet subscriptions. The data are collected by ITU and are available for a large number of countries.

A3	Fixed Internet subscriptions 100 inhabitants
A4	Fixed broadband Internet subscriptions per 100 inhabitants
A5	Mobile broadband subscriptions per 100 inhabitants

138. Example 1 shows growth over time in the core indicators A3, A4 and A5 for developed and developing countries.

Example 1. Growth between 2003 and 2009: Internet subscriptions (A3, A4 and A5)<sup>1</sup>

Source: ITU World Telecommunication/ICT Indicators database.

### Access to, and use of, the Internet by households and individuals

139. The core indicators, HH6, HH7, HH11 and HH12 are shown below. They comprise a basic set of indicators showing access to, and use of, the Internet by households and individuals. The indicators are generally produced by national statistical offices and collected annually by ITU. They are widely available for developed economies and also increasingly available for developing countries – in particular, HH6 and HH7 are available for a reasonable number of developing countries and some least developed countries.

HH6	Proportion of households with Internet access
HH7	Proportion of individuals who used the Internet in the last 12 months
HH11	Proportion of households with access to the Internet by type of access:
	Narrowband
	Fixed broadband
	Mobile broadband
HH12	Frequency of individual use of the Internet in the last 12 months:
	At least once a day
	At least once a week but not every day
	Less than once a week

### School access to the Internet

140. The core indicators on ICT in education contain several basic ICT access indicators for schools. Because many children use the Internet at school, it is suggested that ED5, shown below, would be a suitable context indicator. Pilot testing by UIS has shown that the indicator and its categories have reasonable availability across countries.<sup>2</sup>

ED5	Proportion of schools with Internet access by type of access:
	Any Internet access
	Access by fixed narrowband only
	Access by fixed broadband only
	Both fixed narrowband and broadband access

### Changes in means of accessing the Internet

141. Internet access is now possible using a variety of devices, including computers (desktops and laptops), handheld computers, games machines, digital TVs and mobile cellular telephones. Increasingly, Internet access is available through mobile access devices and services, and arguably, this trend is making control of children's Internet use more difficult.

142. The set of core ICT indicators include three that show the development towards use of mobile access. They are A5 and parts of HH8, as shown below. OECD (2008) discusses trends towards mobile Internet access and provides some statistics for OECD countries. Many countries collect data on the device that individuals use to access the Internet via their ICT use surveys. They include European countries (through Eurostat's Community Survey on ICT Usage in Households and by Individuals), Singapore (IDA, 2009), China (CNNIC, 2010), Hong Kong (China) (Census and Statistics Department, 2009). Some European countries, China and Singapore produce some data in respect of children.<sup>3</sup>

A5	Mobile broadband subscriptions per 100 inhabitants
HH8	Location of individual use of the Internet in the last 12 months:
	.....
	Any place via a mobile cellular telephone
	Any place via other mobile access devices



### Children's use of the Internet

143. Data on children's use of the Internet are available for those countries that conduct, and include children within the scope of, household ICT surveys and/or have other relevant collections. Available data may include Internet use by:

- Age
- Gender
- Location
- Activities undertaken
- Frequency of use
- Devices used to access the Internet,<sup>4</sup> and
- Time spent online.<sup>5</sup>

144. ITU (2008) presented data on children's use of the Internet and other ICTs using data from its annual collection of household core ICT indicators and other available sources. Information included Internet and mobile phone use by age and gender, frequency and location of Internet use, and the nature of young people's use of the Internet. Although there were a number of data comparability issues, an interesting picture of children's Internet use emerged (see Example 2).

#### Example 2. Children's use of the Internet: findings from ITU, 2008

Computer use was higher in both the 5-14 and 15-24 year age groups than the general population in all countries for which data were available. With few exceptions, children (5-14) and youth (15-24) were much more likely to use computers and the Internet than the general population. Use of the Internet in the 15-24 year age group was higher than for the general population in all countries for which data were available.

Rates of use of computers and the Internet for all age groups tended to be lower for transition and developing economies than for developed economies, although there were notable exceptions, for example, Hong Kong (China), the Republic of Korea and Singapore.

Available data indicated similar rates of Internet use for boys and girls aged 5-14 in most countries. The situation was similar in the youth age group of 15-24, although there were more exceptions. For most countries, the situation for the general population was different from that pertaining to young people, with a much higher gender gap in Internet use, in favour of male users.

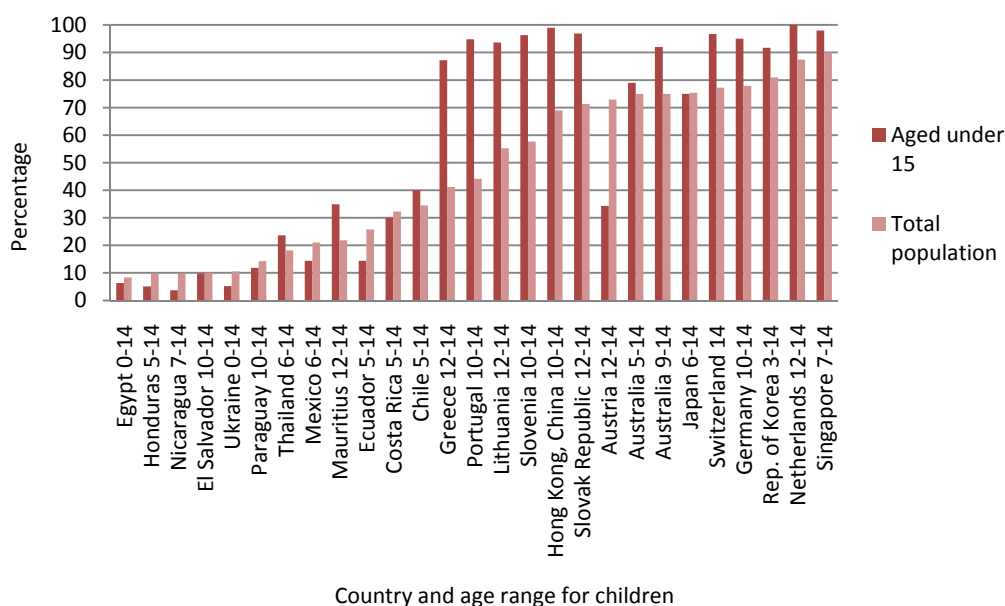
For children and youth in developed economies, home was the most likely location of Internet use. This generally reflected the higher level of home Internet access in developed economies. The more developed Asian economies showed similar patterns of location of use to the developed economies. Among other developing economies, home was less important as a place of Internet use, reflecting lower levels of household Internet access.

Children and youth who use the Internet were quite likely to use it at a place of education. For most economies, children had higher rates of use at a place of education than youth.

Source: ITU, *Use of Information and Communication Technology by the World's Children and Youth: a Statistical Compilation*, 2008.

145. Example 3 shows available data on use of the Internet for children under 15 compared with the total population.

Example 3. Proportion of Internet users, children under 15<sup>6</sup> and total population (HH7)



Source: ITU World Telecommunication/ICT Indicators database, ABS (2009a), Census and Statistics Department, Hong Kong, China (2009), IDA (2009).

146. Of particular relevance to the current topic is the nature of children's use of the Internet. Young people tend to use the Internet in different ways from older people and some of their online activities may be more 'risky' in terms of exposure to threats. Such activities are examined in Chapter 5. Time spent online is a more direct aspect of children's online safety and is also examined in Chapter 5.

147. Suitable context indicators are based on some of the core indicators described above and include use of the Internet by children (HH7), location of that use (HH8) and frequency of use (HH12). While a further split by age and gender would provide useful information, it is unlikely to be feasible for many countries. Many surveys of ICT use ask questions on these aspects of Internet use, although not all include children within their survey scope. For example, the age scope of Eurostat's Community Survey on ICT Usage in Households and by Individuals varies by country, with many European countries unfortunately excluding individuals under the age of 16 from the scope of their national survey.<sup>7</sup>

## Growth of the Web

148. Cisco Systems Inc (2009) compiles forecasts of global Internet Protocol (IP) traffic, with the core methodology relying on analyst projections (Internet users, broadband connections, video subscribers, mobile connections, and Internet application adoption). Estimates are split by type of traffic, segment and geography. For a context indicator, we are most interested in the consumer segment, where traffic is split by region and sub-segment (Web/email, File sharing, Internet gaming, Internet voice, Internet video communications, Internet video to PC, Internet video to TV and Ambient video).<sup>8</sup> See Example 4 for examples of forecast data.

#### Example 4. Growth in global IP traffic

Global Internet Protocol (IP) traffic is projected to quintuple between 2008 and 2013, with a compound annual growth rate of 40%. Regionally, IP traffic is growing fastest in the Middle East and Africa (with a rate of 51%), followed closely by Latin America.

The compound annual growth rate of the consumer segment is 42% between 2008 and 2013. Of the sub-segments, strong growth is projected for the video categories and for Internet gaming. Strong compound annual growth is also projected for all regions, with Africa the highest at 56%.

The compound annual growth rate of mobile data<sup>8</sup> between 2008 and 2013 is estimated at 131%, though is mobile data is very small relative to Internet (in 2008, 33PB compared with 8 126PB).

Source: Cisco Systems Inc (2009).

149. OECD (2009b) describes change in the number of Internet hosts as a leading indicator for measuring growth of the Internet. Surveys are conducted by Internet System Consortium (ISC) of Internet hosts, which are devices connected to the Internet with a unique IP address. Internet hosts include web servers, mail servers and ISP ports. Survey estimates of Internet hosts may underestimate the size of the Internet as they exclude some hosts. OECD (2009b) uses domain name registrations as an indication of the growth in websites. They can be measured as either/both top level domain registrations (for example, .com) and country code top level domains (for example, .com.au). Between 2000 and 2008, the number of domain name registrations increased six-fold. While data for country code top-level domain registrations are available by country, they may not indicate web growth in that country (as registrations requirements and costs may vary for individual countries, leading registrants to register in another domain).

150. According to web analytics consultant, Antezeta (2010), there are three main ways of measuring website usage and all have limitations. They are:

- User-centric, via measuring what individual users do (e.g. what websites they visit);
- Site-centric, measuring how visitors interact with a particular website; and
- Network-centric, collecting data from ISP networks.

151. The Web Analytics Association aims to “... develop common vocabulary, definitions and standards for measuring and reporting web metrics.” It has prepared a definitions document (WAA, 2008) that illustrates the complexity of measurement in this area.

152. Not all the website measurement companies have an international scope. Those that do include Alexa, comScore and Nielsen.

153. Alexa provides global web ranking for the top 500 websites (Alexa, 2010). Its rankings for common websites are shown in Example 5. While *Facebook* is ranked number 2 by Alexa overall, it ranks number 1 in Indonesia, Malaysia, the Philippines and Singapore. It ranks number 5 or less in many developed and developing countries. While its ranking is very high in many countries, as a proportion of visits, most countries contribute less than 5 per cent of visits. The US contributes 30 per cent of visitors.

154. According to its website, comScore (2010) employs an Internet panel of over 2 million people from 170 countries and applies harmonized metric definitions, panel recruitment

approaches and data collection methodologies. ComScore data on worldwide unique visitors for December 2009 and January 2010 data were cited by *Facebook* in February 2010 (Facebook, 2010a). The data compared *Facebook*, *MySpace* and *Twitter*. ComScore (2009) reported worldwide *Twitter* growth data between February 2008 and 2009 and visitation broken down by age (the group 25-34 are the highest users). ComScore released global social networking data for June 2007 and 2008 (comScore, 2008) showing year on year growth in unique visitors (15 years and over) by region. See Example 5.

**Example 5. Growth in social networking, audience aged 15+, home and work locations, 2007 to 2008**

	Unique visitors (thousands)		
	June 2007	June 2008	percentage change
Worldwide	464 437	580 510	25%
Asia Pacific	162 738	200 555	23%
Europe	122 527	165 256	35%
North America	120 848	131 255	9%
Latin America	40 098	53 248	33%
Middle East-Africa	18 226	30 197	66%

Source: comScore World Metrix (comScore, 2008).

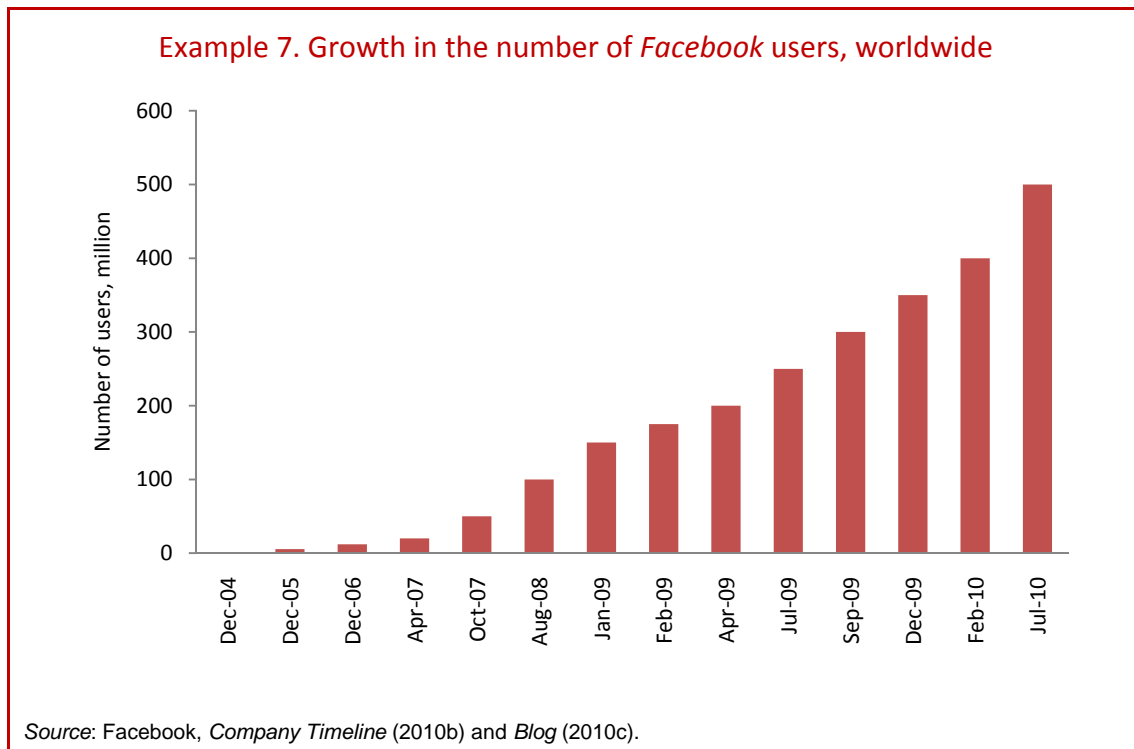
155. Nielsen/NetRatings provides ranks of global web parent companies (The Nielsen Company, 2010).<sup>9</sup> These rankings are shown in Example 6. Unique audience ranges for the top 5 sites ranged from 163 to 362 million during January 2010.

**Example 6. Comparison of global rankings of websites, January and February 2010**

Site	Alexa	Nielsen
Google	1	1
Facebook	2	4
Youtube	3	Included in 1 (owned by Google)
Yahoo	4	3
Live/Microsoft	5	2
Ebay	23	5
Twitter	12	Not ranked in top 10
MySpace	17	Included with Newscorp (ranked 9)

Source: Alexa (2010), The Nielsen Company (2010).

156. Another way of gauging the growth and prominence of social networking websites is to look at user registration statistics. Facebook's *Company Timeline* (2010b) and *Blog* (2010c) provide information on the number of active users and Example 7 shows the growth in users since its inception in February 2004. Of the active users at March 2010, a quarter (100 million) accessed *Facebook* through mobile devices (Facebook, 2010d).



157. Facebook (2010e) provided information on the number and growth of users in the US and other selected countries at the start of 2010. For example, according to Facebook, there were 17 million users in Indonesia at 2 January 2010, with a monthly growth rate of 13 per cent. Other high growth rates were observed for India and Thailand (both 12 per cent) and Malaysia (10 per cent).

## Recommendations

158. Table 1 below shows the context indicators recommended as part of the set of child online protection indicators. The set consists of indicators that are likely to be both reasonably accurate and reasonably available across countries.<sup>10</sup> It is also useful if they are available as time-series, therefore showing change over time. A number of the sources discussed above, while useful, are not recommended as they do not comply with the conditions of accuracy and availability.

Table 1. Recommended context indicators for child online protection

Indicator	Comments	Source <sup>11</sup>
1.1 Fixed Internet subscriptions per 100 inhabitants, aggregated by level of development (developing/developing countries), time-series (see Example 1)	Partnership core indicator A3	ITU
1.2 Fixed broadband Internet subscriptions per 100 inhabitants, aggregated by level of development (developing/developing countries), time-series (see Example 1)	Partnership core indicator A4	ITU
1.3 Mobile broadband subscriptions per 100 inhabitants, aggregated by level of development (developing/developing countries), time-series (see Example 1)	Partnership core indicator A5	ITU
1.4 Proportion of individuals who used the Internet, last 12 months, by country, children aged under 15 and total population, both by gender, latest data (see Example 3)	Partnership core indicator HH7	ITU
1.5 Proportion of households with access to the Internet by type of access, by country, latest data: - Any Internet access - Narrowband - Fixed broadband - Mobile broadband	Partnership core indicators HH6 and HH11	ITU
1.6 Location of individual use of the Internet, last 12 months, by country, children aged under 15 and total population, by gender if possible, latest data: - Home - Place of education - Community Internet access facility - Commercial Internet access facility - Any place via a mobile cellular telephone - Any place via <i>other</i> mobile access devices	Partnership core indicator HH8 (most locations included)	ITU
1.7 Frequency of individual use of the Internet, last 12 months, by country, children aged under 15 and total population, by gender if possible, latest data: - At least once a day - At least once a week but not every day - Less than once a week	Partnership core indicator HH12	ITU
1.8 Proportion of schools with Internet access by type of access, by country, grouped by broad region, latest data: - Any Internet access - Fixed narrowband only - Fixed broadband only - Both fixed narrowband and broadband access	Partnership core indicator ED5	UIS
1.9 Forecast change in Internet Protocol (IP) traffic, current forecast period. <sup>12</sup> (see Example 4) - Global IP traffic by type (Internet, non Internet, mobile) - Consumer Internet traffic by broad region	Indicators of Internet and other IP traffic growth	Cisco Systems
1.10 Change over time in total world number of top-level domain name registrations (global plus country code)	Indicator of global website growth	OECD

## Endnotes

<sup>1</sup> Note the different scale on the y-axis of the two charts.

<sup>2</sup> Personal communication with the UNESCO Institute for Statistics, which developed and pilot tested the ICT in education core indicators.

<sup>3</sup> Though they do not all use the term “mobile” in the same way. For instance, China refers to Internet-enabled mobile phones, while other countries tend to interpret it as any way of accessing the Internet that is independent of location e.g. using a laptop at a WIFI hotspot.

<sup>4</sup> Of the indicators listed here, this is not part of the core ICT indicator set (although access to the Internet by mobile devices is included as part of core indicator, HH8).

<sup>5</sup> Of the indicators listed here, this is not part of the core ICT indicator set.

<sup>6</sup> The age range for children is shown against the country name. Note that country data are not strictly comparable because of differences in age ranges used in national surveys. Very young children tend to use the Internet less than older children so data for countries with a wide age range will generally be biased downwards. To illustrate this effect, two age ranges are shown for Australia – children aged 5-14 and children aged 9-14. It can be seen that the proportion is lower when younger children are included.

<sup>7</sup> Eurostat separately tabulates results for those aged under 16 where data are provided by participating countries.

<sup>8</sup> Definitions (Cisco Systems Inc, 2009). ‘Consumer’ includes fixed IP traffic generated by households, university populations, and Internet cafés. ‘Mobile’ is mobile data and Internet traffic generated by handsets, notebook cards, and mobile broadband gateways.

<sup>9</sup> Definitions, [http://en-us.nielsen.com/main/news/news\\_faqs](http://en-us.nielsen.com/main/news/news_faqs): ‘Unique Audience’ includes anyone who went to a site during the reporting period; repeat site visitors are not counted again.

<sup>10</sup> Availability covers the existence of statistics for a particular country and where they do exist, whether they are freely available or a charged product.

<sup>11</sup> These are not necessarily the direct source of the data but are considered to be convenient sources. For instance, ITU compiles indicators using a number of other sources.

<sup>12</sup> The current forecasts (2008-2013) were checked against the previous forecasts (2006-2012) and, for the same years, were reasonably consistent.

## Chapter 4. Measuring the subjective aspects of child online protection

159. As Figure 1 in Chapter 2 shows, the subject of child online protection has a number of subjective elements. This chapter discusses the elements of awareness, concerns, attitudes and the perception of harm. These can be briefly described as:

- Awareness and knowledge of online threats by children and parents, and possibly other actors;
- Concerns about online threats by children and parents;
- Attitudes to online threats, preventive measures and available information, by parents and children; and
- Perception of harm caused by the threat, usually from the child's point of view.

### Survey data

160. Measuring subjective issues can be very difficult and needs to be approached carefully to avoid statistical bias. A number of surveys have tackled the subjective elements of child online protection, using a variety of approaches. Some of these are discussed below.

#### *Eurobarometer surveys*

161. According to the EC, "The quantitative and qualitative Eurobarometer surveys and studies conducted through the Safer Internet Programme are one of the main sources of information concerning the use of online and mobile technologies by children, as well as European citizens' knowledge of ways to protect their children from illegal and harmful content and conduct online."<sup>1</sup>

162. The 2003/2004 survey, *illegal and harmful content on the Internet* (EC, 2004), was the first on the topic of Internet safety. It measured the attitude and awareness of European Union citizens towards illegal and harmful content on the Internet and their knowledge of how to protect their children against it. For instance, the survey asked parents:

- "Do you feel that you need more information or not about how to protect the children from your household from illegal or harmful content and contact on the Internet?";
- "Would you say that the children in your household know what to do if a situation on the Internet makes them feel uncomfortable?"; and
- Do you know where or to whom you can report illegal or harmful content on the Internet?

163. The 2007 survey, *Safer Internet for children* (EC, 2007), was a qualitative study of 29 European countries covering children aged 9-10 and 12-14. It explored children's perceptions of Internet and mobile phone safety. The study used open-ended questions and language suitable for children (for example, "scary" in relation to risks). It involved a lot of probing and exploration of responses by interviewers.



164. The study had a small sample size and, because of this, as well as its qualitative nature, is more valuable for delivering insights than providing statistical output representative of the population of children.

165. One of the themes was children's perceptions of problems and risks associated with the Internet and mobile phones. Children were given the opportunity to discuss the risks they were aware of ("things that you don't like or find scary") and asked if these problems had changed the way they used the Internet and mobile phones. They were also asked to rate (via coloured stickers) the applications that were most risky. These were then discussed. The interviewers followed this with questions about specific risks, for instance, shocking images and relating with strangers online. The interviewers probed further on several aspects, including what the child would do, how serious they felt the problem to be etc.

