11th World Telecommunication/ICT Indicators Symposium (Mexico City, 2013)

Papers

11th World Telecommunication/ICT Indicators Symposium (WTIS-13)

Mexico City, México, 4-6 December 2013

Contribution to WTIS-13

Document C/1-E
22 November 2013

English

SOURCE: Partnership on Measuring ICT for Development

TITLE: Stocktaking and Assessment on Measuring ICT and Gender

Stocktaking and Assessment on Measuring ICT and Gender

Partnership on Measuring ICT for Development

F I N A L DRAFT

November 2013

Contents

List of tables

Acknowledgements

The Stocktaking and Assessment Report on Measuring ICT and Gender was prepared by Nancy Hafkin, under the overall guidance of UNCTAD and ITU, and in consultation with members of the Partnership Task Group on Gender (TGG).

Preparation of the report was based on desk research, in person and online consultations with members of the TGG and the Partnership as a whole, as well as with other researchers on gender statistics and gender and ICT. The cooperation of all Partnership and other TGG members has been invaluable in this task. Inputs were received from the following TGG members: Susan Teltscher, Esperanza Magpantay and Doris Olaya of ITU, Torbjörn Fredriksson, Scarlett Fondeur and Diana Korka of UNCTAD, Peter Wallet and Martin Schaaper of UIS, David Hunter of ILO, Remi Lang of ESCAP, Nibal Idlebi of ESCWA, Alison Gillwald and Mariama Deen-Swarray of RIA, Shazna Zuhyle of LIRNEasia, Sophia Huyer of WISAT, Sonia Jorge and Karin Alexander of the Web Foundation.

In-person meetings took place especially at the Women, ICT and Development (WICTAD) Forum in Washington in January 2013, at the meeting of the Working Group on Gender of the United Nations Broadband Commission in Mexico City in April 2013 and at the meeting of the WSIS Forum in Geneva in May 2013.

Organizations members of the Partnership on Measuring ICT for Development are grateful for the sharing of data by national statistical offices (NSOs) and the responses received to annual survey questionnaires on measuring information and communication technology (ICT).

The report was financed by the Government of Sweden.

Executive Summary

This report constitutes part of the effort the Task Group on Gender (TGG) of the Partnership on Measuring ICT for Development to improve the availability of sex-disaggregated data, especially in developing countries. It takes stock of existing ICT indicators disaggregated by sex, assesses data availability and identifies main gaps based on an evaluation of needs and demand for such indicators. It furthermore identifies areas covered as well as potential new areas where sex-disaggregated data are desirable and to identify methodological work to be conducted in order to develop relevant indicators and address the data gaps.

The major reason for defining and collecting gender-related statistics on ICT is to identify and document differential access to and use of ICT by sex in order to inform national policy and set international policy goals as a necessary prerequisite to the achievement of a globally equitable information society. The importance of this undertaking has been affirmed in many arenas, including the World Summit on the Information Society (WSIS) and the Millennium Development Goals (MDGs).

When aggregate data collection masks gender differences, women's realities go unrecorded and are ignored, not only in statistics but also in policy formulation. As ICT becomes increasingly vital to innumerable aspects of everyday life globally, attention is directed to digital divides, among which the gender divide is a major concern.

Collection of ICT-related gender statistics ensures that the realities of both men and women are reflected in national ICT data in order to provide the basis for gender-inclusive policy and planning. The paucity of sex-disaggregated ICT data, particularly from developing countries, makes it difficult to assess the case for policymakers to include gender issues in ICT policies, plans and strategies. Efforts to encourage the collection of gender and ICT statistics and indicators focus particularly on developing countries because both the disparities as well as the opportunities that ICT offer girls and women are great.

The Partnership on Measuring ICT for Development, established in 2004, has developed a core list of ICT indicators. The latest version of the list (2013) includes 57 indicators, twelve of which are collected disaggregated by sex (Annex I).

Efforts made by the Partnership and TGG members to collect gender-related ICT statistics are detailed in this report, including those of ITU, UIS, UNCTAD, ILO, United Nations Regional Commissions, Eurostat, OECD, LIRNEasia, Research ICT Africa, Women in Global Society and Technology and the World Wide Web Foundation. Other multi-national efforts and international research studies to define indicators and measure gender and ICT are also outlined. It is necessary, however, to distinguish between data that can be compared internationally, which is the objective of the Partnership, and other efforts to collect and disseminate data.

The almost total absence of ICT statistics and indicators from international gender equality statistics and indicators is underlined in the expectation that better communication between gender statistics and ICT statistics communities could improve this situation. The United Nations Inter-Agency Expert Group on Gender Statistics (IAEG-GS) has taken encouraging steps in this direction.

There is demand for a great variety of information about the relationship between gender and ICT in various realms. Based on a survey of the literature on gender and ICT, areas of high demand for gender-related indicators are identified and proposal made for sex-disaggregation of existing indicators and the addition of new indicators in line with Partnership principles, notably:

- Have information society policy importance at national, regional and international level

- Be simple, realistic and measurable indicators
- Bear a high probability of country response
- Keep the burden of data collection to a minimum

Among the areas covered by the proposed changes, where internationally comparable, reliable gender-related data is lacking are in ICTs and education, in accessing and using ICTs, on barriers to the Internet, in employment in the ICT sector itself and in ICT occupations across many sectors, on ICT in the work force and in entrepreneurship, and on the several aspects mobile phone phenomenon, particularly in developing countries.