166. The 2008 survey, *Towards a safer use of the Internet for children in the EU* (EC, 2008), was a more typical household survey and asked parents about their concerns and awareness of online safety issues. It included questions on concerns about particular online threats ("How worried are you..."); awareness of safety measures ("Which of the following do you think..."); sources of information ("Where do you get your information..."); and, where to report incidents ("Where or to whom would you report illegal content..."). The survey was conducted in 27 EU countries and questions were asked of parents of 6-17 year old children, by telephone interview.

### **Eurostat surveys**

167. The 2010 Eurostat Community Survey on ICT Usage in Households and by Individuals contains an Internet security module. It includes a question on concerns related to Internet use, where one of the categories was "Children accessing inappropriate sites or connecting with potentially dangerous persons from a computer within the household". It also asks whether concerns have prevented some Internet activities, for instance, for example, "Providing personal information to online communities for social and professional networking".

### **US surveys**

168. The US Pew Internet and American Life surveys cover a range of social topics, including how ICT is changing behaviour. The Parents & Teens 2006 Survey (Pew, 2007a) provided a picture of US teenagers' activities online and their concerns about (and management of) some online risks. It asked teenagers who had met a stranger online whether they felt "scared or uncomfortable" because of the online encounter. The survey was conducted by telephone interview, with separate interviews for parents and one of their (randomly chosen) children aged 12-17. A series of focus groups preceded the survey. Other Pew reports are described in Chapter 5.

169. The US Youth Internet Safety surveys (YISS-1 and YISS-2) were conducted by the US Crimes against Children Research Center. The YISS-2 youth questionnaire<sup>2</sup> defined incidents in terms of how the child felt about them, for example:

- "In the past year, did you ever feel worried or threatened because someone was bothering or harassing you online?"

- “In the past year when you were doing an online search or surfing the web, did you ever find yourself in a website that showed pictures of naked people or of people having sex when you did not want to be in that kind of site?”
- “How afraid did you feel, on a scale of 1 to 5, with 1 being just a little afraid and 5 being extremely afraid?”

170. The questionnaire also probed awareness of options for reporting incidents. It asked whether the child had heard about a set of options *e.g.* CyberTipline.

171. The US National Teen Internet surveys of 2006 and 2007 (US) conducted by Cox Communications (2007) included questions gauging youth perceptions about the safety or potential risk associated with online activities such as maintaining an Internet profile and posting personal photos.

### **UK Children Go Online surveys**

172. The UK Children Go Online surveys, conducted between 2003 and 2005, measured 9-19 year olds’ use of the Internet. Both children and their parents were surveyed and topics included their attitudes, concerns and perceptions of risks. The methodology used a private (self-completion) part of the questionnaire to ask children about exposure to unwanted or inappropriate content (pornography, spam, advertising and violent/racist content).

173. The child questionnaire includes questions probing awareness and concerns, for example, awareness of publicity campaigns on Internet safety and what things children worry about when using the Internet. The adult questionnaire asks about opinions (in terms of their level of agreement to a set of statements) of the Internet, for example, “It’s safe for children to spend time on the Internet” and “I am concerned that children might see sexually explicit images on the Internet.” The adult questionnaire also probed parents’ ability to assist their children, for example, “(Do you) know how to check which websites your child has visited”, “(Do you) Know how to access your child’s email account”.<sup>3</sup>

### **Recommendations**

174. It is clear from the above discussion, that accurate measurement of subjective issues is very challenging. Where international comparability is required, cultural and language issues are additional challenges. It is suggested that subjective aspects of child online protection not be included in a set of internationally standard indicators of child online protection. In general, they are likely to be difficult and expensive to collect, especially where children are the respondents (because of use of open-ended questions and/or a complex sequence of questions) and it is considered unlikely that reliable internationally comparable data would be achievable.

175. Perhaps an exception to this is probing the level of knowledge (awareness) of some aspects of Internet safety. While some questions on this could be open to interpretation, others may be more clearcut, for instance, questions to parents about whether they know how to check which websites their child has visited or whether children are aware that the Internet can be dangerous (both examples are from the UKCGO questionnaires). Some other questions are

country-specific, for example, awareness of agencies to report incidents to *e.g.* a particular national helpline or tipline.

## Endnotes

<sup>1</sup> [http://ec.europa.eu/information\\_society/activities/sip/surveys/index\\_en.htm](http://ec.europa.eu/information_society/activities/sip/surveys/index_en.htm).

<sup>2</sup> The YISS-2 youth questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq_YISS2.pdf).

<sup>3</sup> The UKCGO child questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO\\_ChildQuestionnaire.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO_ChildQuestionnaire.pdf). The  
parent questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%20Questionnaire.pdf).



## Chapter 5. Measuring children's risk-prone behaviour, incidents and children's responses

176. This chapter discusses statistics on the types of online behaviour of children that might predispose them to threats (risk-prone behaviours), threatening incidents experienced by children when online, and how they have responded to those incidents. Recommendations are made for data collection on this topic and for a set of statistical indicators that could apply across countries.

### Risk-prone behaviour<sup>1</sup>

177. Several studies (reviewed in Internet Safety Technical Taskforce, 2008) have indicated a link between some 'risky' online behaviours and the experience of threatening incidents. However, there are other factors involved, including the characteristics and experience of individual children.<sup>2</sup> Even though these links may not be causal, the level of risk-prone online behaviour may be an indicator of the level of online risk. For the purposes of this report, risk-prone behaviour includes some activities that may increase risk as well as the sheer amount of time spent online. We examine available survey data and social networking website registrations.

### Survey data

#### Children's Internet activities

178. As illustrated in Chapter 3, a number of official country surveys collect data on individuals' Internet activities. Some countries produce such data in respect of children and some ask about activities that are relevant to this report (such as use of social networking sites). However, most countries do not collect much detail. The following surveys include some questions on child online protection (see details on categories in Annex 2):

- As part of the Eurostat *Community survey*, in recent years, European countries have collected data on individuals' use of the Internet to post messages (e.g. to social networking sites) and upload content to be shared (Eurostat, 2009b). Some of those countries include children under 16 in the scope of their survey.
- Singapore has a relatively detailed set of ICT activity questions and includes children in its survey (IDA, 2009). Data are produced for a range of relevant activities, covering the Internet generally and portable ICT equipment (e.g. mobile phones, PDAs and laptops). Example 8 shows 2008 data for Singapore (IDA, 2009).
- The Australian Bureau of Statistics asked about children's activities in its 2009 CPCLA Survey (ABS, 2009a). Those that could be considered 'risky' are: "Using chat rooms, forums or instant messaging", "Playing online games", "Visiting or using social networking websites – such as *MySpace* or *Facebook*" and "Creating [his/her] own online content such as blogs, websites or uploading photos".<sup>3</sup>

- Thailand, in its 2007 and 2008-09 ICT Household surveys, asked about Internet activities and tabulated the results by age of the user. The categories included “Chatroom & Webboard” and “Game” (National Statistical Office of Thailand, 2007, 2010).
- The Republic of Korea in its 2009 Survey of SNS Usage presented a range of data on individuals’ use of social networking services (NIDA, 2009). The survey was conducted in March 2009 and surveyed Internet users, aged 12-49. NIDA defined SNS (social networking service) as “... Internet service that connects users with other users through the Internet, allowing them to build, sustain and manage their social relationships by managing personal network, sharing information, and self expression.” The definition includes a wide range of services, including instant messaging, personal networking sites such as *Facebook* and *MySpace*, and virtual reality services such as *Second Life*. Results on SNS usage are available split by type of service, type of activity, gender, age, educational attainment and occupation. Cross-classifications are available showing type of service used by age and by gender (see Example 9 below).
- In 2010, Egypt conducted a pilot survey on Internet safety issues (MCIT, 2010). Information was collected on a number of COP topics, with questions separately asked of children and their parents. A question on risk-prone activities was asked of children and included similar response categories to those shown in Example 8 below.<sup>4</sup>

#### Example 8. Risk-prone online activities of children and young people, Singapore, 2008

Selected Internet activities	Internet users, last 12 months, all modes of access		
	Aged 7-14	Aged 15-24	All residents aged 7 and over
Instant messaging	14%	35%	19%
Social networking sites	11%	30%	14%
Reading blogs created by others	5%	13%	6%
Chat rooms	8%	10%	6%
Creating or maintaining own blogs	5%	9%	4%
Sharing own photos	0%	2%	1%
Broadcasting self-produced videos	3%	10%	6%
Interactive online gaming	29%	19%	11%
Downloading or watching movies, images etc	4%	15%	7%
Selected activities, portable ICT equipment	Users of portable equipment, last 12 months		
	Aged 7-14	Aged 15-24	All residents aged 7 and over
Instant messaging	11%	37%	17%
Social networking sites	13%	33%	13%
Reading blogs created by others	5%	17%	6%
Chat rooms	4%	12%	4%
Creating or maintaining own blogs	3%	7%	3%
Sending or receiving digital photograph(s)	3%	6%	4%
Downloading or watching movies, images etc	6%	16%	6%
Source: IDA, Singapore (2009).			

**Example 9. SNS usage by type, gender and age, Republic of Korea, 2009**

Social Networking Service	Gender		Age			
	Male	Female	12-19	20s	30s	40s
Online club/community	57%	56%	63%	72%	51%	41%
Blog/minihompy	52%	57%	62%	75%	49%	34%
Instant messenger	47%	48%	47%	69%	45%	28%
Personal networking site	12%	8%	9%	18%	6%	7%
Virtual reality service	5%	4%	6%	8%	2%	2%
Source: NIDA, Republic of Korea (2009).						

179. For more comprehensive information on risk-prone activities, we need to look to non-official sources. Unfortunately, such data are not generally comparable across countries nor available for many countries. However, they provide potential models that a larger set of countries might use.

180. The US Pew Internet and American Life Project was introduced in Chapter 4. Pew reports are based on telephone surveys and, to a lesser extent, focus group studies. Among other things, their reports describe how teenagers use social media (Pew, 2007a,b), how that use is changing (Pew, 2010), how it compares with adult activities (Pew, 2010) and how they manage online identities (Pew, 2007a). The 2009 report, *Teens and sexting*, examined the incidence of teens using mobile phone to send sexually suggestive photos.

181. The reports provide a useful picture of American teenagers' Internet and mobile phone activities, including those that are considered risky for the purposes of this report. Some findings are shown in Example 10.

**Example 10. Some findings from Pew surveys, US**

Nearly a third (32%) of American online teenagers (and 43% of social-networking teens) have been contacted online by complete strangers and 17% of online teens (31% of social networking teens) have "friends" on their social network profile who they have never personally met (Pew, 2007a).

Of American teenagers aged 12-17 owning cell phones, 4% said they have sent sexually suggestive nude or nearly nude images of themselves to someone else via text messaging, while 15% say they have received such images of someone they know via a text message (Pew, 2009).

Use of social networking websites by American teenagers, aged 12-17, is increasing. In September 2009, 73% of Internet users used social networking websites. This compares with 55% in November 2006 and 65% in February 2008. Among Internet users, teenagers are less likely to use Twitter in 2009 than older people (8% compared with 19%) but are more likely to use social networking sites overall (73% compared with 47%). Teenagers are more likely to create and share content than adults, for example, in 2009, 38% of teens created content compared with 30% of adults (Pew, 2010).

Source: Pew Internet and American Life Surveys.

182. The Crimes against Children Research Center (US) ran studies in 2000 and 2005 on children's Internet safety (Youth Internet Safety Survey – YISS-1 and YISS-2) (Wolak *et al.*, 2006). They conducted telephone interviews with national samples of Internet users aged 10 to 17 and asked about a number of risky activities (see Annex 2 for the list of activities). Some comparable data are available for the two years, 2000 and 2005, enabling valuable measures of change over time.



183. The National Teen Internet surveys of 2006 and 2007 (US) conducted by Cox Communications (2007) had a number of common questions, thus enabling some measures of change over a short time. Respondents were 13-17 year old teenagers and interviews were conducted online. A major objective was to measure online teens' tendency to exhibit potentially risky behavior via the Internet and other forms of virtual communication (such as, text, email, and instant messaging). The study compared the experiences of teens with public online profiles with those without and found that the former face greater exposure to Internet risks (for example, received personal messages from someone they do not know, had been harassed or bullied online).

184. The Eurobarometer 2007 survey, *Safer Internet for children* (EC, 2007), was a qualitative study aimed at children aged 9-10 and 12-14. Among other things, the study asked about various activities, some of which could be considered risky (EC, 2007). The activities are listed in Annex 2.

### **Time spent online**

185. An important aspect of children's online behaviour is the amount of time they spend online. One of the risks identified by the COP initiative is excessive use of the Internet (how the Internet can encourage obsessive behavior or excessive use, which may have damaging effects on children's and young people's health and/or social skills). Several different types of surveys may collect data about the time spent online by individuals. They include time use surveys, ICT use surveys and surveys dealing specifically with child online protection.

186. Time use surveys have been conducted by a large number of countries, including developing countries. The United Nations Statistics Division (UNSD) and the Centre for Time Use Research both document countries conducting time use surveys.<sup>5</sup> UNSD recommends statistical standards for time use surveys, including a time use activity classification, the *International Classification of Activities for Time-Use Statistics*.<sup>6</sup> The only classification of relevance to this report is 1414 – *Using computer technology* (part of Division: 141, Core activities: time spent using mass media). Use of computer technology as a tool for other activities, such as communication, is not included in the UNSD classification. However, at least two countries – Australia, for its 2006 Time Use Survey (ABS, 2008a), and the United Kingdom for its 2005 Time Use Survey (ONS, 2006) – have supplementary codes that indicate whether the Internet and/or a personal computer was used for activities such as communicating. One problem with using time use surveys is that they do not cover all locations in detail and will usually only cover adults (though adults may be as young as 15 or 16).

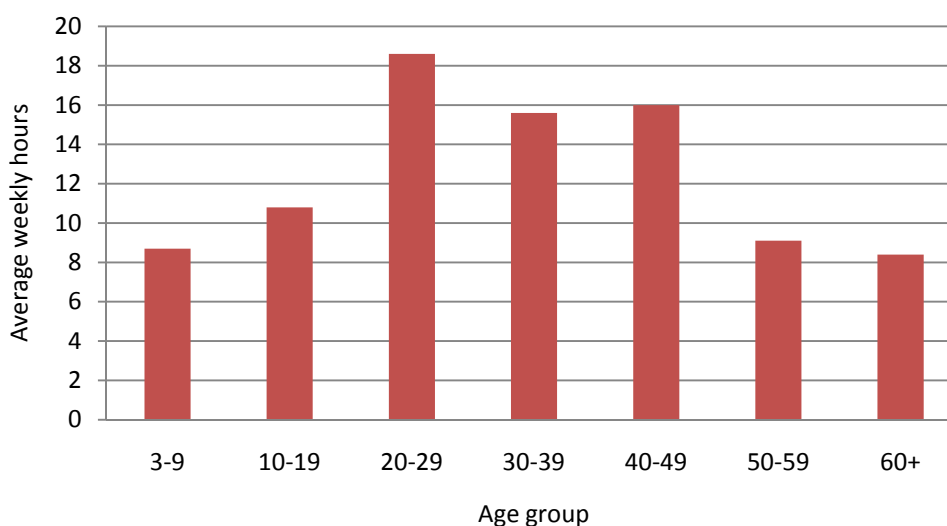
187. While time spent online is not a *Partnership* core ICT indicator, some household ICT surveys include questions on it. For example:

- Australia (usual number of hours per week using the Internet from home, by age range) (ABS, 2009a);
- China (average weekly time online) (CNNIC, 2009);
- Hong Kong (China) (time spent using the Internet per week, by age range) (Census and Statistics Department, 2009);
- Republic of Korea (average weekly time online, by age range) (KISA, 2009); and

- Singapore (average duration of an Internet session, by age range) (IDA, 2009).

188. The five surveys described above all include children. Australia's survey includes children aged 5-14, China covers children aged from 10 years, Hong Kong (China) from 10 years; Republic of Korea from 3 years and Singapore from 7 years. Example 11 shows data from Republic of Korea on weekly average Internet usage hours by age.

**Example 11. Weekly average Internet usage hours, by age, Republic of Korea, 2009**



Source: KISA (2009).

189. Some child online protection surveys have included questions on the time spent online. They include:

- The US Crimes against Children Research Center 2005 *Youth Internet Safety Survey* (how many hours on a usual day when using the Internet);<sup>7</sup>
- The UK Children Go Online Survey (how much leisure time per day);<sup>8</sup>
- The 2007 Eurobarometer qualitative study, *Safer Internet for children* (how often and how much time) (EC, 2007); and
- The 2010 pilot survey on Internet safety issues conducted by Egypt (MCIT, 2010) used the question and categories recommended in Table 2 of this report. It asked children how many hours, on average, they spent on the Internet per week (<5, 5-10, 11-20, 21-30, 31-40, >40).

### **Social networking registrations by age of user**

190. Given that use of social networking sites<sup>9</sup> by children may be a risky behaviour in terms of online threats, it would be useful to have data on the number of registrations by children for such sites.<sup>10</sup> Unfortunately, such data are generally not publicly available. One exception is Facebook, which provides information on the demographic composition of US users (2010d) (but not for other countries at this stage).<sup>11</sup> At 1 March 2010, 11 per cent of US users were aged 13-17, while 28 per cent were aged 18-25 (the largest group). Only 7 per cent of users were

aged 55 or over. Note that these data will be biased to the extent that users provide false age details when registering.

191. Perhaps a more useful representation of the *Facebook* user data is to look at the proportion of each age group in the whole population who are *Facebook* users. This can be done by comparing the numbers provided by Facebook with population estimates for each group. Results are shown in Example 12.

Example 12. Facebook users by age and sex, United States, March 2010							
Facebook users at 1 March 2010							
Age/sex	55-65	45-54	35-44	26-34	18-25	13-17	Total
Female	4 779 660	8 041 540	10 708 140	12 897 800	15 484 600	6 265 460	58 177 200
Male	2 762 400	5 153 300	8 337 400	10 780 500	14 342 400	5 086 920	46 462 920
<b>Total</b>	<b>7 542 060</b>	<b>13 194 840</b>	<b>19 045 540</b>	<b>23 678 300</b>	<b>29 827 000</b>	<b>11 352 380</b>	<b>104 640 120</b>
Proportion of Facebook users in each age group (whole population)							
Female	24%	35%	52%	71%	93%	62%	54%
Male	15%	23%	40%	56%	81%	48%	43%
<b>Total</b>	<b>20%</b>	<b>29%</b>	<b>46%</b>	<b>63%</b>	<b>87%</b>	<b>55%</b>	<b>48%</b>
Facebook growth rates at 1 March 2010, last 28 days, per cent							
Female	4.6	3.1	2.6	0.9	1.5	4.3	
Male	4.3	3.7	5.6	4.5	3.3	5.8	
Source: Facebook (2010e), US Bureau of the Census population estimates, November 2009, <a href="http://www.census.gov/popest/national/asrh/2008-nat-res.html">http://www.census.gov/popest/national/asrh/2008-nat-res.html</a> .							

192. A Nielsen report from March 2009, provided a breakdown of global<sup>12</sup> growth (December 2007 to December 2008) in *Facebook* unique audience by age (The Nielsen Company, 2009). It showed stronger growth in older age groups for both males and females.

## Incidents and responses

### Survey data

193. These are generally surveys of children and/or their parents. There is often a subjective element in some of these questions (for instance, a judgement on what content is “harmful”).

### Eurobarometer surveys

194. The 2005 Eurobarometer survey (*Safer Internet*, EC, 2006) asked parents whether their child had encountered harmful or illegal content on the Internet. An interesting finding is that the proportion reporting ‘Don’t know’ increases with the age of the child.

195. The 2008 survey (*Towards a safer use of the Internet for children in the EU – a parents’ perspective*, EC, 2008) was directed to parents of children aged 6-17. Data collected included whether the child had asked for help when they have encountered an Internet problem (“Has

your child ever asked for your help concerning a situation on the Internet that s/he could not handle?).

### *Eurostat surveys*

196. The 2010 Eurostat Community Survey on ICT Usage in Households and by Individuals, in an Internet security module, asked individuals about their experience of Internet threats in the last 12 months, including “Children accessing inappropriate sites or connecting with potentially dangerous persons from a computer within the household”.

### *US, Youth Internet Safety surveys*

197. The US Youth Internet Safety surveys (YISS) of 2000 and 2005, asked children aged 10-17 about their experiences of online threats, including sexual solicitation, unwanted exposure to sexual material and harassment via the Internet. A feature of the questions is that they specify that the event was unwelcome, for example:

- “Now I have some questions about things that happen to some young people on the Internet. In the past year, did you ever feel worried or threatened because someone was bothering or harassing you online?”
- “In the past year when you were doing an online search or surfing the web, did you ever find yourself in a website that showed pictures of naked people or of people having sex when you did not want to be in that kind of site?”

198. This highlights that responses on incidents can also be subjective – the responding child must consider how they felt about the incident before responding “yes” or “no”. If the encounter or incident did not worry them, then no incident was recorded.

199. The YISS-2 youth questionnaire<sup>7</sup> asked a small number of questions on how the child responded to the incident, for example: “Did this person ever ask you to send them a sexual picture of yourself?” <yes/no/don’t know...> then “Did you send a sexual picture of yourself to this person?”. More examples are listed in Annex 2.

200. Data from the two YISS studies, showing change over time, are shown in Example 13.

<b>Example 13. YISS: Trends in Online Victimization by Age and Gender, United States</b>			
	<b>YISS-1 (2000)</b>	<b>YISS-2 (2005)</b>	<b>Change over time</b>
Youth Internet Users	Rate per 100	Rate per 100	Rate %*
<b>Unwanted sexual solicitations</b>			
All Youth	19	13	-6%
Boys Ages 10 to 13	8	5	–
Boys Ages 14 to 17	15	10	-5%
Girls Ages 10 to 13	15	9	-6%
Girls Ages 14 to 17	34	23	-11%

Unwanted exposure to sexual material			
All Youth	25	34	9%
Boys Ages 10 to 13	16	24	8%
Boys Ages 14 to 17	33	45	12%
Girls Ages 10 to 13	12	21	9%
Girls Ages 14 to 17	29	36	7%
Harassment			
All Youth	6	9	3%
Boys Ages 10 to 13	6	7	–
Boys Ages 14 to 17	6	8	–
Girls Ages 10 to 13	4	7	–
Girls Ages 14 to 17	9	11	–
* Only statistically significant changes are included.			
Source: Wolak <i>et al.</i> (2006).			