The suggested list on measuring gender and ICT comprises:

i) revisions to existing core indicators/surveys,

ii) proposed new indicators, some of which necessitate further development work, and

iii) existing core indicators, of which some have data collection issues, as shown in the Table 1.

The proposed indicators cover the measurement categories of household/individual use, employment, education, business and enterprise/small business owners. Two areas were highlighted for consideration in future revisions and indicator development work: gender equality in broadband access and gender-based violence.

Collection of data on these indicators would be important steps towards the process of building inclusive information societies.

Table 1. Existing core indicators, suggested revisions and proposed new indicators on measuring gender and ICT

Indicator no.	Indicator	Existing/Proposed revisions to existing indicator/Proposed new indicator	Further work needed
Household/individual ICT usage			
HH1, HH2, HH3, HH4, HH6, H11, HH13, HH14, HH16	Households access indicators	Existing Filter question on sex of household head	No change
HH5	Proportion of individuals using a computer	Existing	No change
HH7	Proportion of individuals using the Internet	Existing	No change
HH8	Proportion of individuals using the Internet, by location	Existing	No change
HH9	Proportion of individuals using the Internet, by type of activity	Existing	No change
HH10	Proportion of individuals using a mobile cellular telephone	Existing	No change
HH12	Proportion of individuals using the Internet, by frequency	Existing	No change
HH15	Individuals with ICT skills, by type of skills	Existing	No change

Indicator no.	Indicator	Existing/Proposed revisions to existing indicator/Proposed new indicator	Further work needed
	Proportion of individuals who own a mobile phone	*Proposed new indicator*	*Definition of mobile phone ownership*
	Proportion of individuals using a mobile phone, by type of activity	*Proposed new indicator*	*Development of responses on mobile phone activities*
	Proportion of individuals not using the Internet , by type of barriers	*Proposed new indicator*	*Development of list of barriers to Internet access by individuals*
Education			
ED6	Proportion of learners who have access to the Internet at school	Existing	No change
ED7	Proportion of learners enrolled at the post-secondary level in ICT-related fields	Existing	Data are currently not available for this indicator. UNESCO to collect data on this indicator.
ED8	Proportion of ICT-qualified teachers in schools	Existing	
	Proportion of primary and secondary school teachers trained to teach subjects using ICT facilities (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on non-core indicator ED38
	Proportion of pupils enrolled in programmes offering computer assisted instruction (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on existing indicator
	Proportion of pupils enrolled in programmes offering Internet-assisted instruction (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on existing indicator
	Proportion of pupils enrolled in programmes offering courses in basic computer skills or computing (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on existing indicator
	Proportion of graduates in ICT-related fields at post-secondary non-tertiary and tertiary levels (sex disaggregated)	*Proposed new indicator*	Based on non-core indicator ED46
Employment			
ICT1	Proportion of total business sector workforce involved in the ICT sector	*Proposed revision:* sex disaggregation	
	Proportion of employees in ICT occupations	*Proposed new indicator*	Definition and measurement of ICT occupations
Business			
B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11,	Business access indicators	*Proposed revision:* addition of filter question on gender composition of business	Precise formulation of filter question to be determined: male/female dominated,

Indicator no.	Indicator	Existing/Proposed revisions to existing indicator/Proposed new indicator	Further work needed
B12		employees	neutral
Entrepreneurship/ small business owners			
	Proportion of micro, small business owners/ entrepreneurs using the Internet (sex disaggregated)	*Proposed new indicator*	*Elaboration and implementation of a survey instrument for micro and small businesses with an ICT module* *Development of responses on Internet by type of activities*
	Proportion of micro, small business owners/ entrepreneurs using mobile phones (sex disaggregated)	*Proposed new indicator*	
	Proportion of micro, small business owners/ entrepreneurs using mobile phones by type of activity (sex disaggregated)	*Proposed new indicator*	
	Proportion of micro, small business owners/ entrepreneurs using the Internet by type of activity (sex disaggregated)	*Proposed new indicator*	
E-Government			
EG1	Proportion of persons employed in central Government organizations routinely using computers	Existing	No change in definition. Data are currently not available and should be collected for this indicator.
EG2	Proportion of persons employed in central Government organizations routinely using computers	Existing	No change in definition. Data are currently not available and should be collected for this indicator.

Recommendations

To the Partnership

Continue improving collection of ICT individual-level data, particularly from developing countries, is key to obtaining gender-related ICT statistics. Especially in developing countries the most important activities for the Partnership to pursue are its efforts to encourage NSOs and other official statistical entities in developing countries to collect individual-level ICT data, with sex as a classificatory variable.

The Partnership as a whole and its members individually need to raise awareness among policy makers and data producers of the importance of gender ICT statistics, emphasizing that this can be done without the allocation of additional resources through the collection of individual-level ICT statistics in such a way that they can be easily disaggregated.

The Partnership, through the Task Group of Gender, should continue and increase its interaction with the gender statistics community, especially through the IAEG-GS to foster awareness of the importance of ICT to gender issues.

Efforts should be made especially to promote the collection of data on the use of mobile cellular phones by individuals, particularly in developing countries, because in many developing countries, and especially for girls and women, they are the most-used ICT.

At national level

National statistical offices (NSOs), in collaboration with ICT policy makers, should take into account the integration of a gender perspective into ICT data from the first stage of planning data collection, and setting out the objectives of the survey or census.

As important as promoting an awareness of gender is an emphasis on the collection of internationally comparable statistics, in order to facilitate sound analysis and the development of successful policies and programmes.

While ICT surveys are most desirable for the number of questions that can be included, the inclusion of ICT questions in a module in existing surveys, such as a census or labour force survey, is also valuable.

Efforts need to be made to avoid gender bias and to ensure that the situation of girls and women is properly reflected in individual-level ICT data through guidelines, manuals and training of supervisory and field personnel.

Last but not least, NSOs should disseminate widely the results obtained from the data collection.

Chapter 1 Introduction

Objective of this report

This report constitutes part of the effort the Task Group on Gender (TGG) of the Partnership on Measuring ICT for Development to improve the availability of internationally comparable sex-disaggregated data, especially in developing countries. While it is directed towards the Partnership and national statistical offices (NSOs), it should be of interest to all those concerned with ensuring e-inclusion in the information society. The TGG is led jointly by ITU and UNCTAD and includes other Partnership members: the UNESCO Institute for Statistics (UIS), the United Nations Economic and Social Commission for Western Asia (ESCWA) and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). The International Labour Organization (ILO), LIRNEasia, Research ICT Africa, Women in Global Science and Technology and the World Wide Web Foundation are also TGG members. To achieve its goals the Task Group also collaborates with other organizations including the United Nations Inter-Agency Expert Group on Gender Statistics (IAEG-GS) and the Women, ICT, and Development (WICTAD) International Forum.

The report attempts to achieve the following objectives:

> . . to take stock of existing ICT indicators disaggregated by sex, assess data availability and identify main gaps, presented at the country or regional level based on an evaluation of needs and demand for such indicators, to identify areas covered as well as potential new areas where sex-disaggregated data are desirable to identify methodological work needed to be conducted in order to develop relevant indicators and to address the data gaps.[1]

It pays special attention to development of indicators relevant to gender and ICT in developing countries.

The need for gender statistics

The major reason for defining and collecting gender statistics on ICT is to identify and document differential access to and use of ICT by sex in order to inform national policy and set international policy goals**.** The collection and analysis of ICT gender statistics is a necessary prerequisite to the achievement of a globally equitable information society.

Men and women the world over have different realities, roles, positions and constraints. Too often the situation of men is taken to be the norm for both men and women, ignoring the differences between them. The 2012 UNDP Gender Inequality Index[2] shows that no country in the world has achieved gender equality.[3] Most women tend to be poorer than men and in many countries they are less educated. The majority of the world's illiterates are women. Women in general tend to earn less, hold fewer positions of power and make fewer decisions in the family, in businesses and in political and public life. These inequalities impact women's ability to benefit equally from the opportunities offered by ICT and to contribute fully to shaping the developing global knowledge economy and society.

---

[1] Partnership on Measuring ICT for Development, Task Group on Gender Terms of Reference, 25 March 2013.

[2] UNDP. 2012. *Gender Inequality Index*. http://hdr.undp.org/en/statistics/gii/.

Redressing gender equalities as a matter of equal rights does not give a full picture of the reasons for addressing gender-related issues in ICT. There is a clear economic case for gender equality, as shown by research that closing of gender gaps could lead to substantial increases in per capita income.[3] The roles of women in social development are unquestionable, particularly in the education of children, in the health and well-being of their families. In both their social roles as family caretaker and their production roles, women can profit from ICTs that could obviate their reduced mobility, overcome barriers to information access and increase their economic opportunities and contribute to the reduction of poverty. The case has been made in many arenas of the role that ICTs can play in all aspects of economic and social development. It stands to reason that the full participation of both men and women in access to and use of ICTs will increase the positive impact of ICT. To reach the point of full participation requires knowledge of any gender inequities that exist.

When aggregate data collection masks gender differences, women's realities go unrecorded and are ignored, not only in statistics but also in policy. This realization is at the base of the field of gender statistics. As ICTs become increasingly vital to innumerable aspects of everyday life globally, attention is directed to digital divides, among which the gender divide is a major concern.[4] Collection of gender-related ICT statistics is undertaken in an effort to ensure that the realities of both men and women are reflected in national ICT data in order to provide the basis for gender-inclusive policy and planning.[5]

Without data there is no visibility. Without visibility there is no priority

The paucity of sex-disaggregated ICT data, particularly from developing countries, makes it difficult if not impossible, to make the case to policymakers for the inclusion of gender issues in ICT policies, plans and strategies. The lack of visibility in data resulting from the scarcity of gender statistics carries over to policy and its implementation. The dearth of gender-specific data available to policy makers is reflected in the absence of gender awareness in ICT and ICT-related policies as well as the undertaking of costly gender initiatives on the basis of little evidence.