### Australia, Children's Participation in Cultural and Leisure Activities Survey

201. Australia's National Statistics Office, the Australian Bureau of Statistics (ABS), asked about personal safety or security problems associated with the Internet and mobile phones in its 2009 CPCLA Survey (ABS, 2009a). The questions were asked of an adult household member and asked about the type of personal safety or security problems experienced (see Annex 2 for details). The questions were simple and, according to ABS<sup>13</sup> appeared to work well in the field. They were:<sup>14</sup>

"Have there ever been any problems with [Child 1/Child 2/Child 3]'s personal safety or security in [his/her] use of the Internet?" Yes/No/Don't know

"What did the most recent personal safety or security problem involve?"

1. Access to inappropriate material<sup>15</sup>
2. Strangers asking for/gaining access to child's personal information
3. Bullying/Threatening behaviour
4. Other"

"Have there ever been any problems with [Child 1/Child 2/Child 3]'s personal safety or security in the use of [his/her] mobile phone? Yes/No/Don't know"

"What did the most recent personal safety or security problem involve?"

1. Bullying/Threatening behaviour
2. Strangers asking for/gaining access to child's personal information
3. Receiving inappropriate material in text or media messages
4. Other"

***UK Children Go Online surveys***

202. The UK Children Go Online surveys of 2003-2005, covered 9-19 year olds' use of the Internet. A national survey was conducted face-to-face with 1 511 children and young people aged 9-19, together with a self-completion survey given to 906 of their parents.<sup>16</sup> The survey asked a number of questions about incidents (see Annex 2 for details). Like the YISS-2 questionnaire, some of the questions required a judgement about the incident, with wording such as ". Unwelcome sexual comments ...", "... nasty or hurtful things ...". Others were factual, for instance "When on the Internet, have you ever been sent porn from someone you met on the Internet".

203. The UKCGO children's questionnaire is one of the few to ask how the child responded to threats. ("Have you ever received unwelcome sexual comments from someone in any of the following ways?" <email, instant message, text message, chat room> "When this happened what did you do?" <various options> (see Annex 2). Another line of questioning concerned offline meetings: "Have you ever met anyone face to face that you first met on the Internet?" and "Who suggested the meeting?" Follow up questions included whether the child told anyone before attending the meeting, whether they took anyone else with them and how the meeting went.

204. The UKCGO adult questionnaire also asked about online incidents "As far as you know, has your child ever ...? (see Annex 2 for options, which include "Been bullied over the Internet" and "Been sent unsolicited sexual material over the Internet").

***Republic of Korea, Survey of SNS Usage***

205. The 2009 Republic of Korea Survey of SNS<sup>17</sup> Usage (NIDA, 2009) was conducted in March 2009 and surveyed Internet users, aged 12-49. As well as collecting information on usage of social networking services (described above), the survey asked users about their motivation for, and purpose of, using SNS, time spent using SNS, activities using SNS, user perceptions and complaints about SNS.

206. The last topic is particularly relevant to this section and includes problems such as 'Verbal violence or insults', 'Exposure to unwanted risky information' and 'Distribution of inaccurate information'. Users reported their responses to these experiences as including 'Consult/complain/report to service providers', 'Complain directly to alleged wrongdoers' and 'Consult with public complaint handling offices'.

***Egypt, pilot survey on Internet safety issues***

207. The 2010 pilot survey on Internet safety issues conducted by Egypt (MCIT, 2010) asked children about their experience of online incidents. They included:

- Meeting with strangers face to face following online contact;
- Ending up on a porn site accidentally when looking for something else;
- Receiving pornographic material by email or through pop ups;
- Accidental access to hatred speech and extremist content; and
- Accidental access to bullying content.

**Crime statistics**

208. Official statistics on crimes committed could be a useful source of data on more extreme online threats. Unfortunately, there appear to be no reliable or comparable sources of such data. There seem to be two main reasons for this.

209. The first, as OECD (2010) has discussed, is variation in national laws. The specificity of legislation in this area varies both with regard to the Internet and to the victims. National laws also vary according to the risks they are addressing, for instance, those relating to content, contact, consumer issues, and privacy/information security.

210. The second reason is the nature of electronic crime as a particular instance of a more general crime. The 2008 *Australian Standard Offence Classification* (ASOC) (ABS, 2008b) discusses electronic crime generally in the context of its statistical crime classification.<sup>18</sup> “Electronic crime rarely represents a specific offence, and often includes a wide range of non-technology linked offences, which can also be committed using electronic means. The behaviour is not necessarily different – this is generally a distinction made based on mode. Where a computer can be used to commit an offence, but has historically been committed without a computer, these offences are coded based on the behaviour of that offence. For example, although child pornography offences can be facilitated by the use of a computer and the Internet, the behaviour associated with the offence remains unchanged based on the mode of production, and the offences should be coded accordingly.”

211. Notwithstanding the above, at least one national law enforcement agency collects some data on Internet crimes involving children. Japan’s National Police Agency collects statistics on arrests related to child pornography associated with Internet usage and child prostitution via online dating services (National Police Agency, 2010).

212. Another approach to gathering crime statistics is to survey law enforcement agencies. The National Juvenile Online Victimization Study conducted by the Crimes against Children Research Center (CCRC) at the University of New Hampshire, consisted of two waves – the first in respect of 2000 and the second in respect of 2006 (Wolak *et al.*, 2009). Data were collected from a national sample of law enforcement agencies about arrests for (and characteristics of) Internet sex crimes against minors.<sup>19</sup> The survey approach was taken because “Established criminal justice data collection systems do not gather detailed data on such crimes that could help inform public policy and education.” Some findings are described in Example 14.

**Example 14. Some findings from the National Juvenile Online Victimization Study, US, 2006**

“Arrests of online predators in 2006 constituted about 1% of all arrests for sex crimes committed against children and youth.”

“...the facts do not suggest that the Internet is facilitating an epidemic of sex crimes against youth. Rather, increasing arrests for online predation probably reflect increasing rates of youth Internet use, a migration of crime from offline to online venues, and the growth of law enforcement activity against online crimes.”

“The nature of crimes in which online predators used the Internet to meet and victimize youth changed little between 2000 and 2006, despite the advent of social networking sites.”

“Findings from Wave 1 of the N-JOV Study indicated that the stereotype of the online predator who used trickery and violence to stalk, abduct or assault young children was largely inaccurate.”

Source: Wolak *et al.* (2009).



### Helpline, hotline and tipline statistics

213. Another potentially useful source of data are the *byproduct* statistics generated by helplines and similar on Internet threats and crimes.

214. Child Helpline International (CHI) is an international network of helplines, dealing with crimes against children. CHI collects statistics from its member child helplines around the world and is a member of the COP initiative. Although, at this stage, its statistics do not distinguish Internet-specific crimes, they are considering adding an 'Internet dimension' to their 'reason for contact' field<sup>20</sup> and are testing a question on their 2010 *Violence Against Children* Questionnaire (CHI, 2010).

215. INHOPE is the International Association of Internet Hotlines. Its mission is to eliminate child pornography from the Internet and to protect young people from harmful and illegal uses of the Internet. Although most member hotlines are located in Europe (it covers 21 of the 27 EU member states), other members include Australia, Canada, Iceland, Japan, Russia, South Africa, Korea (Republic of), Taiwan (Province of China) and the United States. INHOPE represents 36 hotlines in 31 countries.<sup>21</sup>

216. Each hotline deals with what is nationally considered to be illegal and this varies between jurisdictions. When a report is received, the material is assessed and traced, then passed to whatever hotline is in the traced host country. The recipient country assesses the alleged infringement under its own laws. If determined to be illegal, the report is referred to the relevant law enforcement officers (INHOPE, 2007).

217. INHOPE collects monthly data from its members. Its *2007 Global Internet Trend Report* provides a rich dataset on hotline reports and outcomes between 2004 and 2006. Data are classified according to the nature of content (see Annex 2), the type of Internet service 'responsible' (e.g. websites, email/spam, P2P, FTP, instant messaging, mobile/WAP services) and the type of report (external, derived or proactive). Some INHOPE data are shown in Example 15.

#### Example 15. INHOPE statistics

Between September 2004 and December 2006, the INHOPE network received 900 000 reports from the public. When added to those proactively found by hotline personnel, the network processed 1.9 million reports. Over 162 000 reports for the whole period were forwarded to law enforcement, more than 150 000 reports to the hosting ISP, more than 170 000 reports to the content owner and almost 33 000 reports to another INHOPE hotline for further processing.

During the last quarter of 2006, the network processed an average of 91 000 reports per month. On average 35 000 reports were received from the public, of which about 19 000 were determined to refer to either illegal or harmful content. An average of 59% of reports referred to content on websites and 30% referred to email/Spam. An average of 9 600 of processed reports per month related to child pornography.

Source: INHOPE (2007).

218. Given that data are collected regularly and according to a consistent statistical framework, it would be tempting to assume that the trends observed reflect those in the real world, therefore, a rise in the number of reports indicates a rise in Internet incidents. For several reasons, that assumption does not hold true. For a start, the network is growing (at an average of one new hotline every three months according to INHOPE, 2007) but it is also becoming more visible and being used by more people. As INHOPE (2007) notes "... The increase in reports could



be due to many reasons .... These reasons could include: change in hotline numbers; change in hotline visibility, change in hotline activity, change in criminal activity, change in visibility of criminal activity.”

219. Some individual hotlines also produce data. Of particular interest is the 2009 analysis from Cybertip of Canada (a member of INHOPE) based on public reports submitted between September 2002 and March 2009. The focus was on websites that host child sexual abuse images (Canadian Centre for Child Protection, 2009). While the research was based on reports received from Canadians, it covered websites from all over the world. The report notes that, while the production and distribution of child sexual abuse images is not new, those activities are greatly facilitated by the Internet and other ICTs. The report cites some statistics on the number of websites containing this type of material and contends that it is increasing over time. Data sources cited include studies, Internet filter statistics and the number of sites blocked by individual ISPs. The analysis in the report is based on the 30 000 voluntary reports received from the Canadian public since the inception of Cybertip.ca in 2002. Analysts classified the material in several ways: age and gender of child, severity of the abuse, type of website incident (*e.g.* child pornography), type of website and host country.

220. While the data from the analysis are global – in the same way that the Internet is global – there are several limitations pointed out by Cybertip.ca, for instance:

- The input data are limited to the information received from the Canadian public;
- Cybertip.ca only follows up URLs that have been reported and therefore likely to be readily visible to the public. The content of such sites may be more benign than some more secure content, *e.g.* password protected sites; and
- The content may change before analysts can access it.

## Recommendations

### Risk-prone behaviour

221. With regard to measuring risk-prone behaviour, it would be relatively easy to specify a small set of potentially risky activities for inclusion in national household ICT surveys. As we saw above, European countries, Australia, Singapore and Thailand already collect some relevant information in their national surveys. Potential issues are that not all such surveys include children and those that do may not ask questions directly of children. Another important issue was raised at the start of this chapter; while risk-prone behaviour may broadly be linked with online incidents, other factors such as individual characteristics are relevant. The identification of ‘at-risk’ children (apart from by age and gender) would be a desirable classification and may be possible in a dedicated COP survey directed at children.

222. While the surveys of Australia, Singapore, Thailand and Egypt include children, not all European countries include individuals under 16 within their survey scope. It is not known to what extent children are actual respondents in surveys that do include children (they are not respondents in the Australian survey and at least some European surveys).

223. The Partnership on Measuring ICT for Development has included four relevant categories in its 2009 revision of the core ICT indicators (part of HH9, *Internet activities undertaken by individuals in the last 12 months*). Those activities are:

- Purchasing or ordering goods or services;
- Playing or downloading video games or computer games;
- Downloading movies, images, music, watching TV or video, or listening to radio or music; and
- Posting information or instant messaging.

224. It would be very useful to split the last category, per the Eurostat surveys of 2009 and 2010, to “Posting messages to chat sites, social networking sites, blogs, newsgroups or online discussion forums; use of instant messaging” and “Uploading self-created content (text, images, photos, videos, music etc.) to any website to be shared.”

225. It could also be useful to split the ‘downloading’ category to explicitly separate downloading activities (particularly movies and music) from using the Internet as a broadcasting medium (e.g. watching TV). The proposed categories are “Downloading movies, videos, images, TV programmes or music” and “Watching TV or video, or listening to radio or music”.

226. The ideas inherent in the above questions are relatively simple and also deal with the main risk-prone behaviours of children – communicating online and sharing created content. The other activities dealing with purchasing online, playing computer games and downloading content are also within the scope of COP measurement and can present challenges for children (see discussion of scope in Chapter 2).

227. The Korean Survey of SNS Usage might be a useful model for countries wishing to further explore use of particular social networking services.

228. Regarding measurement of time spent online, it is suggested that the best vehicle for such questions is a national ICT household survey, as such surveys are carried out by a large number of countries and present a relatively simple means of measuring time spent online. Time use surveys are also carried out by a number of countries but are a complicated way of measuring time spent using ICTs because a secondary classification of ‘technology used’ to carry out a particular activity is required. Such a classification is used by at least two countries (Australia and the United Kingdom) but is not included in the international standards for time use surveys. Time use surveys are also directed towards adults rather than children. For these two reasons they are not recommended for measuring time spent online by children.

229. Specific child online protection surveys are also not recommended as they are not widespread nor carried out within the context of a national statistical system, especially in developing countries. However, they can be a source of ideas for determining the type of time use questions to ask.

230. It is suggested that simple questions on time spent online be used and be directed to children where possible. If that is not possible, then adults should report on their behalf, taking care to answer in respect of Internet use at all locations, not just home. The 2007 questionnaire

from Hong Kong (China) asked “On average, how many hours did you approximately spend weekly using the Internet?”. This was split by location and applied to those who had used the Internet at least once a week during the previous twelve months. While it is not suggested that the data be collected by location, a split by location on the questionnaire may result in a more accurate response as it prompts the respondent to include all locations. The Australian CPCLA survey asked “For how many hours per week does [Child 1/Child 2/Child 3] usually access the Internet at home?”.<sup>22</sup> The 2007 Eurobarometer survey ascertained time spent online by asking how often the Internet was accessed and then how much time was spent online in a particular session. Many surveys already ask about the frequency of Internet use. While the categories may be too broad to be used in this way, the responses could be a useful check against the number of hours that the respondent reports using the Internet.

231. It is suggested that countries adapt the Hong Kong (China) or the Australian question depending on whether the child him/herself is the respondent. A suitable question, if respondents include children could be:

- “In the last 12 months, how many hours did you usually spend each week using the Internet? (At all locations, including home, work, place of education and Internet cafes)”.

232. Where children are not respondents, then the responding adult should be asked about the child’s use. The scope of the question should be individuals who have used the Internet in the previous 12 months. The number of hours could be collected as a range rather than an exact number of hours, although neither the Hong Kong (China) nor Australian questionnaires do this. Possibly a reasonable range would be (number of hours per week): <5, 5-10, 11-20, 21-30, 31-40, >40.<sup>23</sup> This range is also recommended for presenting output. An alternative on location is to follow the practice of Hong Kong (China) and ask about each location separately. The locations in the core indicator, HH8 (*Location of individual use of the Internet in the last 12 months*), would be a suitable set. Questions on location of Internet use and weekly hours of use could be linked.

233. Supplementary recommendations are that:

- More countries include children within the scope of their ICT household surveys, thus enabling data on children’s risk-prone activity to be more widely available (see ITU, 2009f, Chapter 7 for a discussion on the scope of such surveys).
- Sample sizes be sufficient so that output data for children can be split into smaller age groups, and gender if possible, recognizing the differences in children’s behaviour according to age and gender.
- As time series data (showing change over time) are generally more useful than single point-in-time information, it is suggested that countries periodically collect data on risk-prone activities using comparable methodologies and survey questions.

234. While it would be desirable to include an indicator on registrations to (or users of) social networking sites, there does not seem to be good demographic data available across countries. However, the overall growth in *Facebook* registrations has been included as a context indicator (see Chapter 3).

235. Table 2 suggests indicators based on these recommendations.

### Incidents and responses

236. This chapter considered several approaches to measuring online incidents. The household survey approach is the more common and likely to be the most useful. For a start, many countries have existing survey vehicles (these would often be ICT household surveys as discussed in the previous section). Secondly, data collected via a survey can be reliably classified by important demographic factors, such as age and gender.

237. We have seen that hotline statistics and crime data are not likely to be able to provide internationally comparable and reliable data, especially over time. Therefore, those approaches are not recommended.

238. It is suggested that any questions on incidents and responses need to be asked of those experiencing the incident/making the response, that is, children. This is a complicating factor for data collection as many ICT household surveys do not collect information from children (although some collect information about children's activities). The reasons for this may be legal and/or ethical. The surveys described above collect such information from children or adults, with a couple of surveys collecting it from both children and their parents. Lobe *et al.* (2008) provide guidance on best practice in the area of interviewing children about COP topics. They also raise the possibility that children could be selected from schools rather than household surveys, though they illustrate some of the problems involved in using such a methodology. However children are selected, it is important for quantitative surveys that the sample be representative of the populations of interest. It may be necessary to adjust data using national benchmarks, as discussed in ITU (2009f).

239. A particular problem when asking children about incidents is that the severity of the incident is a factor of both the nature of the incident and the victim's perception of it. While this element of subjectivity is valuable information, and should be collected if possible,<sup>24</sup> it is doubtful that comparable information could be collected in an international context. It is therefore suggested that questions on incidents and responses be simple, that is, express a single idea, that is not open to interpretation, and have a clear meaning (or at least readily explained on questionnaires or by interviewers). Threats such as online bullying and harassment are likely to be particularly difficult to measure because they are not easily defined and have a subjective element.<sup>25</sup>

240. If we look at the types of survey questions that are both simple and of most policy relevance, there are a small number of examples and they include the following questions (mostly) sourced from the UKCGO child questionnaire:<sup>26</sup>

### Online encounters resulting in offline encounters

241. This is a sequence of four questions:

- Have you ever met anyone face to face that you first met on the Internet? Yes/No/I don't want to answer.

- Was the person you met....? (If you have met more than one person that you first met on the Internet, think about the last person you met) Much older than you; A bit older than you; About the same age; Younger than you; I don't want to answer/Don't know.
- Who suggested the meeting? I did; They did; We both did; Don't remember; I don't want to answer/Don't know.
- How did the meeting go? I had a really good time; It was okay, nothing special; I didn't enjoy it; The other person upset me; They turned out to be different from what I expected; We didn't meet after all; I don't want to answer; Other; Don't know.

### **Pornography**

- When on the Internet, have you ever.....? (selection of responses) Ended up on a porn site ACCIDENTALLY when looking for something else? Received pornographic junk mail by email/instant messaging? Been sent porn from someone you met on the Internet? ("Porn" is defined as "... stuff meant for adults. For example, nude people, rude and sexy pictures.")
- Overall, how many times have you seen porn on the Internet? A lot (more than 5 times); A few times; Never; I don't want to answer/Don't know.

### **Hate sites**

- When on the Internet, have you ever.....? Ended up ACCIDENTALLY on a site that was hostile or hateful to a group of people? Yes/No/I don't want to answer/Don't know.

### **Violent or gruesome images**

- When on the Internet, have you ever.....? Ended up ACCIDENTALLY on a site with violent or gruesome pictures (e.g. gory or nasty images of people being hurt)? Yes/No/I don't want to answer/Don't know.
- Overall, how many times have you seen violent or gruesome pictures on the Internet? A lot (more than 5 times); A few times; Never; I don't want to answer/Don't know.<sup>27</sup>

242. Few surveys appear to have asked about responses to an online threat or incident. The UK Children Go Online Survey of children and the YISS-2 survey of youth questionnaire are exceptions.

243. The Korean Survey of SNS Usage might be a useful model for countries wishing to further explore incidents and responses arising from use of social networking services.

244. This report does not recommend any particular questions on responses as they are very dependent on preceding questions and likely to be prone to mis-reporting.

245. There are several challenges involved with collecting data from children. They include legal or ethical prohibitions on interviewing children and bias in responses to questions. The latter may arise from the respondent's feelings of shame or embarrassment or the opposite, that is, an inclination to brag about an incident, leading to an exaggerated response. These effects will likely vary by age, by gender and among individuals. While such issues exist for adults as well, they may be magnified for children and, especially, for this subject. It is strongly

recommended that data should be collected from children using personal interviews (either face-to-face or by telephone). The approach of UKCGO, where the interview responses were entered on a laptop and the child was given the laptop to directly enter responses to the more sensitive aspects, should also be considered. Overarching considerations are that interviewers should be sensitive, well-trained and adhere consistently to prompts and procedures.

246. Other aspects of questions put to children, is that they should use language that children understand (*e.g.* use of the “scary” for English-speaking children). Ideally, the reference period should be short enough to avoid recall problems but not so short that only few incidents were reported. In respect of online incidents, UKCGO mostly asks whether something has ever happened, then follows up with questions about the “last time” something happened. The YISS-2 youth questionnaire<sup>28</sup> asks about things that had happened in the last year and then followed up particular incidents. Pew tends to ask respondents about their current activities or whether they have ever done something.

247. Like the other areas covered in this chapter, time series data (showing change in incidents experienced over time) will generally be more useful than single point-in-time information.