Internationally comparable ICT gender statistics can provide insight into the use of ICT for economic and social development. They allow us to learn the ways in which men and women experience ICTs differently and to understand the scope and intensity of the gender digital divide. They are necessary to ensure economic efficiency and national development based on the full utilization of human resources that is especially important in a global knowledge society. The desired result is that men and women contribute equally to the building of national knowledge societies. The cost of not doing so is immense.[6]

---

[3] United Nations.2013. Women's role in economic development: Overcoming the constraints. Background paper for the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda. http://unsdsn.org/files/2013/05/130520-Women-Economic-Development-Paper-for-HLP.pdf

[4] The first use of the terms digital divide did not consider gender. Originating in the United States, it identified gaps based on race, ethnicity and geographical location but made no reference to differences between the sexes. Nancy Hafkin, Gender. 2012, in George Sadowsky, ed., *Accelerating Development Using the Web: Empowering Poor and Marginalized Populations*. Washington: World Wide Web Foundation. http://public.webfoundation.org/publications/accelerating-development/.

[5] UNDESA. 2013. Bringing gender to the forefront of statistics. https://www.un.org/en/development/desa/news/statistics/gender.html

[6] This is evidenced by the UNDP Gender Inequality index that measures percentage loss to potential human development due to shortfalls in the gender equality, with national losses ranging from 4.5 per cent loss (in human development due to inequality between female and male achievements in the

The area of concern for gender and ICT statistics and indicators is broad. ICT is not a stand-alone matter, but permeates such fields as education, health, governance, agriculture, finance, labour and science and technology, all of which have gender issues. The outcome of gender inequities is that ICT policies, strategies, programmes and projects are not gender neutral. ICT impacts men and women differently. Both technology and gender are socially constructed, and society impacts the relationship between the two.[7] Women have many disadvantages in the face of new technologies that result in their often having less access to, less use of and fewer benefits from them. [8] Many things can come between women and the new technology: social norms about appropriate behaviour of women, cultural attitudes, gendered division of labour, gender stereotypes and even gender-based violence. Women may also have more to gain from ICT than men, in time, freedom and opportunities.

The widely acknowledged instrumentality of women in the achievement of all of the Millennium Development Goals (MDGs), adopted in 2000 to provide a framework for the promotion and monitoring of poverty reduction and improvement of quality of life in developing countries, makes it difficult to escape the conclusion that ICTs need to incorporate a strong measure of gender awareness to achieve their targeted impact on the goals.[9]

The policy implication of gender disparities in access to and use of ICT, especially for developing countries, is that unless special interventions are made, most women will not benefit from the information society to the extent that men do. Differential access and usage by males and females call for special attention to gender issues to realize gender equality and fully utilize a country's human potential. The first step in doing this is the collection of data that identifies possible inequalities and problems. If ICT always affected men and women similarly, it would not be necessary to distinguish the situation of women and sex-disaggregated statistics would not be needed for policy making.

The evolution of gender-related ICT statistics

The past ten to fifteen years have seen tremendous advances in the availability of Internet and mobile telephones as well as the development of myriad new applications and functionalities for these technologies and the increasing convergence between them. Internationally comparable statistics and indicators are required to document their spread, the places and frequency of use and the impact they have on the economic and social development of countries and to be able to compare developments across countries.

With growing awareness of the tremendous impacts of the new technologies has come a drive to understand their social impact, to know what individuals use what devices to do what, where and to what effect. The awareness of inequalities among beneficiaries and the need for e-inclusion calls for disaggregated measures of access and use. With this has come the emergence of interest in gender-related ICT statistics and indicators.

---

labour force, empowerment and reproductive health) in the Netherlands to 74.7 per cent in Yemen. UNDP. 2013. *Gender Inequality Index*. http://hdr.undp.org/en/statistics/gii/.

[7] For a comprehensive discussion of gender and technology see J. Wajcman. 2010. Feminist theories of technology. *Cambridge Journal of Economics,* 34 (1), 143-52.

[8] Hafkin. 2002. Are ICTs gender neutral? Lead paper for United Nations INSTRAW discussion list on gender and the digital divide. http://www.un-instraw.org.

[9] Sophia Huyer, Hafkin, Heidi Ertl and Heather Dryburgh. 2005. *Women in the Information Society* Montreal: Orbicom. http://www.itu.int/ITU-D/ict/publications/dd/material/index_ict_opp.pdf. This publication outlines the gender equality dimension of each of the MDGs along with the gender equality and ICT applications, 136.