248. Table 2 suggests indicators based on these recommendations.

Table 2. Recommended indicators for risk-prone behaviour and incidents

Indicator	Comments	Source
<p><b>2.1 Risk-prone behaviour – activities</b>  Proportion of children who have undertaken the following Internet activities in the last 12 months by age group of child (and by gender if possible):</p> <ul style="list-style-type: none"> <li>- Purchasing or ordering goods or services</li> <li>- Playing or downloading video games or computer games</li> <li>- Downloading movies, videos, images, TV programmes or music</li> <li>- Watching TV or video, or listening to radio or music</li> <li>- Posting messages to chat sites, social networking sites, blogs, newsgroups and other online discussion forums; use of instant messaging</li> <li>- Uploading self-created content (text, images, photos, videos, music etc.) to any website to be shared</li> </ul>	<p>The activities are adapted from core ICT indicator HH9, <i>Internet activities undertaken by individuals in the last 12 months</i>. The last four are splits of HH9 activity categories – see <b>Recommendations</b> above.</p> <p>Availability of data for some of these activities is reasonable.</p>	ITU, Eurostat, individual NSOs
<p><b>2.2 Risk-prone behaviour – time spent online</b>  Average time children spent online each week in the last 12 months (hours in ranges: &lt;5, 5-10, 11-20, 21-30, 31-40, &gt;40) by age group of child (and by gender if possible)</p>	<p>Not a core ICT indicator. A similar question is asked in some household ICT surveys. Availability is limited.</p>	Individual NSOs
<p><b>2.3 Incidents – online encounters resulting in offline meetings</b>  Proportion of children who have ever met anyone face-to-face that s/he first met on the Internet (classified by age of person encountered compared with the age of the child: much older, a bit older, about the same age, younger), by age group and gender of child if possible**</p>	<p>Very limited availability, would usually be asked on a specialized COP survey rather than an ICT household survey.</p>	The only known sources are the UKCGO study and Egypt's pilot survey.
<p><b>2.4 Incidents – pornography</b>  Proportion of children (by age group and gender if possible) who have ever:</p> <ul style="list-style-type: none"> <li>- Ended up on a porn site accidentally when looking for something else</li> <li>- Received pornographic junk mail by email/instant messaging</li> <li>- Been sent porn from someone you met on the Internet</li> </ul>	<p>Very limited availability, would usually be asked on a specialized COP survey. See <b>Recommendations</b> above, for definition of 'porn'.</p>	The only known sources are the UKCGO study and Egypt's pilot survey..
<p><b>2.5 Incidents and responses – hate sites</b>  Proportion of children (by age group and gender if possible) who have ever:</p> <ul style="list-style-type: none"> <li>- Ended up accidentally on a site that was hostile or hateful to a group of people</li> </ul>	<p>Very limited availability, would usually be asked on a specialized COP survey.</p>	The only known sources are the UKCGO study and Egypt's pilot survey.
<p><b>2.6 Incidents – violent or gruesome images</b>  Proportion of children (by age group and gender if possible) who have ever:</p> <ul style="list-style-type: none"> <li>- Ended up accidentally on a site with violent or gruesome pictures (e.g. gory or nasty images of people being hurt)</li> </ul>	<p>Very limited availability, would usually be asked on a specialized COP survey.</p>	The only known sources are the UKCGO study and Egypt's pilot survey

## Endnotes

<sup>1</sup> There are also positive aspects to the set of risk-prone activities. The final report from the EU Kids Online project (Livingstone and Haddon, 2009b) explores both risks and opportunities associated with Internet use and recommends policies that minimise risks and maximise opportunities.

<sup>2</sup> The Internet Safety Technical Taskforce makes the link between existing characteristics of children and risk of threatening incidents, for example, 'at-risk' youth may be more attracted to environments such as sexually oriented chat rooms. Other characteristics include the level of confidence or familiarity with the Internet.

<sup>3</sup> This survey is conducted every few years, whereas many ICT use surveys are annual. ABS also conducts an annual ICT use survey but it is confined to those aged 15 or above.

<sup>4</sup> For example, Browsing personal mail, Chatting and instant messages, Downloading (music, film, photos, etc), Social networking websites (i.e. Facebook, My Space etc).

<sup>5</sup> See <http://unstats.un.org/unsd/demographic/sconcerns/tuse/default.aspx> and <http://www.timeuse.org/information/studies/>.

<sup>6</sup> <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=231&Lg=1>.

<sup>7</sup> The YISS-2 youth questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq_YISS2.pdf).

<sup>8</sup> From the UKCGO child questionnaire, which can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO\\_ChildQuestionnaire.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO_ChildQuestionnaire.pdf).

<sup>9</sup> For example, *Facebook*, *MySpace* and *Twitter*.

<sup>10</sup> Such data are of dubious value to the extent that those registering adopt different personas (with different age and/or gender characteristics).

<sup>11</sup> Personal communication, Facebook (February 2010).

<sup>12</sup> Defined by Nielsen for the purposes of the report as: USA, Brazil, United Kingdom, France, Germany, Italy, Spain, Switzerland and Australia.

<sup>13</sup> ABS, personal communication.

<sup>14</sup> ABS CPCLA Questionnaire, April 2009 (unpublished).

<sup>15</sup> Defined by ABS as including "Access to inappropriate websites or web content (regardless of whether the child intentionally or innocently accessed this type of site or content), including pop-ups" and "Receiving emails with inappropriate content".

<sup>16</sup> The UKCGO child questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO\\_ChildQuestionnaire.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO_ChildQuestionnaire.pdf). The parent questionnaire can be found here <http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%20Questionnaire.pdf>.

<sup>17</sup> Social Networking Service.

<sup>18</sup> The ASOC is used in Australian Bureau of Statistics statistical collections, and by the Australian police, criminal courts and corrective services agencies.

<sup>19</sup> Where *Internet-related* is broadly defined to include "... an offender who was a family member, acquaintance, or stranger to a victim used the Internet to communicate with a victim to further a sexual victimization, or otherwise exploit the victim".



<sup>20</sup> CHI, personal communication.

<sup>21</sup> See <https://www.inhope.org/>. INHOPE was founded under the EC Safer Internet Action Plan and is part funded by the EC Safer Internet Plus Programme.

<sup>22</sup> ABS CPCLA Questionnaire, April 2009 (unpublished).

<sup>23</sup> The suggested ranges are based on time online data from the Hong Kong (China) 2009 survey.

<sup>24</sup> For example, UKCGO follows up the 'porn' question with a question on how the child felt about (e.g. found it interesting, disgusting). YISS-2 used terms like "that you did not want", "threaten or embarrass" to qualify the experiences and probed the level of distress caused by individual incidents.

<sup>25</sup> The final report of the Internet Safety Technical Taskforce (2008) makes the point that "It is difficult to measure online harassment and cyberbullying, because these concepts have no clear and consistent definition. Some definitions include acts that embarrass or humiliate youth while others include only those that are deemed threatening."

<sup>26</sup> The UKCGO child questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO\\_ChildQuestionnaire.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO_ChildQuestionnaire.pdf).

<sup>27</sup> This question is not on the UKCGO questionnaire.

<sup>28</sup> The YISS-2 youth questionnaire can be found here [http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Youthq_YISS2.pdf).

## Chapter 6. Measuring preventive actions

249. A very important aspect of child online protection is the action taken to prevent harm to children. This chapter examines available data on this topic and makes recommendations for data collection and for a set of statistical indicators that could apply across countries.

250. Preventive actions may be undertaken by most of the actors outlined in the statistical framework presented in Chapter 2. They include:

- Measures taken by parents and others directly responsible for children's well-being;
- Measures taken by children to protect themselves;
- Government measures in a number of areas; and
- Measures taken by the industry, for example ISPs, social networking websites and search engines.

251. Most of the survey work in this area has been directed at measuring the actions parents take to protect their children. Some surveys have asked children what they do to protect themselves and at least two recent surveys have asked national governments about their policies and measures in this area. These and other measurement approaches are described below.

### Preventive measures by parents and children

#### Survey data

252. Surveys of the measures taken by parents and children are considered together because some studies ask both parents and children similar questions. This can provide an interesting insight into different perspectives.

#### *Eurobarometer surveys*

253. The Eurobarometer surveys of recent years have canvassed this topic extensively. The 2003/2004 survey asked about home rules for use of the Internet and other ICTs ("Have you set any rules for him/her about using any of the following either in your household or elsewhere?"). The results indicated a greater level of freedom as children age (EC, 2004). The 2005 survey asked whether filtering/blocking tools for certain websites were applied when the child uses the Internet (EC, 2006). The 2005 survey tabulated information on various preventive measures taken by parents against the age of the child.

254. Eurobarometer 2008 asked parents about the actions they took to ensure online safety of their children (EC, 2008). The relevant questions are shown in Annex 2 and cover actions such as 'staying nearby when child is online' and 'checking the computer later to see which sites the child visited'. The survey also asked about rules for Internet use, such as 'child is not allowed to create a profile in an online community'. Example 16 provides data from Eurobarometer 2008.

**Example 16. Eurobarometer 2008: Percentage of parents not allowing at least one activity, EU27**

Giving out personal information	92%
Buying online	84%
Talking to people they don't know in real life	83%
Spending a lot of time online	79%
Creating a profile in an online community	63%
Using chat rooms	61%
Accessing certain websites	49%
Downloading/playing music, films, games	38%
Using email/instant messaging tools	37%
Base: parents whose child uses the Internet, % of "Not allowed"	
Source: Eurobarometer, <i>Towards a safer use of the Internet for children in the EU – a parents' perspective: summary</i> (EC, 2008).	

### **Eurostat surveys**

255. Eurostat's questionnaire for the 2010 Community Survey on ICT Usage in Households and by Individuals includes an Internet security module, which has a question on whether a parental control or a web filtering software is used ("Which IT security software or tool do you use?...a parental control or a web filtering software").

### **Australia, Children's Participation in Cultural and Leisure Activities Survey**

256. The CPCLA survey (ABS, 2009a) collected information in respect of children's use of ICT and measures taken to protect children at home from online threats (via Internet and mobile phone). The measures are shown in Annex 2 and, for the Internet, are: placing the computer in a public area of the house, installing an Internet content filter, supervising or monitoring children's Internet use, and educating children about safe and appropriate use of the Internet. ABS tabulated the results by the age range of the child. The Australian survey is unusual in that it collected data on mobile phone use as well as Internet use. The data are theoretically able to be cross-tabulated against whether the child uses the mobile phone to access the Internet. The survey methodology was such that children were not directly asked questions – a responsible adult household member responded on their behalf. The next survey is expected to be run in 2012 and, at this stage, it is envisaged that similar questions will be used.<sup>1</sup>

### **US, Youth Internet Safety surveys**

257. In YISS-2 (2005), parents were asked about use of online safety tools (see Annex 2 for a list). They were described as software that "filters, blocks, or monitors what your child does or sees online".<sup>2</sup>

### **UK Children Go Online surveys**

258. The UK Children Go Online surveys asked both children and their parents about rules and practices for online behaviour.<sup>3</sup> Children were asked about what they are not allowed to do on

the Internet (see list in Annex 2) and what things their parents do to ensure their online safety, for example:

- “When you use the Internet at home, do your parent(s) do any of these things? ... Ask/talk to you about what you are doing or did on the Internet”;
- “When you use the Internet at home, do your parent(s) do any of these things? ... Stay in the same room or nearby when you’re online”; and
- “And do they sometimes .....? Sit with you and go online together”.

259. Parents were asked similar questions, via a self-completion questionnaire, for instance:

- “Do you (or your spouse/partner) do any of these things nowadays? .... Ask/talk to your child about what he/she is doing or did on the Internet”;
- “Do you (or your spouse/partner) do any of these things nowadays? .... Make sure you stay in the same room or nearby when your child is online”; and
- “Do you (or your spouse/partner) do any of these things nowadays? .... Sit with your child and go online together”.

260. The contrast between child and parent responses is interesting. In part, it could be caused by children’s lack of awareness of their parents’ behaviour (for instance, parents may discretely stay nearby when the child is online). Some of the questions were also worded differently, for example, children were asked whether “sometimes” their parents “Sit with you and go online together”, while parents were asked if “nowadays” you “Sit with your child and go online together”. Some findings are shown in Example 17.

#### Example 17. UK Children Go Online, What parents do when child is using the Internet

While 25% of children reported that their parents ask what they are doing when using the Internet, 81% of parents reported that they ask what their children are doing.

Similarly, 22% of children reported that their parents stay in the same room or nearby when they are online, compared with 50% of parents reporting that they do that.

The situation was more equal in respect of sitting with the child and going online together (31% of children compared with 32% of parents reporting this). However, note that the question asked of children referred to “sometimes” while that for parents did not. Otherwise, it is possible that children would report a lower incidence of this than their parents.

Source: Livingstone and Bober (2005).

#### US, Pew surveys

261. In late 2006, Pew conducted a national telephone survey in the United States of just under 1 000 teenager-parent pairs (Pew, 2007a). The parent survey asked about household rules on Internet use by their children and about measures taken at home, including use of filtering software, monitoring software and non-technical measures such as placing the computer in a public area of the home.

262. Among other things, the teenager survey asked about preventive measures taken by teenagers to manage their online identities to maintain privacy. They found that most were taking steps to protect themselves online from obvious sources of risk (such as making contact with strangers). Example 18 provides some findings from this survey.

**Example 18. Pew findings US teenagers' management of their online identities, 2006**

Two-thirds of teenagers with social network site profiles reported that their online profile is not visible to all Internet users. Of those whose profile is visible to everyone, nearly half (46%) reported that they give at least some false information on their profiles. This behaviour varied by age and gender, with boys and younger teenagers more likely to post false information on their profiles.

Source: Pew (2007a).

**Egypt, pilot survey on Internet safety issues**

263. The 2010 pilot survey on Internet safety issues conducted by Egypt (MCIT, 2010) asked both children and their parents about preventive measures. Parents were asked about rules applying to Internet use and used the categories shown in the recommended indicator in Table 3. Parents were also asked about other protective measures, including those in the recommended indicator *Protective measures taken by parents at home* in Table 3.<sup>4</sup>

**Measuring the policy response****Survey data**

264. There are two known surveys directed to governments that have asked about policy responses to COP. The Child Online Protection Initiative National Survey was run by ITU in 2009; it was conducted online and used tickbox responses (ITU, 2009g). The questions are shown in Annex 2 and responses were grouped according to countries' level of economic development (developed, developing and least developed). According to the designer of the survey (John Carr from the Children's Charities' Coalition on Internet Safety), the survey appeared to work well and produced useful results.<sup>5</sup> As at April, 2010, there were 51 responding countries, including a number of developing and least developed countries.<sup>6</sup> A selection of findings from the survey can be found in Example 19.

**Example 19. Some findings from ITU's Child Online Protection Initiative National Survey, 2009**

**Perceptions of child safety issues in relation to the Internet.** Exposure to harmful or inappropriate content was ranked first (mentioned by 80% of countries) while exposure to illegal content was ranked a close second (78% of countries). Just over half (53%) of countries reported that exposure to sexual predators was an issue for them.

**The availability of advice or guidance about safer Internet usage by children and young people.** Only five countries (10%) reported that such advice was not available in their country. Of areas covered by the advice or guidance, how to deal with or avoid exposure to harmful or inappropriate content was the most common and listed by 80% of respondents, followed by advice and guidance on bullying or harassment (61%), how to report online concerns or incidents (61%) and sexual predators (59%).

**Awareness raising and related programmes for parents.** Just over half (53%) of the responding countries have such programmes. Most developed countries, but only 20% of least developed countries, reported such programmes.

**National focal point or agency with responsibility for promoting Internet safety for children and young people.** Just under half (45%) of responding countries have such a focal point.

**Legal framework and law enforcement resources.** Nearly two-thirds (65%) of countries said that their cyberspace and real world laws in this area were comparable. In most countries (88%), the possession of child pornography/child abuse images is an offence.

**Co-operation with the Internet industry.** About half the countries reported that they have a hotline or other specific mechanism for reporting suspected illegal content on the Internet and just under half the countries reported that they have such a mechanism for reporting suspected illegal behaviour found or taking place on the Internet.

**Help needed by countries.** While countries at all levels of development reported that they needed help, calls for assistance from the least developed and the developing countries were strongest.

Source: ITU (2010a).

265. The second survey directed to governments is the APEC Children Protection Project Survey (APEC, 2009), which asked member countries open-ended questions about policy responses (shown in Annex 2). The results for OECD member countries are described by OECD (2010).

## Industry measures

### Action by social networking websites

266. Social websites may have measures to protect children and are a potential source of data on those measures, which include:<sup>7</sup>

- Minimum age to register accounts;
- Rules and policies to protect younger users from inappropriate contact and content, *e.g.* provision of reporting tools and follow-up of such reports;
- Privacy tools and settings (*e.g.* on *MySpace*, profiles with ages set from 13 to 15 years are automatically private);
- Policies to delete inappropriate user profiles (*e.g.* those that are underage, fake or belong to profiles of registered sex offenders);
- Public education and awareness-raising (*e.g.* Facebook's *Safety Tips*); and
- Software tools (*e.g.* *MySpace's ParentCare* software).

267. Unfortunately, there appear to be limited statistics on the child protection measures taken by MySpace and Facebook. They include an announcement by Facebook in December 2009 of the release of new tools to control information and the subsequent request to its approximately 350 million users to review and update their *Facebook* privacy settings (Facebook, 2010g). Another example is reports on the number of convicted sex offender profiles deleted by MySpace and Facebook.<sup>8</sup>

### Action by ISPs

268. ISPs may also take measures to protect children (for instance, by filtering websites or offering parental controls) and are a possible source of statistics on those measures. However, there are a very large number of ISPs in the world and their practices in this area appear to be highly variable. Surveys of ISPs are a possible source of information but are only run by a small number of countries. The Australian Internet Activity Survey, for instance, includes questions on measures taken to protect children. See Example 20.

**Example 20. ISPs with over 1 000 active subscribers, selected services offered, Australia, 2007 to 2009**

Services offered	Dec 2007	Dec 2008	Jun 2009
Email content filtering services	78%	73%	67%
Web content filtering services	29%	26%	25%
Source: ABS (2009b).			

## Other actions by the information industry

269. Search engines may have options that limit the websites shown in search results. For example, *Google* has a filtering function called *SafeSearch* that can be set at different levels.<sup>9</sup> Data on the number of sites blocked by such filters would be interesting but appear not to be available. Even if they were, the results may not be a meaningful indicator of the number of suspect sites. The *Google* search works by looking for trigger words in a web page address. This both excludes sites that are not suspect and fails to exclude sites that are suspect but do not indicate that in the name of the web page.<sup>10</sup>

## Recommendations

270. Several examples of statistical work in this area have been presented in this chapter. Data on preventive measures may be collected from those doing the protection (parents, governments, businesses) or from those being protected (children).

271. It is suggested that where such data refer to measures taken at home, the data should be collected from the protector (usually parents but respondents in household surveys may be other adults or older siblings). The experience of the UKCGO surveys is that different answers result when parents and children are separately asked about measures taken to protect children. Part of the reason may be that children are not always aware of those measures.

272. Another lesson from the UKCGO survey is that it is useful to collect information on frequency in respect of some preventive measures (for instance, rather than ask whether the parent supervises the child when s/he is using the Internet, it is suggested that questions provide some options on the frequency of the activity, *e.g.* always, often, about half the time, sometimes, never...supervise the child when s/he is using the Internet). As an example, Eurobarometer 2008 (EC, 2008) asked parents about the measures they take when their child uses the Internet at home and asks them to qualify those measures in terms of frequency (always, very frequently, not very frequently, never, don't know/not applicable).

273. Using the tables in Annex 2, we can see that some categories on preventive measures are simple and narrow, that is, there is a single idea and it is clear what it means (or at least could be explained on questionnaires or by interviewers). Many countries conduct a household ICT survey, collecting information on access to ICT (including the Internet) and use of ICTs by one or more household members. Such surveys are suitable for collection of data on household preventive measures and we have seen that some of these surveys already collect such data (for instance, the Eurostat community surveys of 2010 and the Australian CPCLA survey of 2009). It is suggested that questions asking about preventive measures aim to use simple, single-idea categories. Examples that appear to comply with this principle are:

- *Questions to parents on rules applying to children's Internet use.* Eurobarometer 2005 and 2008 include "When your child is online, are there things that s/he is not allowed to do?" Eurobarometer 2008<sup>11</sup> provides a number of options, all of which appear to be simple and relevant. They are: "Spend a lot of time online"; "Access certain websites"; "Create a profile in an online community"; "Use email/ instant messaging tools"; "Use chat rooms"; "Give out personal information"; "Download/play music"; "Download/play films"; "Download/play



games”; “Buy online” and “Talk to people they don’t know in real life”. Eurobarometer (EC, 2008) tabulated this question as the proportion of parents with Internet-using children. UKCGO had a question on rules in both the parent and children questionnaire. The categories are fairly similar to those of Eurobarometer 2008. Parent data were tabulated as the proportion of parents and children data as the proportion of children. Because of discrepancies in responses between parents and children found by UKCGO (Livingstone and Bober, 2004), it is important that countries are consistent in who they address this question to.

- *Measures taken by parents at home.* These include “Placing the computer in a public area of the house” and “Supervising or monitoring child’s use of the Internet” (CPCLA). This can be augmented with other categories: both the Eurobarometer 2008 and *UK Children Go Online* parent questionnaires used a more extensive list than this, including “Make sure you stay in the same room or nearby when your child is online”; “Sit with your child and go online together”; “Help your child when he/she is on the Internet”; “Ask/talk to your child about what he/she is doing or did on the Internet”; “Check the computer later, to see which sites your child visited”; “Check the messages in your child’s e-mail account/instant messaging service” and “Check whether your child has a profile on a social networking site/online community”. As discussed above, it is useful to have an associated frequency for actions that are ongoing (e.g. always, often, about half the time, sometimes, never).
- *Use of software.* Eurobarometer 2008 includes “Does the computer that your child uses at home have installed any of the following software?” with options being “Filtering software (blocking certain websites/activities)” and “Monitoring software (recording where they go/what they do online)”. UKCGO asked children and parents very similar questions about filtering and monitoring software. The YISS-2 parent questionnaire<sup>12</sup> asks about “...software on the computer your child uses at home that filters, blocks, or monitors what your child does or sees online”, including software that “Filters sexually explicit images or websites”; “Monitors your child’s online activities” or “Blocks personal information from being posted or e-mailed”. It is not suggested that this level of detail be included on questionnaires. ABS (2009a) asked parents (or a responsible adult) about “Actions taken for personal safety and security in Internet use at home.” An option was “Installing an Internet content filter”. One of the lessons in ICT statistics is that it is important to define technical concepts. ABS, at least, provides a very detailed definition of an Internet content filter in its instructions to interviewers.<sup>13</sup>

274. Pew (2007a) reported on the preventive actions taken by teenagers to manage their online identities in order to maintain privacy. They found that most teenagers were taking steps to protect themselves online from obvious areas of risk. For example, two-thirds of those with social network site profiles reported that their profile is not visible to all Internet users. This is an example of a single idea with an unambiguous response. Such a question could be a useful inclusion on surveys directed to children (as discussed in the last chapter).

275. Like other areas covered in this publication, time series data (showing change over time) will generally be more useful than single point-in-time information. It is suggested that countries periodically collect data using comparable methodologies and survey questions. This enables some monitoring over time of the preventive actions taken, and may throw some light on the effectiveness of awareness-raising efforts.



276. In addition, it is useful to tabulate the preventive actions taken by parents against the age of the children they are protecting. Several studies have shown that actions differ with the age of the child. For example, Eurobarometer 2006, *Safer Internet* found that parents of young children sit with their child when s/he goes online far more often than parents of teenagers.

277. In respect of governments' activities in child online protection, ITU's Child Online Protection Initiative National Survey is a fairly simple and inexpensive means of providing internationally comparable data (ITU, 2010a). In addition, it is one of the few statistical sources that includes data for a number of developing and least developed countries.<sup>6</sup> There are possible shortcomings of such a survey and they include:

- That a small number of people are responding on behalf of the government (there is room for the contact details of two respondents on the survey form itself). The responding person/persons may not have complete knowledge of all the work of government within the countries. There is also the risk that the respondent/s for one country will interpret some activities as either more or less significant than other respondents. These problems are mitigated to a degree by a statement encouraging countries "... to consult with relevant national stakeholders in order to ensure a comprehensive national overview." and the follow up detail required, for example, "Are there any programmes for parents to help them understand the online safety issues facing their children? Yes/No/Don't know". If "Yes", a number of details are sought including the name of the initiative, organization, dates and contact details.
- That government in a country can consist of several levels (*e.g.* national, provincial and local) and that a response in respect of one level may not apply to the national situation. This is broader problem associated with surveys of government. A partial solution is to specify any limitations of available advice, initiatives, laws or co-operative arrangements with respect to national coverage.
- The relatively low response rate (27% – 51 countries out of 191) poses a risk of non-response bias, that is, that responding countries are different from non-responding countries in terms of how they respond. It is hoped that future surveys can achieve a higher response rate.