In discussing gender it is vital to remember that gender/sex categories are not homogenous. There is tremendous variation within the population of women in any given country with regard to age, ethnicity, education, skills, employment, income and geography, among other factors. Scholars have argued that some of these categories – individually or in groups—are more determinate of a woman's relationship to ICT than her sex. It is important to look at gender in relation to these other categories in order to have a nuanced view of gender and ICT. For example, RIA's research in 12 African countries showed that education and income were stronger determinants of ICT access and use than gender. Socio-cultural gender factors, which also underlie the reasons why more women are concentrated in the uneducated, unemployed and poor, also marginalise them from optimal use of ICTs.[10] Another study showed a positive correlation between being a woman and ICT, when gender inequalities are removed and women are put on an equal footing with men.[11] But these inequalities exist – even in advanced countries – so they must be taken into account.

Several measures adopted by the United Nations led to the awareness of collecting gender and ICT statistics. Initial stimulus came from the 2001 Economic and Social Council (ECOSOC) resolution E/2001/L.29 on "Social and human rights questions: advancement of women" that called for mainstreaming a gender perspective into all policies and programmes of the United Nations system." The Commission on the Status of Women session focused on women, media and communication (2003) highlighted gender and ICT statistics and indicators and recommended that Governments and relevant United Nations agencies and organizations:

> . . . increase efforts to compile and disaggregate by sex and age, statistics on ICT use, in order to develop gender-specific indicators on ICT use and needs and to collect gender-specific data on employment and education patterns in the media and in ICT professions.[12]

The World Summit on the Information Society (WSIS) in its first phase (Geneva, 2003) recognized this gap in the lack of gender-related indicators and recommended corrective action:

> Gender-specific indicators on ICT use and needs should be developed and measurable performance indicators should be identified to assess the impact of funded ICT projects on the lives of women and girls.[13]

The Geneva Declaration of Principles (2003) emanating from WSIS stated that it was "... fully committed to an Information Society that enables women's empowerment and full participation in all spheres of society and all decision-making processes."

---

[10] Alison Gillwald, Anne Milek & Christoph Stork. Gender assessment of access and usage in Africa. 2010. Research ICT Africa. http://www.researchictafrica.net/publications/Towards_Evidence-based_ICT_Policy_and_Regulation__Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%205%20%20Gender%20Assessment%20of%20ICT%20Access%20and%20Usage%20in%20Africa%202010.pdf

[11] Martin Hilbert. 2010. Digital gender divide or technologically empowered women in developing countries? *Women's Studies International Forum*, 3(6), 479-489. http://www.martinhilbert.8m.net/DigitalGenderDivide.pdf.

[12] 47th Session of the [United Nations] Commission on the Status of Women. 2003. Participation and access of women to the media, and information and communications technologies and their impact on and use as an instrument for the advancement and of women. Agreed Conclusions, 3. http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N03/332/81/PDF/N0333281.pdf.

[13] WSIS 2003, Plan of Action, First Phase of the WSIS (10-12 December 2003, Geneva) Geneva Plan of Action, item 28d.WSIS-03/GENEVA/DOC/0005, http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=1161%7C1160.

Although the WSIS Plan of Action (2003) spoke of the need for gender analysis to be included in an ICT development index and the statistics generated to set up the index,[14] the Plan of Action made no reference to the collection of sex-disaggregated data, which are the basis for developing gender-specific indicators and it set no gender-specific targets.

Advent of the Partnership on Measuring ICT for Development

The Partnership on Measuring ICT for Development, launched at UNCTAD XI in Sao Paulo in 2004, was enjoined in the Tunis agenda emanating from the second phase of WSIS in 2005, to WSIS efforts to develop specific gender-disaggregated indicators to measure the various dimensions of the digital divide.[15] The objective of the Partnership was to provide reliable, internationally comparable indicators across countries to document the spread of ICT for development.

A major advance in the collection of sex-disaggregated ICT statistics came with the ITU addition in 2005 of person-level data to the collection of ICT use in household surveys and, in 2007, disaggregation by sex, among other classificatory variables. There were seven individual use indicators established at this time, as shown in Table 2, with multiple responses possible for three of them (H8, H9 and H12). It was noted that sub-indicators be constructed using the individual classificatory variables of age, gender, highest education level, employment status and occupation.[16]

Table 2: Partnership Core Indicators with possibility of disaggregation by sex in 2007

Indicator ID	Indicator
HH5	Proportion of individuals who used a computer in the past 12 months
HH6	Proportion of households with Internet access
HH7	Proportion of individuals who used the Internet in the past 12 months
HH8	Location of individual use of the Internet in the past 12 months
HH9	Internet activities undertaken by individuals in the past 12 months
HH10	Proportion of individuals who used a mobile cellular telephone in the past 12 months
HH12	Frequency of individual use of the Internet in the past 12 months

Source: United Nations Statistical Commission, 2009.

The importance of including individual use questions in the household surveys cannot be overly emphasized. Until this took place, there was no way to disaggregate individual use at the household level, which is essential to understanding gender differences since access to ICT in the household as a whole does not guarantee its use by all persons. Another advantage of the collection of core indicators

[14] Hafkin & Huyer suggested ways of including gender analysis and gender statistics in a digital divide index in *Engendering the Knowledge Society: Measuring Women's Participation*. 2007, Chapter 2. Montreal: ORBICOM.