278. As measures by government may be very effective, statistics showing change in adoption of such measures over time will be particularly useful in this area.

279. This chapter also looked at the information sector as a source of information but data appear to be limited. While not widespread, surveys of ISPs, such as that conducted by Australia, may provide a good model for individual countries to pursue. However, no recommendations for particular indicators are made in this publication.

280. Table 3 suggests indicators based on the above recommendations.

Table 3. Recommended indicators for preventive actions

Indicator	Comments	Source
<p><b>3.1 Parents' rules applying to children's Internet use</b></p> <p>Proportion of parents who do not allow children to do certain Internet-related activities (at home or elsewhere) by age group of child (and gender if possible):<sup>14</sup></p> <ul style="list-style-type: none"> <li>- Give out personal information</li> <li>- Buy goods or services online</li> <li>- Talk to people they don't know in real life</li> <li>- Spend a lot of time online</li> <li>- Create a profile in an online community</li> <li>- Use chat rooms</li> <li>- Download movies, videos, images, TV programmes or music</li> <li>- Download or play games</li> </ul>	<p>Suitable questions could be added to ICT household surveys. They are asked of adult respondents in households where children live. These would preferably be parents, though many surveys only stipulate that an adult respond. Options are from Eurobarometer (2008), with minor adaptation.</p> <p>Availability of data is restricted to EU 27 countries.</p>	<p>Eurobarometer 2008</p> <p>UKCGO</p>
<p><b>3.2 Protective measures taken by parents at home</b></p> <ul style="list-style-type: none"> <li>- Placing the computer in a public area of the house (by age group of child)</li> <li>- Installing Internet filter software on the computer the child uses at home (by age group of child)</li> <li>- Installing monitoring software on the computer the child uses at home (by age group of child)</li> <li>- Talking to the child about what s/he is doing or did online (by age group of child and by frequency: always, often, about half the time, sometimes, never, don't know)<sup>15</sup></li> <li>- Sitting with your child when s/he is on the Internet (by age group of child and by frequency: always, often, about half the time, sometimes, never, don't know)<sup>15</sup></li> </ul>	<p>Response categories are adapted from CPCLA, UKCGO and Eurobarometer. Note the definitions of Internet filter software and monitoring software (see <b>Recommendations</b>). Note also that monitoring and filtering software may be available in the same package.</p> <p>Availability appears to be limited to EU countries, US and Australia. These questions could be included in household ICT surveys.</p>	<p>Eurobarometer 2008, YISS, CPCLA, UKCGO</p>
<p><b>3.3 Measures taken by governments</b></p> <p>Indicators based on ITU's 2009 COP survey by level of economic development (developed, developing and least developed).</p>	<p>Questions are shown in Annex 2 and several findings are shown in Example 19. No reduction in questions is recommended.</p>	<p>ITU</p>

## Endnotes

<sup>1</sup> ABS, personal communication.

<sup>2</sup> The YISS-2 parent questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Parentq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Parentq_YISS2.pdf).

<sup>3</sup> The UKCGO child questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO\\_ChildQuestionnaire.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/UKCGO_ChildQuestionnaire.pdf). The parent questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/YPNM%20Parent%20).

<sup>4</sup> The questions were based on an earlier draft of this report.

<sup>5</sup> Personal correspondence.

<sup>6</sup> Of the responses received, 10 were from developed countries, 31 from developing countries and 10 from least developed countries.

<sup>7</sup> Examples from MySpace (2010), Facebook (2010f). Measures taken by other social networking sites are reviewed in the final report of the Internet Safety Technical Taskforce (2008).

<sup>8</sup> MySpace (<http://www.reuters.com/article/idUSN2424879820070724> and [http://www.reuters.com/article/idUSTRE51278C20090204?loomia\\_ow=t0:s0:a49:g43:r1:c1.000000:b30320516:z0](http://www.reuters.com/article/idUSTRE51278C20090204?loomia_ow=t0:s0:a49:g43:r1:c1.000000:b30320516:z0)) ; Facebook ([http://news.cnet.com/8301-13577\\_3-10168255-36.html](http://news.cnet.com/8301-13577_3-10168255-36.html)).

<sup>9</sup> <http://www.google.com/support/websearch/bin/answer.py?answer=35892&hl=en#safe>.

<sup>10</sup> These articles explain how the Google filtering works:  
[http://cyber.law.harvard.edu/archived\\_content/people/edelman/google-safesearch/](http://cyber.law.harvard.edu/archived_content/people/edelman/google-safesearch/) and  
[http://news.cnet.com/2100-1032\\_3-5198125.html](http://news.cnet.com/2100-1032_3-5198125.html).

<sup>11</sup> From the 2008 Eurobarometer questionnaire (annex document),  
[http://ec.europa.eu/information\\_society/activities/sip/surveys/index\\_en.htm](http://ec.europa.eu/information_society/activities/sip/surveys/index_en.htm).

<sup>12</sup> The YISS-2 parent questionnaire can be found here  
[http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Parentq\\_YISS2.pdf](http://www.lse.ac.uk/collections/EUKidsOnline/Interview%20schedules/Parentq_YISS2.pdf).

<sup>13</sup> Defined as follows “Internet content filters are pieces of software that help manage access to online content on home computers by undertaking functions such as blocking, screening or monitoring unwanted material. Such filters allow websites, pop-ups and offensive material to be blocked, emails to be filtered, chat rooms to be monitored and passwords to be set up. Internet content filters can also be individually set for different members of a household. While Internet content filters reduce the risk of accessing unsafe or inappropriate material or sites online, they will not block all offensive content or provide security for the computer itself in the form of keeping out computer viruses.” It is possible that other household surveys such as UKCGO and Eurobarometer also have more extensive definitions of technical concepts such as Internet filters available to interviewers.

<sup>14</sup> Choice of options has been determined according to the main actions not allowed per Eurobarometer 2008.

<sup>15</sup> It is suggested that this information be tabulated in two ways, by age group and by frequency. It is unlikely that sample sizes would support a cross-classification of information by age by frequency, even though that would be more useful.

## Chapter 7. Statistical challenges

281. This chapter discusses the major statistical challenges in child online protection measurement. Chapter 2 presented a number of elements for a statistical framework and subsequent chapters dealt with measurement of aspects of child online protection. All those chapters have mentioned challenging measurement issues.

282. It should be evident at this point that the nature of the topic *Child online protection* is itself a major statistical challenge. The final report from the Internet Safety Technical Taskforce (2008)<sup>1</sup> found that the risks minors face online are “complex and multifaceted and are in most cases not significantly different from those they face offline”. We have also seen, especially in chapters 4 and 5, that many important aspects of the topic are subjective, while others partly rely on an individual’s perception or interpretation of a situation.

283. There are a number of other statistical challenges and these are discussed below.

### Data availability

284. It is clear that apart from isolated (and usually non-comparable) individual country studies, there is a lack of data on most aspects of child online protection.

285. The exceptions are some existing data on risk-prone Internet activities, time spent online and several pan European surveys conducted by Eurobarometer and, more recently, Eurostat.

286. A particular problem is a general lack of data from developing countries. The level and nature of Internet use tends to be different in those countries – and therefore the problems children face online may differ from those of children in developed countries. As an example, children in developing countries are more likely to use the Internet outside the home (ITU, 2008), thus limiting preventive measures that could be taken by parents.

287. This report has made some recommendations to improve the data available on this topic by proposing relatively small extensions to existing data collection work and suggesting some of the simpler and more objective types of questions that could be included in country household surveys.

### International comparability

288. A number of issues hamper the ability to compare child online protection issues across countries. Lack of availability of data, as discussed above, is a major problem. Other issues include differing laws<sup>2</sup> and lack of commonality of definitions and question wording.

289. Several actual and potential data sources with a global reach have been examined in this report and found not to be suitable or available. They include hotline/helpline statistics, crime statistics and data from social networking sites, search engines and ISPs.

290. Probably the best data, for cross-country comparisons, are provided by the Eurobarometer surveys carried out between 2003 and 2008.

291. The *EU Kids Online* final report addressed the challenges of making international comparisons in the context of a number of European studies (Livingstone and Haddon, 2009b; Lobe *et al.*, 2008). It found that a useful approach was to rank the risks and compare that ranking across countries. For example, they found that “Giving out personal information is the most common risky behaviour at around half of online teenagers” and “Seeing pornography online is the second most common risk”.

292. The recommendations in this report, if adopted by a large number of countries, should improve international data comparability.

### Data interpretation

293. The topic of child online protection can be an emotive one and statistics on the subject need to be interpreted and presented carefully. The final report of the Internet Safety Technical Taskforce (2008), discussed the misleading quotation of ‘one-liners’ without consideration of the underlying data. They cited the YISS-2 study done at the Crimes Against Children’s Research Center (Wolak *et al.*, 2006), which found that quite a high proportion of Internet-using minors (1 in 7) experienced unwanted online sexual solicitation. A closer look at the data shows that 1 in 25 Internet-using minors experienced aggressive online sexual solicitation.

### Change over time

294. One of the themes of this report is the value of using a time series of data to show change over time. Such data are of obvious value for monitoring problems and for assessing the effectiveness of policy responses.

295. An important prerequisite for reliable time series data is a consistent measurement approach at all points in time and sample sizes sufficiently large to reliably measure differences between time points. Generally, surveys should be designed to show change over time, in order to produce good estimates of differences between time points. Few of the studies examined in this report have a time series dimension. While there were several Eurobarometer surveys conducted between 2003 and 2008, they were not specifically designed to show change (although a small number of comparisons were made where possible).

296. The YISS-1 and YISS-2 studies were specifically designed to show change between two points in time, 2000 and 2005. The studies used the same methods and asked most of the same questions. In addition, the differences quoted were tested for statistical significance (Wolak *et al.*, 2006).

## Data quality

297. There are a number of aspects of data quality that are relevant to any set of statistics. Where data are derived from sample surveys, they include both sampling and non-sampling error.

298. Sampling error is generally higher where sample sizes are small. This is a particular issue for rare events, such as the incidence of the more serious online threats and crimes. It also presents challenges for cross-classification of data, such as by age, gender or socio-demographic status.

299. Non sampling error is also called ‘bias’ and includes error arising from unrepresentative samples,<sup>3</sup> the sensitive nature of a topic,<sup>4</sup> question wording,<sup>5</sup> interview techniques, processing error and low response rates.<sup>6</sup> It is beyond the scope of this report to examine these sources of error in any detail and readers are referred to publications that cover the subject more completely, including ITU (2009f).

300. The YISS-1 and YISS-2 studies conducted in 2000 and 2005 by the Crimes against Children Research Center at the University of New Hampshire discussed the limitations of their methodologies, in terms of:

- How candid the respondents were, given the sensitive nature of the subject;
- Possible lack of representativeness of respondents (“The young people we did not talk to may have been different from the youth we talked to.”); and
- The results are estimates based on a sample and therefore have associated sampling error;

301. In respect of non-survey sources, the biased nature of statistics derived from reporting to hotlines/helplines was discussed in Chapter 5.

## Methodology and data collection

302. A good summary of the approaches to measuring child online protection can be found in the final report of the Internet Safety Technical Taskforce (2008) and the final report of *EU Kids Online* (Livingstone and Haddon, 2009b). Data collection in this area of statistics is generally by personal interview (either telephone or face-to-face). While telephone interviewing is likely to be relatively inexpensive, it may not be the best approach for interviewing children. The method of interviewing children used in the UKCGO survey is of interest as it allowed children to directly enter data into a laptop (using computer-assisted personal interview – CAPI – software).

303. In this report, we have discussed examples of data collected from both qualitative and quantitative surveys,<sup>7</sup> and from non-survey sources such as byproduct data (an example of which is hotline/helpline statistics that bring together data collected as part of the reporting process).

304. A very useful guide to best practice in data collection in this area is one of the outputs of the EU Kids Online Project (see Lobe *et al.*, 2008). Advice is offered via a number of FAQs and covers many aspects of surveying in this field, including children as respondents.

305. There are a number of aspects of conducting household surveys that are beyond the scope of this report. ITU (2009f) discusses measurement of household ICT indicators using household surveys and refers to other statistical works in this field.

## Endnotes

<sup>1</sup> To the Multi-State Working Group on Social Networking of State Attorneys General of the United States.

<sup>2</sup> A 2006 press release from the International Centre for Missing & Exploited Children illustrates this problem. It refers to a study of child pornography laws in 184 Interpol member countries. The study found that more than half of the countries studied had no laws addressing child pornography and for many other countries, laws were inadequate. See [http://www.missingkids.com/missingkids/servlet/NewsEventServlet?LanguageCountry=en\\_US&PageId=2336](http://www.missingkids.com/missingkids/servlet/NewsEventServlet?LanguageCountry=en_US&PageId=2336).

<sup>3</sup> Samples that are not representative of the population that is in scope of the study. This can be a particular problem when response rates are low.

<sup>4</sup> This report has discussed the problems of bias arising from the sensitive nature of many aspects of child online protection. They include under-reporting through shame or embarrassment and over-reporting by exaggerating or bragging.

<sup>5</sup> This is discussed in the final report from the Internet Safety Technical Taskforce (2008) in connection with a comparison of data from various sources. It may also be a source of error for individual surveys. The use of age-appropriate language, considered earlier in this report, is an aspect of question wording.

<sup>6</sup> Poor response rates are typical of many private surveys (that is, those not conducted by official statistical organisations). Poor response may affect sampling error due to sub-optimal sampling sizes and also non-sampling error, because responses may be biased.

<sup>7</sup> The differences between qualitative and quantitative surveys are explained in Chapter 2.





## Chapter 8. Conclusions and summary of recommendations

### Conclusions

306. A statistical framework for measuring child online protection (COP) was described in Chapter 2. It included the scope of the COP statistical field, actors and units, concepts and definitions, classifications, relationships between elements, and links to existing statistical frameworks.

307. A number of sources of existing and potential sources of data on COP have been discussed in this report. While there is a general lack of data on the topic, the lack of internationally comparable data and data from developing countries is even more pronounced.

308. Chapter 7 summarized the many statistical challenges inherent in measuring COP and discussed throughout the report. They include: the complex and subjective nature of the subject being measured; lack of data; problems inherent in interpreting COP data; measuring change over time; issues surrounding data quality, both sampling and non-sampling error; methodology and data collection.

### Summary of recommendations

309. Recommendations were made in chapters 2 to 6 of this report and are briefly summarized below.

310. A number of existing general and specific statistical standards were examined in Chapter 2. A scope for the COP statistical field was proposed based on the COP guidelines promulgated by ITU. It covers content, contact, children's conduct, commerce, excessive use and societal issues such as the digital divide.

311. Actors and units were generally defined in accordance with the COP guidelines. They are: children (generally, a human being below the age of eighteen years); parents and guardians; educators; governments; industry; perpetrators; and other actors such as NGOs and international organizations.

312. Groups of indicators were recommended as part of the COP statistical framework. They are: background context (*Internet access and use* and *Growth of the Web*); the subjective aspects of child online protection (awareness, concerns etc); children's risk-prone behaviour; incidents and responses; and preventive actions.

313. Existing standards for measuring the background context were described. They include concepts, definitions, classifications, indicators and model questions. It was recommended that they be adopted for the new COP statistical field. Relevant general classifications were also examined and recommended. They include classifications for age, gender and industry.

314. A number of existing classifications and definitions for online safety elements of the framework were presented and discussed. The classifications were distinguished as *output*

*classifications* (used to present data and as a basis for analysis) and *input classifications* (those applying to input data, e.g. appearing on questionnaires). The classifications recommended were generally input classifications and are subsets of the longer classifications presented. They are consistent with the recommendations for the online safety indicators made in chapters 5 and 6. It is suggested that individual countries may wish to collect more extensive data, in which case, more comprehensive classifications would be required.

315. Chapter 3 discussed a number of ways of measuring the context in which online threats to children arise. Two sets of indicators – *Internet access and use* and *Growth of the Web* were suggested and a number of existing indicators were recommended in Table 1 at the end of the chapter. The *Internet access and use* indicators included ITU telecommunications indicators (Internet subscribers and mobile broadband subscriptions) and household ICT indicators (individuals using the Internet and frequency of individual Internet use, and households and schools with Internet access by type of access). The *Growth of the Web* indicators were forecasts to change in Internet Protocol traffic, change over time in total world number of top-level domain name registrations and *Facebook* worldwide active users.

316. Chapter 4 considered what is possibly the most challenging aspect of measuring child online protection, that is, dealing with elements that are highly subjective. They include awareness, concerns, attitudes and the perception of harm, and involve parents and children. Attempts to measure these aspects were described and the challenges highlighted. Given the uncertainty of measuring such elements in an international context, no recommendations were made for indicators, although it was suggested that simple questions about knowledge or awareness could be added to country questionnaires. Some questions of this type may be country-specific, for example, whether the respondent knows which agencies to report incidents to or has heard of particular organizations that are active in prevention.

317. Chapter 5 discusses the online safety elements of children's risk-prone behaviour, online incidents and children's responses to those incidents. A number of potentially useful types of data sources were examined including survey data, crime statistics, social networking site data, and data from helpline reports. Ultimately, survey approaches were recommended for measuring these aspects of child online protection.

318. With regard to measuring risk-prone behaviour, a small set of potentially risky activities was identified, based on the existing Internet activities categories of the Partnership's indicator HH9, *Internet activities undertaken by individuals in the last 12 months*. Sources for measuring time spent online were also examined and recommendations for data collection made. Supplementary recommendations were that the scope of existing ICT household surveys be expanded to include children, where they do not already; that samples are of sufficient size to provide output by children's age and gender; and that such surveys be periodically conducted so that time series data are available.

319. For incidents and responses, it was suggested that children (rather than parents) be asked about incidents that had occurred to them, and their responses to those incidents. It was further suggested that questions on incidents and responses have a single clear idea, that is not open to interpretation, and that language appropriate for children be used. A set of simple and relevant questions for inclusion on surveys was suggested and cover online/offline encounters,

pornography, hate sites, and violent or gruesome images. As above, it was suggested that time series data be collected where possible.

320. The recommendations on incidents do not cover all the types of incidents that might be experienced, for instance they exclude bullying and harassment, which are not easily defined and have a subjective element. Nor do they cover questions on children's responses (although possible models were presented).

321. Chapter 5 concludes with a table showing indicators for risk-prone behaviour and incidents (Table 2). They cover a set of Internet activities that may be undertaken by children and appear to increase their risk of harm; the time spent online by children; and a set of incidents that appear to be measurable in a cross-country context.

322. Chapter 6 looked at measuring preventive actions by several types of actors in the COP framework. It ultimately focused on the actions of parents and governments and recommended survey approaches in both cases. As with other indicators, it was suggested that time series data be collected where possible.

323. Existing ICT (or other) household surveys may be used for measuring the actions of parents and three types of questions were suggested: rules applying to children's Internet use, measures taken by parents at home, and use of software.

324. ITU's Child Online Protection Initiative National Survey appears to be a reasonable model for collecting internationally comparable data on preventive measures taken by governments. Possible shortcomings and partial solutions were discussed.

325. Chapter 6 concludes with a table showing recommended indicators of preventive actions (Table 3). They cover parents' rules applying to children's Internet use; protective measures taken by parents at home; and measures taken by governments. The first two sets of indicators are likely to be collectable using ICT household surveys, while the third consists of information from a COP survey of governments conducted by ITU.

326. Annex 1 brings together the indicators recommended in the report. This list of indicators could be used by countries in their initial efforts to collect internationally comparable data on child online protection.

## Annex 1: Recommended indicators for child online protection

This annex brings together the recommended indicators from tables 1-3. It covers context, children's risk-prone behaviour and incidents, and preventive actions. See tables 1-3 for more detailed information, for instance, on data availability and data sources.

Recommended context indicators	
1.1	Fixed Internet subscribers per 100 inhabitants, aggregated by level of development (developing/developing countries), time-series
1.2	Fixed broadband Internet subscribers per 100 inhabitants, aggregated by level of development (developing/developing countries), time-series
1.3	Mobile broadband subscriptions per 100 inhabitants, aggregated by level of development (developing/developing countries), time-series
1.4	Proportion of individuals who used the Internet, last 12 months, by country, children aged under 15 and total population, both by gender, latest data
1.5	Proportion of households with access to the Internet by type of access, by country, latest data: <ul style="list-style-type: none"> <li>- Any Internet access</li> <li>- Narrowband</li> <li>- Fixed broadband</li> <li>- Mobile broadband</li> </ul>
1.6	Location of individual use of the Internet, last 12 months, by country, children aged under 15 and total population, by gender if possible, latest data: <ul style="list-style-type: none"> <li>- Home</li> <li>- Place of education</li> <li>- Community Internet access facility</li> <li>- Commercial Internet access facility</li> <li>- Any place via a mobile cellular telephone</li> <li>- Any place via <i>other</i> mobile access devices</li> </ul>
1.7	Frequency of individual use of the Internet, last 12 months, by country, children aged under 15 and total population, by gender if possible, latest data: <ul style="list-style-type: none"> <li>- At least once a day</li> <li>- At least once a week but not every day</li> <li>- Less than once a week</li> </ul>
1.8	Proportion of schools with Internet access by type of access, by country, grouped by broad region, latest data: <ul style="list-style-type: none"> <li>- Any Internet access</li> <li>- Fixed narrowband only</li> <li>- Fixed broadband only</li> <li>- Both fixed narrowband and broadband access</li> </ul>
1.9	Forecast change in Internet Protocol (IP) traffic, current forecast period. <ul style="list-style-type: none"> <li>- Global IP traffic by type (Internet, non Internet, mobile)</li> <li>- Consumer Internet traffic by broad region</li> </ul>
1.10	Change over time in total world number of top-level domain name registrations (global plus country code)

## Recommended indicators for risk-prone behaviour and incidents

### 2.1 Risk-prone behaviour – activities

Proportion of children who have undertaken the following Internet activities in the last 12 months by age group of child (and by gender if possible):

- Purchasing or ordering goods or services
- Playing or downloading video games or computer games
- Downloading movies, videos, images, TV programmes or music
- Watching TV or video, or listening to radio or music
- Posting messages to chat sites, social networking sites, blogs, newsgroups and other online discussion forums; use of instant messaging
- Uploading self-created content (text, images, photos, videos, music etc.) to any website to be shared

### 2.2 Risk-prone behaviour – time spent online

Average time children spent online each week in the last 12 months (hours in ranges: <5, 5-10, 11-20, 21-30, 31-40, >40) by age group of child (and by gender if possible)

### 2.3 Incidents – online encounters resulting in offline meetings

Proportion of children who have ever met anyone face-to-face that s/he first met on the Internet (classified by age of person encountered compared with the age of the child: much older, a bit older, about the same age, younger), by age group and gender of child if possible

### 2.4 Incidents – pornography

Proportion of children (by age group and gender if possible) who have ever:

- Ended up on a porn site accidentally when looking for something else
- Received pornographic junk mail by email/instant messaging
- Been sent porn from someone you met on the Internet

### 2.5 Incidents and responses – hate sites

Proportion of children (by age group and gender if possible) who have ever:

- Ended up accidentally on a site that was hostile or hateful to a group of people

### 2.6 Incidents – violent or gruesome images

Proportion of children (by age group and gender if possible) who have ever:

- Ended up accidentally on a site with violent or gruesome pictures (e.g. gory or nasty images of people being hurt)

**Recommended indicators for preventive actions****3.1 Parents' rules applying to children's Internet use**

Proportion of parents who do not allow children to do certain Internet-related activities (at home or elsewhere) by age group of child (and gender if possible):

- Give out personal information
- Buy goods or services online
- Talk to people they don't know in real life
- Spend a lot of time online
- Create a profile in an online community
- Use chat rooms
- Download movies, videos, images, TV programmes or music
- Download or play games

**3.2 Protective measures taken by parents at home**

- Placing the computer in a public area of the house (by age group of child)
- Installing Internet filter software on the computer the child uses at home (by age group of child)
- Installing monitoring software on the computer the child uses at home (by age group of child)
- Talking to the child about what s/he is doing or did online (by age group of child and by frequency: always, often, about half the time, sometimes, never, don't know)
- Sitting with your child when s/he is on the Internet (by age group of child and by frequency: always, often, about half the time, sometimes, never, don't know)

**3.3 Measures taken by governments**

Indicators based on ITU's Child Online Protection Initiative National Survey by level of economic development (developed, developing and least developed).