[15] ITU. 2005. WSIS Tunis Agenda for the Information Society. WSIS-05/TUNIS/DOC/6 (Rev. 1)-E. Date: 18 November 2005. http://www.itu.int/wsis/docs2/tunis/off/6rev1.html.

[16] United Nations Statistical Commission. 2009. Revisions and additions to the core list of ICT indicators. http://unstats.un.org/unsd/statcom/doc09/bg-ictindicators.pdf.

on individual use is that they permit questions about the use of technologies not only at home but at other places as well and that they can be disaggregated to age and educational level.

ITU's recently issued policy on Gender Equality & Mainstreaming that underlines the basic case for gender statistics and indicators could further boost the work of the Partnership on gender statistics and indicators:

> As the United Nations specialized agency for information and communication technologies, ITU's overall mission is "Connecting the World". In this context, including a gender perspective in ITU's work is essential to ensure that the benefits of ICT are made available to all women and men on a fair and equitable basis.[17]

[17] ITU. 2013. Report by the Secretary-General, ITU'S Activities Related to Resolution 70 (Rev. Guadalajara, 2010) Corrigendum 1 to Document C13/39-E, 18 June 2013.

Chapter 2 Measurement of gender and ICT

Measurement of gender and ICT within the Partnership and its Task Group on Gender (TGG)

This chapter summarises existing work on gender-related ICT indicators of the Partnership, its TGG members, and others working in the area of international statistics.

Partnership core indicators

The latest version of the Partnership on Measuring ICT for Development core list of ICT indicators (2013) includes 57 indicators, covering ICT infrastructure and access, access to and use of ICT by households and individuals, use of ICT by businesses, the ICT sector, trade in ICT goods, ICT in education and e-government (Annex I). Of these 57 indicators, twelve can be collected disaggregated by sex. Seven fall within the purview of ITU, while three are the concern of UNESCO through its Institute for Statistics. No international agency as yet collects the two person-level indicators of e-government, as they have not yet been widely tested.[18] None of the business indicators are yet disaggregated by sex.

Activities of Partnership members on gender-related statistics

ITU

ITU has a long history in defining and collecting internationally comparable telecommunication/ICT indicators, playing a key role in standardizing their definitions. The first indicators collected with sex-disaggregation were those on telecommunication staff (full-time equivalent telecommunication employees) and Internet users, which were provided by telecommunication operators and authorities from countries. More recently, in 2005, and closely linked to the WSIS, ITU expanded its statistical work into the area of household statistics and started to collect data on ICT household indicators from national statistical offices. As an active member of the Partnership on Measuring ICT for Development ITU has contributed to the development of the core list of ICT household indicators, including their definitions, consultations with stakeholders, and the preparation of relevant methodological documents. Sex-disaggregated data on these ICT household indicators started to be collected annually by ITU through its questionnaire sent to national statistical offices (NSOs) in 2007. In countries, this information is collected by NSOs through national household surveys. Core indicators on aspects of individual use of ICT can now provide information on the gender dimension.

In addition to gender, data for each of the individual ICT use indicators are also collected and can be broken down by age; urban/rural location; educational level; labour force status; and occupation of the person. Indicators are also broken down by gender these classifications (for example, by age and gender simultaneously), but not all countries report them since sample design and sizes do not necessarily allow

[18] United Nations Economic and Social Council. 2011. Report of the Partnership on Measuring Information and Communication Technology for Development. Note by the Secretary-General. http://unstats.un.org/unsd/statcom/doc12/2012-12-ICT-E.pdf.

for such level of disaggregation in household surveys. By 2011, ICT use data was reported by 38 developing countries (up from 30 in 2008) and 38 developed countries.[19] ITU has also been delivering training courses on measuring ICT access and use by households and individuals in developing countries.

ITU disseminates the sex-disaggregated data that it collects in a number of forms, including the electronic database, World Telecommunication/ICT Indicators (WTI) database, the Yearbook of Statistics, and through its website. The Measuring the Information Society (MIS) report 2011 included a chapter on Internet use where the gender dimension is analysed.

ITU also participates in the United Nations Inter-Agency Expert Group on Gender Statistics (IAEG-GS), which considers three ICT-related indicators in their minimum set of gender indicators. ITU is currently contributing with data for two of them (proportion of individuals using the Internet and proportion of individuals using a mobile cellular telephone).

UNCTAD

UNCTAD currently collects data on 12 core indicators measuring the use of ICT in business. While gender has long been identified as an important dimension of the digital divide, at the time when the core indicators were proposed, it was not clear how the business indicators could be disaggregated by sex, and none of the business core indicators and data is currently disaggregated by sex. The present report makes a few proposals on how this issue could be addressed.

UNCTAD has been extensively involved in issues related to gender in the information economy, notably in the *Information Economy Report* of 2010 that covered in-depth the linkage between women, ICT and the information economy and poverty alleviation while the 2011 report contained a chapter on women entrepreneurship and ICT.[20] In 2012 UNCTAD received a grant from the Government of Sweden, through the Swedish International Development Cooperation Agency (Sida), to improve together with the Partnership the availability of gender-related statistical indicators and data and to develop the capacity of NSOs to collect such internationally comparable data.[21]

UNESCO Institute of Statistics (UIS)

UIS has been deeply involved in the disaggregation of education statistics and indicators by sex for more than 50 years. Based on administrative data of pupils and teachers, UIS helps to monitor the achievement of the gender-related aspects of the MDGs and Education for All (EFA).

UIS is internationally mandated to administer statistical data collections on the availability, use and impacts of ICT in education. By 2013, UIS collected data from 86 developing and 12 developed economies and has published data with accompanying analytical reports. In relation to ICT and gender,

---

[19] Data supplied by ITU. Developed and developing countries as defined by the United Nations Statistics Division. http://unstats.un.org/unsd/methods/m49/m49regin.htm.

[20] UNCTAD, 2010, Information Economy Report. http://unctad.org/en/docs/ier2010_embargo2010_en.pdf**.** UNCTAD, 2011. Information Economy Report, 2011.

[21] UNCTAD, 2013. Sweden contributes to the work of UNCTAD on ICT data and leveraging ICTs for women's entrepreneurship. http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=305&Sitemap_x0020_Taxonomy=Technology%20and%20Logistics.#1570.Science, Technology and Innovation.20.UNCTAD Home.1946.ICTs and Women's Entrepreneurship.

UIS collects sex-disaggregated enrolment data in programmes offering various types of ICT-assisted instruction as well as on the training of teachers. UIS has also been developing statistical capacity in different regions by holding workshops with representatives from relevant Ministries, particularly Education, as well as from national statistical offices.

United Nations Regional Commissions[22]

Only some of the regional commissions collect ICT data; others publish ITU ICT data.

Economic Commission for Africa

The Economic Commission for Africa has two initiatives that collect sex-disaggregated and gender-related data from its member States. It has developed an African database entitled Scan ICT, covering 62 core indicators, with both age and gender as classificatory variables on its individual indicators. While the database has not been updated recently, ECA is continuing the Scan ICT programme with NSOs in Nigeria, Morocco and Namibia. The participating countries generally use the Partnership core indicators.[23]

ECA also has a regional entry into the composite gender index field, in the African Gender and Development Index (AGDI) that notably of all the composite gender equality indexes includes an indicator of the inclusion of gender issues in technology policies of African states, explicitly including ICT.[24] The index is currently being piloted in 30 African countries.

Economic and Social Commission for Asia and the Pacific (ESCAP)

ESCAP does not collect ICT data from member States. ESCAP conducted a review of national gender statistics collection in 2012 that showed that slightly more than a quarter said they never collected gender and ICT statistics, while the same percentage said they collected them regularly.[25] However, the response rate was less than half of ESCAP's members and did not include mainland China, India or the Republic of Korea (which has extensive gender and ICT statistics). Significantly, no country identified ICT as an area where it planned to expand the production of gender statistics.

Economic and Social Commission for Western Asia (ESCWA)

In the past decade ESCWA started a project on Arab Women in Science and Technology, which included a list of indicators adopted by high-level decision makers from 15 Arab countries. Finding sex-disaggregated data available only from Egypt, Jordan and Palestine, the secretariat discontinued the

---

[22] ECA, ESCAP, ESCWA and ECLAC are members of the Partnership. ESCAP and ESCWA are also members of the TGG.

[23] ECA and Partnership on Measuring ICT for Development. 2011. *Framework for a set of e-government core indicators.* http://www.itu.int/ITUD/ict/partnership/material/Framework_for_a_set_of_E-Government_Core_Indicators_Final_rev1.pdf; National Information Technology Development Agency. 2012. *DRAFT FINAL REPORT SCAN□ICT NIGERIA 2011 PHASE I Household and Individual Survey. (Volume 1).* Unpublished report submitted to United Nations Economic Commission for Africa

[24] ECA. 2004. *African Gender and Development Index*. 2004. ECA. Addis Ababa. http://www.uneca.org/sites/default/files/publications/agdi_book_final.pdf.

[25] The review was based on the UNSD Global review of gender statistics common questionnaire sent to all United Nations regional commissions. http://unstats.un.org/unsd/gender/Jordan_Mar2012/Default_Jordan_2012.html.

project and urged all Arab member States to collect sex-disaggregated data in technical and scientific areas. The 2013 ESCWA Expert Group Meeting on the Role of ICT in Socio-economic Development recommended bridging the gender digital gap in the region. ESCWA is also undertaking a study on the impact of ICT on Arab youth, with particular attention to gender issues, including the potential of ICT for women's empowerment in higher education and employment.