## Annex 2: Examples of measurement categories used in child online protection surveys and output

### Children's risk-prone behaviour

#### *Eurobarometer 2007 Survey (Safer Internet for children)*

Internet applications
Searching for information as a part of my school work
Searching for information on subjects which interest me/surfing for fun
Sending and receiving emails
Using instant messaging (MSN)/chatting with friends
Engaging in open chatrooms
Creating my own blog/homepage and posting my own texts, photos, music on the Internet
Reading and responding to friends' blogs/homepages
Reading and responding to blogs/homepages of someone I have never met
Playing on-line games
Downloading music, films, videos, games or other files
Sharing files (music, films, videos, games or others)
Sharing photos
Downloading ring tones/images for my mobile phone
Taking part in competitions
Making phone calls through the Internet
Mobile phone applications
Making and receiving phone calls
Sending/receiving SMSs
Taking photos/images
Sending/receiving/sharing images
Connecting to the Internet through my mobile phone

#### *Eurostat, Community Survey on ICT Usage in Households and by Individuals, 2009 and 2010*

Selected Internet activities
Posting messages to chat sites, social networking sites, blogs, newsgroups or online discussion forum, use of instant messaging
Uploading self-created content (text, images, photos, videos, music etc.) to any website to be shared



**Crimes against Children Research Center, Youth Internet Safety Survey, 2005 (YISS-2), children's questionnaire**

<b>The number of times (in the past year) the child posted:</b>
his/her real last name, phone number, school name or home address where anyone online could see it (like in a profile or online journal)
his/her age or year of birth online where anyone online could see it
a picture of him/herself on the Internet where anyone online could see it
<b>Whether (in the past year) the child:</b>
posted a sexual picture of him/herself online
used a screen name that s/he considered sexual in any way
<b>The number of times (in the past year) the child:</b>
gave his/her real last name, phone number, school name or home address to someone s/he met online but had never met in person
gave his/her age or year s/he was born to someone s/he met online but had never met in person
has sent a picture of him/herself over the Internet to someone s/he met online who s/he had never met in person, including through a web cam

**Singapore (IDA), Annual Survey on Infocomm Usage in Households and by Individuals, 2008**

<b>Selected Internet activities</b>
Instant messaging
Social networking sites
Reading blogs created by others
Chat rooms
Creating or maintaining own blogs
Sharing own photos
Broadcasting self-produced videos
Interactive online gaming
Downloading or watching movies, images etc
<b>Selected activities, portable ICT equipment</b>
Instant messaging
Social networking sites
Reading blogs created by others
Chat rooms
Creating or maintaining own blogs
Sending or receiving digital photograph(s)
Downloading or watching movies, images etc

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**Australia (ABS), Children's Participation in Cultural and Leisure Activities Survey, 2009**

<b>Selected Internet activities</b>
Does the child access the Internet at home for
Emailing?
Using chat rooms, forums or instant messaging?
Playing online games?
Listening to or downloading music?
Watching or downloading TV programmes, videoclips, cartoons or movies – for example on YouTube?
Using eBay, auction sites or Internet shopping?
Visiting or using social networking websites – such as MySpace or Facebook?
Creating [his/her] own online content such as blogs, websites or uploading photos?

## Online threats and incidents

### *INHOPE classification of reports of potentially illegal or harmful content*

Reports of potentially illegal or harmful content	Definition
Child Pornography	Child pornography under national law
Other Child-Related Content	Child trafficking, child sex tourism, child nudism, child grooming activities, child erotica/inappropriate images of children, and adult pornography accessible to children
Racism and Xenophobia	Racism or xenophobia under national law
Extreme Adult Content	Extreme sexual and physical violence, non-consensual sexual acts and other types of pornographic content deemed illegal under national law. For example, rape websites etc.
Adult Pornography	Pornographic content that in most countries does not contravene national law.
Other Illegal Content	Promoting violence against an individual, terrorism and drugs.
<b>Reports not considered to be illegal or harmful</b>	
SPAM not Containing Illegal Content	
Other Content	

### *ITU's Child Online Protection Initiative National Survey, 2009, problems*

What are the main problems facing children and young people in your country in relation to the Internet: [Please tick as many as apply]
Exposure to illegal content
Exposure to other forms of harmful/inappropriate content
Exposure to bullying or harassment
Exposure to sexual predators
Exposure to travelling sex offenders (sex tourism)
Exposure to fraud and/or financial scams
Exposure to identity theft
Over-use or "addiction" to the technology
Exposure to Internet related crime such as virus attacks/hacking
Exposure to age-inappropriate commercial activity
There are no problems. Everything seems to be fine
Don't know/Other (If other, please specify)

***Eurobarometer 2008 (Towards a safer use of the Internet for children in the EU – a parents' perspective), Internet situations that children could not handle***

Has your child ever asked for your help concerning a situation on the Internet that s/he could not handle? Yes/no
What was the situation in which your child asked your help:
A technical problem (like a virus)
Being harassed online
Information searching
Being bullied online
Being contacted by strangers online
Having found sexually or violently explicit images online
Something else

***Crimes against Children Research Center, Youth Internet Safety Survey, 2005 (YISS-2), children's questionnaire, incidents and activities***

<b>Unwanted sexual exposure and solicitation</b>
Did anyone use the Internet to threaten or embarrass you by posting or sending messages for other people to see?
Did you find yourself in a website that showed pictures of naked people or of people having sex when you did not want to be in that kind of site?
Did you receive email or Instant Messages that you did not want with advertisements for or links to x-rated websites?
Did you open a message or a link in a message that showed you actual pictures of naked people or of people having sex that you did not want?
Did you find people talking about sex in a place or time when you did not want this kind of talk?
Did anyone on the Internet ever try to get you to talk online about sex when you did not want to?
Did anyone on the Internet ask you for sexual information about yourself when you did not want to answer such questions?
Did anyone on the Internet ever ask you to do something sexual that you did not want to do?
Did anyone on the Internet ever ask you or encourage you to runaway from home?
<b>What the child was doing when these incidents occurred</b>
Using an email account (includes opening a file)
At an online dating or romance site
In a chat room
Using instant messages
In a game room or other game site
At an online forum or message board
At another specific web page or website
Using downloads from file sharing programmes
In an online journal or blog

**Australia (ABS), Children's Participation in Cultural and Leisure Activities Survey, 2009, Internet problems experienced**

<b>Problems with child's personal safety or security in [his/her] use of the Internet</b>
(What did the most recent personal safety or security problem involve?)
Access to inappropriate material
Strangers asking for or gaining access to child's personal information
Bullying or threatening behaviour
Other

**UK Children Go Online children survey, 2003-2005, children's questionnaire, threats**

<b>Questions asked of children</b>
Have you ever received unwelcome sexual comments from someone in any of the following ways <email, instant message, text message, in a chat room>?
Has someone ever said nasty or hurtful things to you in any of the following ways <email, instant message, text message, in a chat room>?
When on the Internet, have you ever.....?
Ended up on a porn site ACCIDENTALLY when looking for something else
Visited a porn site ON PURPOSE
Seen a pop-up advert for a porn site while doing something else
Received pornographic junk mail by email/instant messaging
Been sent porn from someone you know
Been sent porn from someone you met on the Internet
When on the Internet, have you ever.....?
Ended up ACCIDENTALLY on a site with violent or gruesome pictures (e.g. gory or nasty images of people being hurt)
Visited a site with violent or gruesome pictures ON PURPOSE
Ended up ACCIDENTALLY on a site that was hostile or hateful to a group of people
Visited a site that was hostile or hateful to a group of people ON PURPOSE
<b>Questions asked of parents</b>
As far as you know, has your child ever ...?
Visited an Internet chat room
Made new friends over the Internet
Been bullied over the Internet
Received unwanted sexual comments over the Internet
Come across pornography on the Internet
Been sent unsolicited sexual material over the Internet
Come across violent or gruesome material on the Internet
Come across racist or hateful material on the Internet
Met someone face to face that they first met on the Internet
Given out information that they shouldn't on the Internet

## Children's responses to incidents

*UK Children Go Online children survey, 2003-2005, children's questionnaire, responses to threats*

<b>Questions</b>
Have you ever received unwelcome sexual comments from someone in any of the following ways? <email, instant message,
Has someone ever said nasty or hurtful things to you in any of the following ways? <email, instant message, text message,
<b>Responses</b>
I deleted it straight away
I tried to block messages from the person
I told a parent
I told a friend
I replied to the message to ask them to stop
I replied to the message to send sexual comments/nasty comments to them
I don't want to answer
Other
Don't know

## Preventive measures

*Eurobarometer 2008 (Towards a safer use of the Internet for children in the EU – a parents' perspective), actions taken to ensure children's online safety*

When your child uses the Internet at home, what do you usually do? <Always, Very frequently, Not very frequently, Never, DK/NA>
Make sure you stay nearby when your child is online
Sit with your child when s/he goes online
Ask/talk to your child about what s/he is doing or did online
Check the computer later, to see which sites your child visited
Check the messages in your child's e-mail account/instant messaging service
Check whether your child has a profile on a social networking site/online community
When your child is online, are there things that s/he is not allowed to do?
No restrictions
Spend a lot of time online talk to people they don't know in real life
Use email
Use instant messaging tools
Use chat rooms
Create a profile in an online community
Access certain websites
Download/play music
Download/play films
Download/play games
Buy online
Give out personal information
Some parents are restricting activities, while others are allowing more activities to their children online. I will list activities, and please tell for each if you allow them or not
Spend a lot of time online
Talk to people they don't know in real life
Use email/ instant messaging tools
Use chat rooms
Create a profile in an online community
Access certain websites
Download/play music, films, games
Buy online
Give out personal information
Does the computer – that your child uses at home – have installed any of the following software?
Filtering software (blocking certain websites/activities)
Monitoring software (recording where they go/what they do online)
No, none of them

**UK Children Go Online children survey, 2003-2005, children's questionnaire, rules**

Are there any of these things which you are NOT allowed to do on the Internet?
Give out personal information
Use email
Use chat rooms
Use instant messaging
Play games
Download things
Buy anything
Fill out forms or quizzes
Don't Know
None of these
Other

**Australia (ABS), Children's Participation in Cultural and Leisure Activities Survey, 2009, actions taken for Internet personal safety and security**

<b>Actions taken for personal safety and security in Internet use at home</b>
Placing the computer in a public area of the house
Installing an Internet content filter
Supervising or monitoring child's use of the Internet
Educating child about safe and appropriate use of the Internet
Any other actions?
No action taken

**Crimes against Children Research Center, Youth Internet Safety Survey, 2005 (YISS-2), parent's questionnaire, protective measures**

Blocks SPAM e-mail?
Blocks pop-up ads?
Filters sexually explicit images or websites?
Blocks or controls your child's use of chat rooms, e-mail, newsgroups or instant messaging?
Monitors your child's online activities?
Limits the amount of time your child can spend online?
Blocks personal information from being posted or e-mailed?
Uses a browser or search engine just for kids?



*ITU's Child Online Protection Initiative National Survey, 2009, preventive measures*

<b>Available advice or guidelines</b>	
Agencies, or equivalents, that have published any advice or guidelines on the safe or appropriate use of the Internet by children and young people	Ministry of Education
	Ministry of Communications
	Ministry of Trade or Business Affairs
	The Telecoms Regulator
	Internet Service Providers or other providers
	Mobile phone network operators
	Law enforcement agencies
	NGOs or civil society organizations
	Ministry of Health or Social Services
Where the advice or guidance has been published	On TV or radio, or other public media
	On the Internet
	In printed form (e.g. booklets/leaflets/posters/brochures)
Areas covered by the advice or guidance	Exposure to harmful/inappropriate content
	Exposure to bullying or harassment
	Exposure to sexual predators
	Exposure to travelling sex offenders (sex tourism )
	Exposure to fraud or to age-inappropriate commercial activity
	Over-use of or "addiction" to the technology
	How to report concerns or incidents
	Exposure to other forms of harmful/inappropriate content
<b>Available awareness and training programmes</b>	Programmes/policies within schools/educational establishments/youth groups/other bodies
	Programmes for parents
	Programmes for teachers or others who work with children and young people
	Programmes provided by other agencies, outside of the schools or educational system
	Future planned programme/policy initiatives on Internet safety for children and young people
<b>Legal Framework</b>	Laws concerning the protection of children and young people that apply in the real world apply equally to similar behaviours or actions on the Internet
	The possession of child pornography/child abuse images is an offence
	The possession of child pornography/child abuse images is an offence if linked to intention to distribute
<b>Law enforcement</b>	Programmes exist for law enforcement agencies to help officers understand and deal with online safety issues facing children and young people
	Law enforcement officers are trained to retrieve and analyse digital data taken from computers and the Internet
	Forensic resources are sufficient to meet the volume of Internet-related crimes against children needing investigation
<b>National Focal Point</b>	There is a national focal point or agency with a specific responsibility for promoting safety on the Internet for children and young people

<b>Co-operation with the Internet industry</b>	There is a hotline or other specific mechanism for reporting suspected illegal content on the Internet
	There is a hotline or other specific mechanism for reporting suspected illegal behaviour found or taking place on the Internet
	Main players in the Internet industry co-operate with the government and other relevant agencies in promoting the safe and appropriate use of the Internet by children and young people

***APEC Children Protection Project Survey of national governments, 2009, open-ended questions about policy responses***

<b>1. Current experiences regarding information considered harmful to children within economies. (What kinds of issues is each economy concerned with?)</b>
<b>2. Current methods to manage access to information considered harmful to children</b>
Please describe status of technology development in your economy (filtering technology, detecting technology, mobile phone and other handheld device specific technology, etc.)
Does your economy have relevant laws and regulation?
Contents of voluntary efforts, such as self-regulation? Does your economy have any self-regulation?
Does your economy have policies to improve literacy or raise awareness regarding these issues? What is the current situation of best practices by government or private sector regarding safe online practices? If there are some policies and practices, please provide an overview.
Please describe domestic cooperation framework in your economy. (Example: public-private partnerships, inter-ministerial cooperation, cooperation among businesses, etc.)
Does your economy cooperate internationally on these issues? If there is some international cooperation regime, please describe the overview.



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**8<sup>th</sup> World Telecommunication/ICT Indicators  
Meeting (WTIM-10)**  
Geneva, Switzerland, 24 - 26 November 2010



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*Contribution to WTIM-10 session 7*

**Document C/12-E  
23 November 2010**

**English**

**SOURCE:** *Partnership on Measuring ICT for Development's* Task Group on Measuring the WSIS Targets

**TITLE:** Monitoring the WSIS Targets – Proposed list of indicators

**DRAFT**

**22 November 2010**



Task Group on Measuring the WSIS Targets (TG WSIS)

# **MONITORING THE WSIS TARGETS**

## **PROPOSED LIST OF INDICATORS**

**Comments should be submitted through**  
(<http://groups.itu.int/Default.aspx?alias=groups.itu.int/wsisis-targets>).

***BACKGROUND DOCUMENT FOR SESSION 7***  
***Partnership on Measuring ICT for Development:***  
***Measuring the WSIS targets***

***8<sup>th</sup> World Telecommunication/ICT Indicators Meeting (WTIM)***

***Geneva, 24-26 November 2010***

## Background

The World Summit on the Information Society (WSIS) Geneva Plan of Action identified a number of goals and targets to be achieved by 2015, along with numerous recommendations based on different “action lines”. In 2008, the United Nations Economic and Social Council (ECOSOC) recommended that the *Partnership on Measuring ICT for Development* track progress towards the achievement of the WSIS goals and targets (Resolution 2008/3).

The *Partnership* has been working since 2004 to develop a set of core ICT indicators based on international standards, which could be collected by countries to monitor ICT developments. They cover basic infrastructure indicators, household ICT access and individual use, business ICT use, the ICT sector and trade in ICT goods, and ICT in education. Work on defining core indicators on ICT in government is in its final stage.

Several of the core ICT indicators can be applied to measure some of the WSIS targets. Other WSIS targets go beyond the areas covered so far by the *Partnership* core indicators and include, for example, targets related to connecting villages, health centres, libraries, post offices and museums, scientific and research centers, and to improve linguistic diversity and local content on the Internet.

At the international level, no systematic approach has been taken so far to measure progress towards the achievement of the WSIS targets. The WSIS outcome documents do not specify quantifiable indicators that could be applied to monitor progress. As a result, no international framework exists for measuring the WSIS targets and goals.

ITU, in close collaboration with UIS, UNDESA and WHO started to work on a quantitative review of the WSIS and targets, identifying a set of measurable indicators that could be applied by national and international stakeholders. The outcomes of this effort were presented in the *World Telecommunication/ICT Development Report (WTDR) 2010: Monitoring the WSIS targets*, launched in May 2010 at the WSIS Forum Geneva. The report also took stock of what had been achieved to date with respect to each of the targets. Following the WTDR 2010, the work on measuring the WSIS targets was brought under the umbrella of the *Partnership*, in particular through the creation of the *Task Group on Measuring the WSIS Targets* (TG WSIS).

The task group consists of members of the *Partnership* involved and/or interested in measuring one or several of the WSIS goals and targets. These include ITU, OECD, UIS, UNCTAD, UNDESA, UNECA, UNECLAC, UNESCAP and UNESCWA. Since some of the targets address topics that are dealt with by organizations that are currently not members of the *Partnership*, non-members (e.g. WHO and civil society organizations) were also invited to participate in the Task Group, as “external collaborators”<sup>1</sup>. After its first meeting, during the WSIS Forum in May 2010, the task group primarily worked through the TG WSIS online forum (<http://groups.itu.int/Default.aspx?alias=groups.itu.int/wsisis-targets>).

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<sup>1</sup> Non-members would only participate in this particular Task Group and not in any other activity of the Partnership that is open to Partnership members only.

### ***Objective and content of this proposed list of indicators***

This proposed list of indicators on monitoring the WSIS targets is the result of a consultation process that started with the preparation of the WTDR 2010 and continued through the work of the TG WSIS between May and November 2010. During this period, and based on the indicators proposed in the WTDR, the task group reviewed and refined the indicators, the results of which are presented in this (draft) document.

The overall objective of this document is to present a set of measurable indicators that will help monitor progress made on each one of the WSIS targets. These indicators, which include as much as possible the core indicators developed by the *Partnership*, will contribute to the collection of indicators at the national and international levels to monitor progress towards achieving the WSIS targets until 2015 and beyond. In some cases, the original wording of the goals has been adjusted to reflect recent ICT development, for example the importance of broadband Internet access in recent years, or to increase the 'measurability' of a target. These adjustments in the goals are highlighted with revision marks.

Besides the indicators, this document further includes the definitions, and, depending on the indicators, explanatory notes. Background information concerning, for example, the choice of the indicators can be found in the WTDR 2010.

This proposed list of indicators will be presented at the ITU World Telecommunication/ICT Indicators Meeting (WTIM), in November 2010 and will continue to be updated, based on the comments received during the meeting, and from the TG WSIS members .

This list will provide the basis for a more extensive framework document to monitor the WSIS targets, which is expected to be finalized in early 2011. Besides the indicators and their definitions, this framework document is expected to include collection methodologies, and comments on associated statistical issues for each of the WSIS targets.

The task group will continue to review progress made on the goals and a final report will be prepared for 2015, making a global assessment of progress achieved in reaching the WSIS targets.

## **Indicators for measuring Target 1: Connect *all* villages with ICTs and establish community access points**

### **Indicator 1.1: Percentage of rural population covered by a mobile cellular telephone network, broken down by technology**

Indicator 1.1 refers to the percentage of a country's inhabitants that live within rural areas and that are served by a mobile cellular signal, irrespective of whether or not they choose to use it.

*Percentage of rural population covered by a mobile cellular telephone network* measures the theoretical ability to use mobile cellular services if one has a cellular telephone and a subscription.

There is no internationally agreed definition for *urban/rural* and countries should use their national definition of urban and rural.

This indicator should be broken down by technology :

- Proportion of rural population covered by a 2G mobile communication network (providing download speeds of below 256 kbit/s).
- Proportion of rural population covered by a mobile broadband signal (providing download speeds of at least 256 kbit/s).

Both indicators measure the percentage of inhabitants that are within range of a mobile broadband signal, irrespective of whether or not they are subscribers. This is calculated by dividing the number of inhabitants that are covered by a 2G/mobile broadband signal by the total population.

This indicator can be calculated from the Indicator A7 of the Partnership: *Percentage of the population covered by a mobile cellular telephone network*.

Explanatory Note: This indicator should not be confused with the percentage of the rural land area covered by a mobile cellular signal or the percentage of the rural population that subscribes to a mobile cellular service.

### **Indicator 1.2: Proportion of rural households with a telephone, broken down by type of network (fixed and/or mobile, mobile only, fixed only)**

Indicator 1.2 refers to telephone access (not use) at home by in-scope rural households. The indicator is split into four parts, as follows:

- Proportion of rural households with any telephone
- Proportion of rural households with fixed telephone only
- Proportion of rural households with mobile cellular telephone only
- Proportion of rural households with both fixed and mobile cellular telephone

A *fixed telephone* line (previously called main telephone line in operation) is an active\* line connecting the subscriber's terminal equipment to the public switched telephone network (PSTN) and which has a dedicated port in the telephone exchange equipment. This term is synonymous with the terms *main station* or *Direct Exchange Line (DEL)* that are commonly used in telecommunication documents. It may not be the same as an access line or a subscriber. This should include the active number of analogue fixed telephone lines (112a), ISDN channels (28c), fixed wireless (WLL), public payphones (1112) and VoIP subscriptions (112IP). If not included, specify in a note.

(\*Active lines are those that have registered an activity in the past three months)



The *proportion of rural households with any telephone* is calculated by dividing the number of in-scope rural households with access to any telephone (fixed or mobile) by the total number of in-scope rural households. The result is then multiplied by 100 to be expressed as a percentage.

The *proportion of rural households with fixed telephone only* is calculated by dividing the number of in-scope rural households with a fixed telephone only by the total number of in-scope rural households. The result is then multiplied by 100 to be expressed as a percentage.

The *proportion of rural households with mobile cellular telephone only* is calculated by dividing the number of in-scope rural households with a mobile phone only by the total number of in-scope rural households. The result is then multiplied by 100 to be expressed as a percentage.

There is no internationally agreed definition for *rural* and countries should use their national definition of urban and rural.

The *proportion of rural households with both fixed and mobile cellular telephone* is calculated by dividing the number of in-scope rural households with both a fixed and mobile phone by the total number of in-scope rural households. The result is then multiplied by 100 to be expressed as a percentage.

This indicator can be derived from *Partnership* indicator HH3 and should be collected through a household survey.

Explanatory Note:

The telephone equipment and services should be in working condition.

### Indicator 1.3: Percentage of rural households with Internet access, by type of access (narrowband, broadband)

Indicator 1.3 refers to access to (not use of) the Internet at home by in-scope rural households.

Internet access services are disaggregated by the following categories:

- Narrowband
- Fixed (wired) broadband
- Wireless broadband

<i>Narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode.
<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access. It also includes terrestrial mobile wireless access, which includes the following two types of subscriptions: <ul style="list-style-type: none"> <li>• Standard mobile subscriptions with active use only, which includes mobile subscriptions with advertise data speeds of 256 kbit/s or greater and which have been used to make an Internet data connection via IP in the previous 3 months. To be counted, the subscription must allow access to the greater</li> </ul>

		<p>Internet via HTTP and must have been used to make a data connection using the Internet Protocol in the previous three months. Standard SMS and MMS messaging do not count as an active Internet data connection even if they are delivered via IP.</p> <ul style="list-style-type: none"> <li>Subscriptions to dedicated data services over a mobile network which are purchased separately from voice services either as a stand-alone service (modem/dongle) or as an add-on data package to voice services which requires an additional subscription. All dedicated mobile data subscriptions with recurring subscription fees are included as "active data subscriptions" regardless of actual use. Pre-paid mobile broadband plans require active use if there is no monthly subscriptions. This could also include mobile WiMax subscriptions.</li> </ul>	
<p>The <i>Internet</i> is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.</p> <p>There is no internationally agreed definition for <i>rural</i> and countries should use their national definition of urban and rural.</p> <p>The <i>proportion of rural households with Internet access</i> at home is calculated by dividing the number of in-scope rural households with Internet access by the total number of in-scope rural households. The result is then multiplied by 100 to be expressed as a percentage.</p>			
<p>This indicator can be derived from the <i>Partnership</i> indicator HH6 and should be collected through a household survey.</p>			
<p><b>Explanatory Note:</b>  Access may be by any device enabling Internet access (not only a computer). This includes a mobile phone, PDA, games machine and digital TV. Access can be via a fixed or mobile network.  The Internet connection should be functional, that is any equipment, software or services needed should be in working condition.</p>			

#### Indicator 1.4: Location of individual use of the Internet in the last 12 months, by urban/rural.

<p>Indicator 1.4 refers to the location of Internet use by in-scope individuals in the previous 12 months, broken down by individuals living in urban/rural areas.</p> <p>This indicator will help measure the percentage of the population in rural areas that accesses the Internet through public Internet facilities. This will help identify the demand side of public Internet facilities. Both, community Internet access facilities and commercial Internet access facilities should be included.</p> <p>The <i>Internet</i> is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.</p> <p>There is no internationally agreed definition for <i>urban/rural</i> and countries should use their national definition of urban and rural.</p> <p>The proportion of individuals who used the Internet at each of the following locations can be calculated as either the proportion of in-scope individuals broken down by individuals living in urban/rural areas or the proportion of Internet users, using the Internet at each urban/rural location. In either case, the result is then multiplied by 100 to be expressed as a percentage:</p> <p>Locations are defined per the response categories. They are the following:</p>	
Home	

Work	Where a person's workplace is located at his/her home, then he/she would answer yes to the home category only.
Place of education	For students. Teachers (and others who work at a place of education) would report 'work' as the place of Internet use.  Where a place of education is also made available as a location for general community Internet use, such use should be reported in the Community Internet access facility category.
Another person's home	The home of a friend, relative or neighbour.
<b>Community Internet access facility</b>	For example, public libraries, publicly provided Internet kiosks, non-commercial telecentres, digital community centres, post offices, other government agencies; access is typically free and is available to the general public.
<b>Commercial Internet access facility</b>	For example, Internet or cybercafés, hotels and airports; access is typically paid (i.e. not free of charge).
Other locations (please specify .....)	Excluding use at any location via a mobile phone or other mobile access device. Note that 'other locations' is not a core indicator category. However, it is useful to include it in questionnaires as it allows respondents to provide a comprehensive response. Locations included in an 'other' category may need to be re-coded to one of the other categories. If this happens frequently, it can indicate problems with category wording.
Any place via a mobile cellular telephone	Use of the Internet at any location via a mobile phone (including handheld devices with mobile phone functionality).
Any place via other mobile access devices	Use of the Internet at any location via other mobile access devices, e.g. a laptop computer or handheld device that uses wireless access (at a WiFi 'hotspot') or a laptop computer connected to a mobile phone network.
This indicator can be derived from the <i>Partnership</i> indicator HH8, which includes two response categories related to public Internet access facilities (highlighted in <b>bold</b> ) and should be collected through a household survey.	
<p>Explanatory Note:</p> <p>Individuals should be asked about all locations of Internet use (that is, the survey question used by countries should specify multiple responses). In cases where countries ask about the <i>main location</i> or a small number of <i>most commonly used locations</i>, the results will not be comparable with those of countries that ask about <i>all locations of use</i>.</p> <p>The difference is that the last will reflect the actual use at each place, whereas the first two will not. Countries can replace the Community and/or Commercial Internet access facility categories with those that reflect the types of facilities available in their country.</p>	

## **Indicators for measuring Target 2: Connect ~~all universities, colleges~~ secondary schools and primary schools with ICTs**

### **Indicator 2.1: Proportion of schools with a radio used for educational purposes**

Indicator 2.1 measures the proportion of schools, for ISCED levels 1 to 3, offering radio-assisted instruction. It does not measure the intensity of use of radios for educational purposes.

A *radio* is defined as a stand-alone device capable of receiving broadcast radio signals, using popular frequencies, such as FM, AM, LW and SW. Unless they are intentionally used for educational purposes, radio sets integrated into other devices (such as a Walkman, car radio, clock radio, audio cassette or CD players/recorders) are excluded.

The *proportion of schools with a radio used for educational purposes* is calculated by dividing the number of schools providing radio-assisted instruction by the total number of schools. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator ED1 *Proportion of schools with a radio used for educational purposes* and can be collected through annual school census.

#### **Explanatory Note:**

For the purposes of this indicator, radios used for educational purposes are in working condition.

Radio-assisted instruction includes both radio broadcast education and interactive radio instruction (IRI).

Both public and private schools are included.

ISCED levels 1 to 3 cover schools offering primary, lower secondary and upper secondary education.

There are no known significant statistical issues with this indicator.

### **Indicator 2.2: Proportion of schools with a television used for educational purposes**

Indicator 2.2 measures the proportion of schools, for ISCED levels 1 to 3, offering television-assisted instruction. It does not measure the intensity of use of televisions for educational purposes.

A *television* (TV) is defined as a stand-alone device capable of receiving broadcast television signals using popular access means such as over-the-air, cable and satellite. Television broadcast receivers integrated into other devices (such as a computer, PDA, Smartphone or mobile phone) are considered only if their intended use is for educational purposes.

The *proportion of schools with a television used for educational purposes* is calculated by dividing the number of schools providing television-assisted instruction by the total number of schools. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator ED2 *Proportion of schools with a television used for educational purposes* and can be collected through annual school census.

#### **Explanatory Note:**

For the purposes of this indicator, televisions used for educational purposes are in working condition.

Television-assisted instruction is similar to radio broadcast education, with the additional benefit of video. It helps to bring abstract concepts to life through clips, animations, simulations, visual effects and dramatization.

Both public and private schools are included.

ISCED levels 1 to 3 cover schools offering primary, lower secondary and upper secondary education.

There are no known significant statistical issues with this indicator.

### Indicator 2.3: Learners-to-computer ratio

Indicator 2.4 refers to the average number of learners per computer enrolled in ALL schools, for ISCED levels 1 to 3.

The learners-to-computer ratio is an aggregate measure of the digital divide, irrespective of the type of school or intended use of computers.

*Computer* refers to a programmable electronic device that can store, retrieve and process data, as well as share information in a highly structured manner. It performs high-speed mathematical or logical operations according to a set of instructions.

This indicator is ED4bis *Learners-to-computer ratio (for ISCED levels 1-3)* from the UNESCO list of proposed indicators on ICT in education and can be collected from through annual school census.

#### Explanatory Note:

This ratio is neither a measure of actual use of computers in schools nor of time spent by learners to use computers.

Only computers in working condition for use in teaching and learning should be included. Other additional criteria may be applied, such as the age of the computer, its configuration and capacity, kinds of software available, etc.

The criteria for “working condition” of computers are left to the countries’ discretion, taking into consideration their own pedagogical requirements for schools, their technological environment and their financial capacities.

### Indicator 2.4: Proportion of schools with Internet access, by type of access (narrowband, broadband)

Indicator 2.3 measures the proportion of schools with access to the Internet, as a proportion of all schools, for ISCED levels 1 to 3. The indicator is split into four parts, as follows:

- Proportion of schools with any Internet access
- Proportion of schools with access by fixed narrowband only
- Proportion of schools with access by fixed broadband only
- Proportion of schools with both fixed narrowband and broadband access

The *Internet* refers to worldwide interconnected networks that enable users to share information in an interactive format — referred to as hypertext — through multiple wired or wireless receivers (personal computers, laptops, PDAs, Smartphones, etc.).

Internet access services are aggregated into the following broad categories:

<i>Fixed narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and other forms of access with an advertised download speed of less than 256 kbit/s.
<i>Fixed broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.

The *proportion of schools with Internet access, by type* is calculated for each type of access (including any access) by dividing the number of schools with Internet access by the total number of schools. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator ED5 *Proportion of schools with Internet access by type of access* and can be collected through annual school census.

#### Explanatory Note:

For the purposes of this indicator, Internet connections are functional, that is, any equipment, software or

services needed are in working condition.

Both public and private schools are included.

ISCED levels 1 to 3 cover schools offering primary, lower secondary and upper secondary education.

There are no known significant statistical issues with this indicator.

## Indicators for measuring Target 3: Connect **all** scientific and research centres with ICTs

### Indicator 3.1: Percentage of scientific and research centres with broadband Internet access

*Scientific and technical research* is defined as fundamental research, applied research (in such fields as agriculture, medicine, industrial chemistry etc.) and development work leading to new devices, products or processes.

Broadband Internet access services are aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

#### Explanatory Note:

Scientific and technical research is defined as including “*fundamental research, applied research (in such fields as agriculture, medicine, industrial chemistry etc.) and development work leading to new devices, products or processes*”. It includes research related to economics or sociology, but excludes routine testing, censuses and market studies. For example, this means that national statistics offices are excluded from counts of research institutions for routine assessments, but could be included if the definition of research institutions focuses on research into economic or social problems.<sup>2</sup>

Internet connectivity should be used by scientific and research centres for information and knowledge production, education and training, and to support the establishment of partnerships, cooperation and networking.

### Indicator 3.2: Presence of a national research and education network (NREN), by bandwidth (Mbit/s)

A *national research and education network (NREN)* is a specialized Internet service provider dedicated to supporting the needs of the research and education communities within a country. It usually administers and supports a high-speed backbone network, often offering dedicated channels for individual research projects.

*Bandwidth* refers to the total capacity of domestic and international Internet bandwidth in *Mega Bits Per Second (Mbit/s)*. 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 impacts the speed at which information is delivered to and sent from Internet users. This is measured in the number of bits that can be transferred per second. The data are obtained from Internet Service Providers (ISPs) with domestic and international connectivity infrastructure.

*Presence of a national research and education network (NREN)* measures a country's ability to participate in international research.

NRENs perform two main functions in relation to scientific research:

- NRENs act as high-capacity ICT infrastructures to support the work of researchers, promote collaboration, transfer data and share information or confirm experiments;

<sup>2</sup> <http://unesdoc.unesco.org/images/0017/001781/178114eb.pdf>



- NRENs can also facilitate new research in their own right, by providing platforms and experimental test-beds for testing new services and advanced networking technologies.

**Explanatory Note:**

The network administrator often acts as an ISP and is closely identified with the network it oversees.

NRENs usually offer a mix of dedicated channels and public Internet access, often through a combination of dedicated backbones, leased lines or private-sector operators.

Networks connect a range of different institutions, often with different needs. In order to provide services to diverse clients, high capacity is often important.

### Indicator 3.3: Number of national research and education network (NREN) nodes

A *national research and education network (NREN)* is a specialized Internet service provider dedicated to supporting the needs of the research and education communities within a country. It usually administers and supports a high-speed backbone network, often offering dedicated channels for individual research projects.

NRENs perform two main functions in relation to scientific research:

- NRENs act as high-capacity ICT infrastructures to support the work of researchers, promote collaboration, transfer data and share information or confirm experiments;
- NRENs can also facilitate new research in their own right, by providing platforms and experimental test-beds for testing new services and advanced networking technologies.

The number of NREN nodes in a country depicts the size of the NREN, but such nodes are usually not all scientific and research centres and often include other institutes, such as schools, museums, libraries, hospitals or government departments.

**Explanatory Note:**

The network administrator often acts as an ISP and is closely identified with the network it oversees.

NRENs usually offer a mix of dedicated channels and public Internet access, often through a combination of dedicated backbones, leased lines or private-sector operators.

Networks connect a range of different institutions, often with different needs. In order to provide services to diverse clients, high capacity is often important.

### Indicator 3.4: Percentage of universities with broadband access to the national research and education network (NREN)

*Percentage of universities with broadband access to the national research and education network (NREN)*, refers to the percentage of a country's universities that have the access to the national research and education network (NREN) through a broadband Internet connection.

A *national research and education network (NREN)* is a specialized Internet service provider dedicated to supporting the needs of the research and education communities within a country. It usually administers and supports a high-speed backbone network, often offering dedicated channels for individual research projects.

NRENs perform two main functions in relation to scientific research:

- NRENs act as high-capacity ICT infrastructures to support the work of researchers, promote collaboration, transfer data and share information or confirm experiments;
- NRENs can also facilitate new research in their own right, by providing platforms and experimental test-beds for testing new services and advanced networking technologies.

Broadband access may be aggregated into the following broad categories:



<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

### Indicator 3.5: Percentage of public scientific and research centres with broadband access to the national research and education network (NREN)

*Percentage public scientific and research centres with broadband access to the national research and education network (NREN)*, refers to the percentage of a country's public scientific and research centres that have the access to the national research and education network (NREN) through a broadband Internet connection.

*Scientific and technical research* is defined as fundamental research, applied research (in such fields as agriculture, medicine, industrial chemistry etc.) and development work leading to new devices, products or processes<sup>3</sup>.

A *national research and education network (NREN)* is a specialized Internet service provider dedicated to supporting the needs of the research and education communities within a country. It usually administers and supports a high-speed backbone network, often offering dedicated channels for individual research projects.

NRENs perform two main functions in relation to scientific research:

- NRENs act as high-capacity ICT infrastructures to support the work of researchers, promote collaboration, transfer data and share information or confirm experiments;
- NRENs can also facilitate new research in their own right, by providing platforms and experimental test-beds for testing new services and advanced networking technologies.

Broadband access may be aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

#### Explanatory Note:

Given recent developments in collaborative research, the current classification of scientific and technical institutions may be increasingly outdated and in need of revision. The classification and number of public scientific and research centres is not straightforward to measure. Indeed, certain types of institutions (for example vocational training institutes, or institutions that have public-private partnerships or other types of collaboration) may need to be included additionally. As mentioned earlier, it is doubtful that all universities should be included.

<sup>3</sup> <http://unesdoc.unesco.org/images/0017/001781/178114eb.pdf>.

## **Indicators for measuring Target 4: Connect *all* public libraries, cultural centres, museums, post offices and archives with ICTs**

### **Indicator 4.1: Percentage of public libraries with broadband Internet access**

*Percentage of public libraries with broadband Internet access* refers to the percentage of public libraries in the country which have access to broadband Internet.

A *library* is an organization, or part of an organization, the main aims of which are to build and maintain a collection and to facilitate the use of such information resources and facilities as are required to meet the informational, research, educational, cultural or recreational needs of its users; these are the basic requirements for a library and do not exclude any additional resources and services incidental to its main purpose.<sup>4</sup>

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Broadband Internet access services are aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

### **Indicator 4.2: Percentage of public libraries providing public Internet access**

A *library* is an organization, or part of an organization, the main aims of which are to build and maintain a collection and to facilitate the use of such information resources and facilities as are required to meet the informational, research, educational, cultural or recreational needs of its users; these are the basic requirements for a library and do not exclude any additional resources and services incidental to its main purpose.<sup>5</sup>

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

*Public Internet access* refers to a library at which Internet access is made available to the public, on a full-time or part-time basis. A library should have at least one public computer for Internet access.

### **Indicator 4.3: Percentage of public libraries with a web presence**

A *library* is an organization, or part of an organization, the main aims of which are to build and maintain a collection and to facilitate the use of such information resources and facilities as are required to meet the informational, research, educational, cultural or recreational needs of its users; these are the basic requirements for a library and do not exclude any additional resources and services incidental to its main purpose.<sup>6</sup>

<sup>4</sup> [http://www.uis.unesco.org/template/pdf/cscl/Qre2007\\_Libraries\\_EN.pdf](http://www.uis.unesco.org/template/pdf/cscl/Qre2007_Libraries_EN.pdf)

<sup>5</sup> [http://www.uis.unesco.org/template/pdf/cscl/Qre2007\\_Libraries\\_EN.pdf](http://www.uis.unesco.org/template/pdf/cscl/Qre2007_Libraries_EN.pdf)

<sup>6</sup> [http://www.uis.unesco.org/template/pdf/cscl/Qre2007\\_Libraries\\_EN.pdf](http://www.uis.unesco.org/template/pdf/cscl/Qre2007_Libraries_EN.pdf)

*Web presence* includes a website, home page or presence on another entity's website (including a related business). It excludes inclusion in an on-line directory and any other web pages where the library does not have control over the content of the page.

**Explanatory Note:**

Fundamental problem is measuring the number of public libraries with a website. In some countries, there is a network of public branches that are administered by a central library. While the central library may have a website, the branches might not.

#### Indicator 4.4: Percentage of cultural centres with broadband Internet access

*Percentage of cultural centres with broadband Internet access* refers to the percentage of the country cultural centres which have the access to the Internet.

The definition of a *cultural centre* refers to the concept of *cultural institutions*.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Broadband Internet access services are aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

**Explanatory Note:**

Cultural centres can include places for arts, educational and recreational activities, exhibitions, shows, social gatherings and so forth.

#### Indicator 4.5: Percentage of cultural centres with a web presence

The definition of a *cultural centre* refers to the concept of the *cultural institutions*.

*Web presence* includes a website, home page or presence on another entity's website (including a related business). It excludes inclusion in an on-line directory and any other web pages where the cultural centre does not have control over the content of the page.

Indicator focuses on providing online content, looking at whether or not the cultural centre has a website, a prerequisite for providing online information and access to content.

**Explanatory Note:**

Cultural centres can include places for arts, educational and recreational activities, exhibitions, shows, social gatherings and so forth.

#### Indicator 4.6: Percentage of cultural centres providing public Internet access

The definition of a *cultural centre* refers to the concept of the *cultural institutions*.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

*Public Internet access* refers to a cultural centre at which Internet access is made available to the public, on a full-time or part-time basis. All such centres should have at least one public computer for Internet access.

**Explanatory Note:**

Cultural centres can include places for arts, educational and recreational activities, exhibitions, shows, social gatherings and so forth.

#### Indicator 4.7: Percentage of museums with broadband Internet access

*Percentage of museums with broadband Internet access* refers to the percentage of the country museums which have access to the Internet.

*Museum* is defined as a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.<sup>7</sup>

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Broadband Internet access services are aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

A major weakness of museum statistics is that there is no official source for recent data on the number of museums broken down by country.

#### Indicator 4.8: Percentage of museums with a web presence

*Museum* is defined as a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.<sup>8</sup>

*Web presence* includes a website, home page or presence on another entity's website (including a related business). It excludes inclusion in an on-line directory and any other web pages where the museum does not have control over the content of the page.

The indicator is useful towards measuring the online content availability of museums.

A major weakness of museum statistics is that there is no official source for recent data on the number of museums broken down by country.

#### Indicator 4.9: Percentage of post offices with broadband Internet access

<sup>7</sup> International Council of Museums (ICM), see: [http://archives.icom.museum/hist\\_def\\_eng.html](http://archives.icom.museum/hist_def_eng.html)

<sup>8</sup> International Council of Museums (ICM), see: [http://archives.icom.museum/hist\\_def\\_eng.html](http://archives.icom.museum/hist_def_eng.html)

*Percentage of post offices with broadband Internet access* refers to the percentage of the post offices in the country which should have the access to the Internet.

*Post offices* are postal establishments open to the public to which customers may apply for postal services. Sections of exchange offices or sorting offices offering similar services are also included in this category. These offices may be run by the designated operator or by third parties, and may be permanent or mobile.<sup>9</sup>

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Broadband Internet access services are aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

#### Indicator 4.10: Percentage of post offices providing public Internet access

*Percentage of post offices providing public Internet access* is measured by the proportion of the post offices offering public Internet access.

*Post offices* are postal establishments open to the public to which customers may apply for postal services. Sections of exchange offices or sorting offices offering similar services are also included in this category. These offices may be run by the designated operator or by third parties, and may be permanent or mobile.<sup>10</sup>

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

*Public Internet access* refers to a post office at which Internet access is made available to the public, on a full-time or part-time basis. A post office should have at least one public computer for Internet access.

#### Indicator 4.11: Percentage of archives with broadband Internet access

*Percentage of archives with broadband Internet access* refers to the percentage of the archives in the country which have access to the Internet.

*Archives* refer to the whole of the documents produced by an organisation, administrative unit, firm, establishment, even a family or a person, in the course of the exercise of their activities and preserved for reference purposes.<sup>11</sup>

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

<sup>9</sup> Universal Postal Union (UPU), Postal Statistics Questionnaire 2009, see: <http://www.upu.int/en/resources/postal-statistics/postal-statistics-questionnaires.html>.

<sup>10</sup> Universal Postal Union (UPU), Postal Statistics Questionnaire 2009, see: <http://www.upu.int/en/resources/postal-statistics/postal-statistics-questionnaires.html>.

<sup>11</sup> See <http://www.unesco.org/webworld/ramp/html/r8722e/r8722e17.htm>

Broadband Internet access services are aggregated into the following broad categories:

<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

#### Indicator 4.12: Percentage of archives with a web presence

*Archives* refer to the whole of the documents produced by an organisation, administrative unit, firm, establishment, even a family or a person, in the course of the exercise of their activities and preserved for reference purposes.<sup>12</sup>

*Web presence* includes a website, home page or presence on another entity's website (including a related business). It excludes inclusion in an on-line directory and any other web pages where the archive does not have control over the content of the page.

#### Indicator 4.13: Percentage of content in archives that has been digitized

*Percentage of content in archives that has been digitized* measures the amount of content potentially available online and which can be preserved and shared in digital formats.

*Archives* refer to the whole of the documents produced by an organisation, administrative unit, firm, establishment, even a family or a person, in the course of the exercise of their activities and preserved for reference purposes.<sup>13</sup>

#### Indicator 4.14: Percentage of digitized information in archives that is available online

*Percentage of digitized information in archives that is available online* measures the content which is actually available online/on the Internet.

*Archives* refer to the whole of the documents produced by an organisation, administrative unit, firm, establishment, even a family or a person, in the course of the exercise of their activities and preserved for reference purposes.<sup>14</sup>

<sup>12</sup> <http://www.unesco.org/webworld/ramp/html/r8722e/r8722e17.htm>

<sup>13</sup> <http://www.unesco.org/webworld/ramp/html/r8722e/r8722e17.htm>

<sup>14</sup> <http://www.unesco.org/webworld/ramp/html/r8722e/r8722e17.htm>

## Indicators for measuring Target 5: Connect **all** health centres and hospitals with ICTs

### Indicator 5.1: Proportion of public hospitals with Internet access, by type of access (narrowband, broadband)

*Proportion of public hospitals with Internet access, by type of access* refers to the percentage of the public hospitals in the country which have access to the Internet broken down by the type of access (narrowband or broadband).

*Hospital* is defined as residential establishment equipped with inpatient facilities for 24-hour medical and nursing care, diagnosis, treatment and rehabilitation of the sick and injured, usually for both medical and surgical conditions, and staffed with at least one physician. The hospital may also provide outpatient services.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Internet access services are aggregated into the following broad categories:

<i>Narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode.
<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

Explanatory Note:

Secondary or tertiary services are not differentiated.

Broadband connectivity is now considered essential in order to be able to work effectively with e-health tools and services using ICT.

### Indicator 5.2: Proportion of health centres with Internet access, by type of access (narrowband, broadband)

*Proportion of health centres with Internet access, by type of access* refers to the percentage of the health centres in the country which have access to the Internet broken down by the type of access (narrowband or broadband).

*Health centre* is defined as a facility that provides (ambulatory) medical and sanitary services to a specific group in a population.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Internet access services are aggregated into the following broad categories:



<i>Narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode.
<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

**Explanatory Note:**  
 Health centres can be subdivided into public and private.  
 Broadband connectivity is now considered essential in order to be able to work effectively with e-health tools and services using ICT.

#### Indicator 5.3: Proportion of public hospitals using computers/the Internet to collect/process/transmit individual patient information

*Hospital* is defined as residential establishment equipped with inpatient facilities for 24-hour medical and nursing care, diagnosis, treatment and rehabilitation of the sick and injured, usually for both medical and surgical conditions, and staffed with at least one physician. The hospital may also provide outpatient services.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

A *computer* is a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants (PDAs) or TV sets.

#### Indicator 5.4: Proportion of health centres using computers/the Internet to collect/process/transmit individual patient information

*Health centre* is defined as a facility that provides (ambulatory) medical and sanitary services to a specific group in a population.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

A *computer* is a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants (PDAs) or TV sets.



## **Indicators for measuring Target 6: Connect ~~all local and central~~ government departments and establish websites and e-mail addresses<sup>15</sup>**

### **Indicator 6.1: Percentage of persons employed in central government institutions routinely using computers**

Government employees include all persons working for the specified government institution, not only those working in clerical jobs. It includes short-term and casual employees .

A *computer* is a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants (PDAs) or TV sets.

### **Indicator 6.2: Percentage of persons employed in central government institutions routinely using the Internet**

Government employees include all persons working for the specified government institution, not only those working in clerical jobs. It includes short-term and casual employees.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

### **Indicator 6.3: Percentage of central government institutions with a Local Area Network (LAN) connecting at least two computers**

A *LAN* refers to a network connecting computers within a localized area such as a single building, department or site; it may be wireless.

### **Indicator 6.4: Percentage of central government institutions with an Intranet**

An *intranet* refers to an internal communications network using Internet protocols and allowing communication within an organization (and to other authorized persons). It is typically set up behind a firewall to control access.

### **Indicator 6.5: Percentage of central government institutions with Internet access, by type of access (narrowband, broadband)**

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Internet access services are aggregated into the following broad categories:

<i>Narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode.
<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access.

<sup>15</sup> These indicators will be completed once the Partnership core indicators on e-government have been finalized.

#### Indicator 6.6: Percentage of central government institutions with a web presence

A *web presence* includes a website, home page or presence on another entity's website (including a related institution). It excludes inclusion in an on-line directory and any other web pages where the government does not have control over the content of the page.

#### Indicator 6.7: Percentage of central government institutions offering online services by level of sophistication of service

Types of online services by level of complexity:

- Accessing general information (about the institutions, services offered, requirements, and/or documentation).
- Downloading forms (only)
- Requesting information by e-mail
- Receiving answers to email/phone inquiries
- Downloading and sending forms
- Completing/lodging online forms
- Making online payments (bills, taxes, health, licenses, certificates)
- Obtaining official certificates (through certification or electronic signature)

## **Indicators for measuring Target 7: Adapt all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances**

### **Indicator 7.1: Proportion of ICT-qualified teachers in primary and secondary schools**

Indicator 7.1 refers to the number of teachers trained to teach basic computer skills (or computing) in primary and secondary schools, expressed as a percentage of the total number of teachers at these levels of education.

*Proportion of ICT-qualified teachers in primary and secondary schools* measures the extent to which primary and secondary school teachers have the required ICT training to teach basic computer skills (or computing) classes.

This indicator is the *Partnership* indicator ED8 *Proportion of ICT-qualified teachers in primary and secondary schools (for ISCED levels 1-3)* from the UNESCO list of proposed new indicators on ICT in education.

Explanatory Note:

All teachers trained specifically in pre-service or in-service schemes in ICT according to nationally defined qualification standards are counted as qualified.

This indicator only presents the skilled teaching force available to deliver basic ICT skills (or computing) classes. This does not necessarily mean that each of the teachers recorded as qualified does actually teach a basic ICT skills (or computing) course. Furthermore, in schools where there is no ICT equipment or inadequate ICT equipment, course delivery may not be effective even though they should have teachers qualified to teach ICT.

### **Indicator 7.2: Proportion of teachers trained to teach subjects using ICT**

The *proportion of primary and secondary school teachers trained to teach subject(s) using ICT* refers to those teachers who have received a nationally defined minimum of formal training to teach one or more subjects at the relevant level(s) using ICT to support their teaching.

Indicator 7.2 measures the availability of teachers trained to use ICT to teach subjects in primary and secondary schools.

*Teacher education* refers to formal teacher training (pre-service or in-service) designed to equip teachers with the knowledge, attitude, behaviour and skills required for teaching at the relevant level.

This indicator is the indicator ED38 *Proportion of primary and secondary school teachers trained to teach subject(s) using ICT facilities (for ISCED levels 1-3)* from the UNESCO list of proposed new indicators on ICT in education.

Explanatory Note:

Trained teachers are counted according to nationally defined qualification standards.

### **Indicator 7.3: Proportion of schools with computer-assisted instruction**

*Proportion of schools with computer-assisted instruction* refers to the number of schools offering computer-assisted instruction expressed as a percentage of the total number of schools in the country.

*Indicator 7.3* measures the overall presence and availability of computer-assisted instruction in primary and secondary schools.

*Computer-assisted instruction* is defined as an interactive learning method in which a computer is used to present instructional material, monitor learning and help in selecting and accessing additional material in accordance with individual learner needs.

This indicator is the indicator ED22 *Proportion of schools with computer-assisted instruction (for ISCED*

*levels 1-3) from the UNESCO list of proposed new indicators on ICT in education.*

Explanatory Note:

From a statistical perspective, an educational institution that has a computer laboratory devoted to pedagogical use is counted as having computer-assisted instruction.

This indicator only reflects the presence and accessibility of computer-assisted instruction in schools, but not the actual intensity of use.

#### **Indicator 7.4: Proportion of schools with Internet-assisted instruction**

*Proportion of schools with Internet-assisted instruction* refers to the number of schools offering Internet-assisted instruction expressed as a percentage of the total number of schools in the country.

*Indicator 7.4* measures the overall presence and availability of Internet-assisted instruction in primary and secondary schools.

*Internet-assisted instruction* is defined as an interactive learning method in which Internet is used to deliver instructional material on a computer or through other devices, in accordance with learners' pedagogical need. It helps to develop the autonomy in research activities and information literacy skills.

This indicator is the indicator ED23 *Proportion of schools with Internet-assisted instruction (for ISCED levels 1-3)* from the UNESCO list of proposed new indicators on ICT in education.

Explanatory Note:

From a statistical perspective, an educational institution that has an Internet laboratory devoted to pedagogical use is counted as having Internet-assisted instruction.

This indicator only reflects the presence and accessibility of Internet-assisted instruction in schools, but not the actual intensity of use.

## ***Indicators for measuring Target 8: Ensure that all of the world's population have access to television and radio services***

### **Indicator 8.1: Proportion of households with a radio**

A *radio* is defined as a device capable of receiving broadcast radio signals, using popular frequencies, such as FM, AM, LW and SW. It includes a radio set integrated in a car or an alarm clock and digital audio player (MP3 player) but excludes radios integrated with a mobile phone or in a computer.

The *proportion of households with a radio* is calculated by dividing the number of in-scope households with a radio by the total number of in-scope households.

This indicator can be derived from the *Partnership* indicator HH1 *Proportion of households with a radio* and should be collected through a household survey and in censuses.

Explanatory Note:

The radio should be in working condition.

The question is asked of all in-scope households.

### **Indicator 8.2: Proportion of households with a TV**

A *TV* (television) is defined as a stand-alone device capable of receiving broadcast television signals, using popular access means such as over-the-air, cable and satellite. It excludes TV functionality integrated with another device, such as a computer or a mobile phone.

The *proportion of households with a TV* is calculated by dividing the number of in-scope households with a TV by the total number of in-scope households.

This indicator can be derived from the *Partnership* indicator HH2 *Proportion of households with a TV* and should be collected through a household survey and in censuses.

Explanatory Note:

The TV should be in working condition.

The question is asked of all in-scope households.

### **Indicator 8.3: Proportion of households with multi-channel television service, broken down by type of service**

*Multichannel television* refers to services that provide additional programming beyond the free-to-air analogue terrestrial channels. Multichannel TV services should be broken down by:

- Cable television (CATV) service refers to multichannel programming delivered over a coaxial cable for viewing on television sets
- Direct-to-home (DTH) satellite services are received via a satellite dish capable of receiving satellite television broadcasts
- Internet-Protocol TV (IPTV) is the delivery of multimedia services such as television/video/audio/text/graphics/data delivered over an IP-based network
- Digital terrestrial television (DTT) is the technological evolution and advance from analogue terrestrial television, which broadcasts land-based (terrestrial) signals.

The *proportion of households with a multichannel television service* is calculated by dividing the number of in-scope households with a multichannel television service by the total number of in-scope households.

This indicator should be collected through a household survey and in censuses.

***Indicators for measuring Target 9: Encourage the development of content and put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet***

**Indicator 9.1: Proportion of Internet users, by language**

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

An *Internet user* is a person who used the Internet from any device (including mobile phones) in the last 12 months.

**Indicator 9.2: Proportion of webpages, by language**

The basic method for measuring the *percentage of webpages* in a given language involves crawling the space to be measured and applying identification and counting techniques. Basically, if the language has a specific script for encoding, the pages are counted from that parameter. If the same script is shared by many languages (like for instance the Latin script), a language-recognition algorithm is required to identify the different languages sharing the same script.

**Indicators for measuring Target 10: Ensure that more than half the world's inhabitants have access to ICTs, *in particular broadband Internet*, within their reach *and make use of them***

**Indicator 10.1: Mobile cellular telephone subscriptions per 100 inhabitants**

*Indicator 10.1* refers to the number of mobile cellular telephone subscriptions in a country for each 100 inhabitants.

*Mobile cellular telephone subscriptions* refer to the subscriptions to a public mobile telephone service which provides access to Public Switched Telephone Network (PSTN) using cellular technology. This includes pre-paid SIM cards active during the past three months, as well as both, analogue and digital cellular systems (IMT-2000 (Third Generation, 3G) and 4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems. Subscriptions to public mobile data services, private trunked mobile radio, telepoint or radio paging, and telemetry services should also be excluded. This should include all mobile cellular subscriptions that offer voice communications.

*Mobile cellular telephone subscriptions per 100 inhabitants* is calculated by dividing the number of mobile cellular telephone subscriptions by the total population and then multiplying by 100.

This indicator is the *Partnership* indicator A2 *Mobile cellular telephone subscriptions per 100 inhabitants*.

**Explanatory Note:**

Subscriptions should be distinguished from users.

*Subscriptions* are taken by entities (e.g. businesses, individuals) that subscribe to a mobile phone service by a postpaid or prepaid account. They are likely to be legal owners of a mobile phone and the associated subscription. Individual mobile phone *users* are covered by the household indicator HH10. The household indicator is generally presented as the proportion of individuals but the underlying data refer to the number of mobile phone users.

A mobile subscription implies that a person not only has access to, but can also use, ICTs.

**Indicator 10.2: Proportion of individuals who used a mobile cellular telephone in the last 12 months**

*Indicator 10.2* refers to mobile cellular telephone use in the previous 12 months by in-scope individuals.

*Mobile cellular telephone* refers to a portable telephone subscribing to a public mobile telephone service which provides access to Public Switched Telephone Network (PSTN) using cellular technology. This includes pre-paid SIM cards active during the past three months, as well as both, analogue and digital cellular systems (IMT-2000 (Third Generation, 3G) and 4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems. Subscriptions to public mobile data services, private trunked mobile radio, telepoint or radio paging, and telemetry services should also be excluded. This should include all mobile cellular subscriptions that offer voice communications.

The *proportion of individuals who used a mobile cellular telephone* is calculated by dividing the total number of in-scope individuals who used a mobile cellular telephone in the last 12 months by the total number of in-scope individuals. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator HH10 and should be collected through a household survey.

**Explanatory Note:**

Use of a mobile phone does not require that the telephone is owned or paid for by the user. It may be available through work, a friend or family member. It may be owned collectively by several individuals or the use could be purchased from a public telephone call service.

### Indicator 10.3: Proportion of individuals who used the Internet (from any location) in the last 12 months

*Indicator 10.3* refers to Internet use in the previous 12 months from any location by in-scope individuals.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

The *proportion of individuals who used the Internet* is calculated by dividing the number of in-scope individuals who used the Internet (from any location) in the last 12 months by the total number of in-scope individuals. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator HH7 and should be collected through a household survey.

#### Explanatory Note:

Internet use may be facilitated by any device enabling Internet access (not only a computer). This includes a mobile phone, PDA, games machine and digital TV. Use can be via a fixed or mobile network.

### Indicator 10.4: Proportion of households with access to the Internet by type of access (narrowband, broadband)

*Indicator 10.4* refers to the Internet access service/s used at home by in-scope households.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Internet access services are disaggregated by the following broad categories:

<i>Narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode.
<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the Internet) via mobile cellular networks.
<i>Wireless broadband</i>	Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access. It also includes terrestrial mobile wireless access, which includes the following two types of subscriptions: <ul style="list-style-type: none"> <li>Standard mobile subscriptions with active use only, which includes mobile subscriptions with advertise data speeds of 256 kbit/s or greater and which have been used to make an Internet data connection via IP in the previous 3 months. To be counted, the subscription must allow access to the greater Internet via HTTP and must have been used to make a data connection using the Internet Protocol in the previous three months. Standard SMS and MMS messaging do not count as an active Internet data connection even if they are delivered via IP.</li> <li>Subscriptions to dedicated data services over a mobile network which are purchased separately from voice services either as a stand-alone service (modem/dongle) or as an add-on data package to voice services which requires an additional subscription. All dedicated mobile data subscriptions with recurring subscription fees are included as "active data subscriptions"</li> </ul>



	regardless of actual use. Pre-paid mobile broadband plans require active use if there is no monthly subscriptions. This could also include mobile WiMax subscriptions.
This indicator is generally calculated as the proportion of in-scope households with Internet access that use each type of access service, for instance, the proportion of households with Internet access that use a fixed broadband service as their means of access. However, it may also be useful to compare with the total population, for instance, the proportion of all households with mobile broadband. In either case, the result is then multiplied by 100 to be expressed as a percentage.	
This indicator is the <i>Partnership</i> indicator HH11 and should be collected through a household survey.	
<p>Explanatory Note:</p> <p>The Internet connection should be functional, that is, any equipment, software or services needed should be in working condition.</p> <p>It is expected that countries will collect data at a finer level than shown above. The categories chosen by countries should allow aggregation to total narrowband and total broadband, as well as to fixed and mobile broadband, as defined above. ITU's model questionnaire (Annex 2, ITU 2009a) has a set of more detailed categories: analogue modem, ISDN, other narrowband, DSL, cable modem, other fixed broadband and mobile broadband.</p> <p>As households can have more than one access service, multiple responses are possible.</p>	

#### Indicator 10.5: Proportion of businesses using computers

*Indicator 10.5* refers to the use of (not access to) computers by in-scope businesses during the reference period.

A *computer* is a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants (PDAs) or TV sets.

The *proportion of businesses using computers* is calculated by dividing the number of in-scope businesses using computers during the reference period by the total number of in-scope businesses. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator B1.

Explanatory Note:

Use can be at the business's premises or elsewhere.

There are no known significant statistical issues for this indicator, although care should be taken with the definition of *computer*.

#### Indicator 10.6: Proportion of businesses using the Internet, by type of access (narrowband, broadband)

*Indicator 10.6* refers to the use of the Internet by in-scope businesses during the reference period — whether or not the business used a computer (as the Internet may be accessed in other ways).

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files.

Internet access services are disaggregated by the following broad categories:

<i>Narrowband</i>	Includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode.
<i>Fixed (wired) broadband</i>	Refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include for example cable modem, DSL, fibre-to-the-home/building and other fixed (wired) broadband subscriptions. It excludes access to data communications (including the

	Internet) via mobile cellular networks.
<i>Wireless broadband</i>	<p>Refers to wireless high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax and fixed wireless access. It also includes terrestrial mobile wireless access, which includes the following two types of subscriptions:</p> <ul style="list-style-type: none"> <li>• Standard mobile subscriptions with active use only, which includes mobile subscriptions with advertise data speeds of 256 kbit/s or greater and which have been used to make an Internet data connection via IP in the previous 3 months. To be counted, the subscription must allow access to the greater Internet via HTTP and must have been used to make a data connection using the Internet Protocol in the previous three months. Standard SMS and MMS messaging do not count as an active Internet data connection even if they are delivered via IP.</li> <li>• Subscriptions to dedicated data services over a mobile network which are purchased separately from voice services either as a stand-alone service (modem/dongle) or as an add-on data package to voice services which requires an additional subscription. All dedicated mobile data subscriptions with recurring subscription fees are included as “active data subscriptions” regardless of actual use. Pre-paid mobile broadband plans require active use if there is no monthly subscriptions. This could also include mobile WiMax subscriptions.</li> </ul>

The *proportion of businesses using the Internet* is calculated by dividing the number of in-scope businesses using the Internet by the total number of in-scope businesses. The result is then multiplied by 100 to be expressed as a percentage.

This indicator is the *Partnership* indicator B3.

Explanatory Note:

Internet use may be facilitated by any device enabling Internet access (not only a computer). This includes a mobile phone, PDA, games machine and digital TV. Use can be via a fixed or mobile network.

Use can be at the business's premises or elsewhere. The UNCTAD (2009) model questionnaire distinguishes Internet use that takes place inside the business from use that takes place outside the business premises.

There are no known significant statistical issues with this indicator.

#### Indicator 10.7: Proportion of businesses using mobile phones

*Indicator 10.7* refers to the use of the mobile phones by in-scope businesses during the reference period.

*Mobile phones* refer to portable telephones subscribing to a public mobile telephone service which provides access to Public Switched Telephone Network (PSTN) using cellular technology. This includes pre-paid SIM cards active during the past three months, as well as both, analogue and digital cellular systems (IMT-2000 (Third Generation, 3G) and 4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems. Subscriptions to public mobile data services, private trunked mobile radio, telepoint or radio paging, and telemetry services should also be excluded. This should include all mobile cellular subscriptions that offer voice communications.

*The proportion of businesses using mobile phones* is calculated by dividing the number of in-scope businesses using mobile phones during the 12-month reference period by the total number of in-scope businesses.

This indicator is the indicator M1 from the UNCTAD list of Proposed indicators and model questions on mobile phone use in businesses<sup>16</sup>.

<sup>16</sup> [http://www.unctad.org/en/docs/sdteecb20072rev1\\_en.pdf](http://www.unctad.org/en/docs/sdteecb20072rev1_en.pdf)