The 2012 review of gender statistics in ESCWA member States, based on responses from 13 (of 14) States, showed that all respondents had at least a gender focal point in the NSO, but none reported the ICT government entity collecting gender statistics. Seven countries, however, said they produced gender and ICT statistics regularly, three reported they did so irregularly and two said they never did. No country reported gender and ICT as an area in its expansion plan. At the same time, however, the report listed it as a field mentioned for national priority.[26]

Economic Commission for Latin America and the Caribbean (ECLAC)

With assistance from the International Development Research Centre (IDRC, Canada) the Economic Commission for Latin America and the Caribbean established the Observatory for the Information Society in Latin America and the Caribbean (OSILAC) to promote the creation of ICT statistics in 2004.[27] OSILAC worked with NSOs of the region to include ICT indicators in existing household surveys and promoted the Partnership core indicators on ICT, with gender as one of the individual variables.[28]

ECLAC highlighted its gender and ICT data at the 12th Regional Conference on Women in Latin American and the Caribbean on women's economic empowerment, gender equality and ICT held in the Dominican Republic in October 2013.[29] ECLAC also maintains a database on gender equality through its Gender Equality Observatory for Latin American and the Caribbean but none of the indicators in this database refer to ICT.[30]

EUROSTAT

Eurostat has extensive information society statistics that cover the ICT sector, broadband and connectivity, ICT usage by households, individuals and enterprises and e-public services. Indicators of ICT usage for its Households and by Individuals surveys are broken down by gender, among a number of other classificatory variables including age and educational attainment.[31] The vast number of person-

---

[26] Neda Jafar, ESCWA Review of Gender Statistics. Presentation at 2012 Global Forum on Gender Statistics, Dead Sea, Jordan, 27-29 March 2012.

[27] What is OSILAC? 2013. http://www.cepal.org/cgi-bin/getprod.asp?xml=/socinfo/noticias/paginas/8/44988/P44988.xml&xsl=/socinfo/tpl-i/p18f-st.xsl&base=/socinfo/tpl-i/top-bottom.xsl.

[28] http://estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/estadisticasIndicadores.asp?idioma=e

[29] http://www.cepal.org/cgi-bin/getProd.asp?xml=/mujer/noticias/noticias/6/46146/P46146.xml&xsl=/mujer/tpl-i/p1f.xsl&base=/mujer/tpl/top-bottom.xslt

[30] User Manual for the Gender Equality Observatory for Latin America and the Caribbean. 2010. ECLAC: Santiago. http://www.eclac.cl/publicaciones/xml/2/40112/ManualObservatorioWebIngles.pdf.

[31] EUROSTAT information society databases are publically available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive_databases. Eurostat ICT usage statistics cover the member states of the European Union plus Norway, Iceland, candidate and accession countries to the EU.

level variables includes many with regard to online purchases and problems encountered there, willingness to pay for online content and use of online public services.[32]

OECD

OECD collects a large number of individual use ICT indicators from its members on the basis of its Model survey on ICT usage by households/individuals (2005).[33] That questionnaire is being updated to increase the number of breakdowns and variables.[34] The current questionnaire includes queries about viruses and protection therefrom, good computer practices (e.g. backup), most recent use of the Internet and access to the Internet by other than broadband. There are also detailed questions on Internet purchase of goods and services, which may have less applicability in non-OECD countries.[35]

In its *Guide to Measuring the Information Society* (2011), OECD publishes tables on the availability of Partnership core indicators of household and individual use as well as of education for non-OECD economies, listing economies, individual indicators and their availability for 2009 or latest year.[36] The OECD Directorate for Science, Technology and Industry is collecting a set of sex-disaggregated indicators (comparable to those of the Eurostat database) for non-European OECD countries.[37] OECD also has a gender data portal, but none of the data relate to ICT.[38] OECD published an extensive paper on gender and ICT in 2006 that covered a number of aspects of employment, access to ICT and gender differentials in ICT use in developed countries.[39]

---

[32] All the variables are listed at this site: http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/documents/Tab/Variables%20summary%20HH%202003-2012.pdf.

[33] OECD. 2005. ICT access and use by households and individuals: Revised OECD model survey http://www.oecd.org/dataoecd/58/27/35937246.pdf.

[34] OECD. 2013. Information and Communication Technology in *OECD Statistical Programme of Work.* http://www.oecd.org/std/OECD-main-statistical-activities-2013.pdf.

[35] OECD model questionnaire for ICT access and use by households and individuals. 2005, Table 6.A1.1 in OECD. 2011. *OECD Guide to Measuring the Information Society*. Paris: OECD. http://browse.oecdbookshop.org/oecd/pdfs/free/9311021e.pdf.

[36] Economies were listed only if they supplied information on at least one household/individual use indicator. OECD. 2011. *Guide to Measuring the Information Society*. https://www.google.com/search?q=oecd+guide+to+measuring+the+information+society+2011&oq=OECD+guide+measu&aqs=chrome.2.69i57j0l5.13969j0j4&sourceid=chrome&espv=210&es_sm=91&ie=UTF-8

[37] *Ibíd*. In the 2013 listing data were available from six non-OECD member countries (Argentina, Bahrain, Belarus, Jordan, Malaysia and Mauritius).

[38] http://www.oecd.org/gender/data/.

[39] Pierre Montagnier & Desirée van Welsum, ICTs and Gender – Evidence from OECD and Non-OECD Countries. OECD, Directorate for Science, Technology and Industry. 2006. http://www.unctad.org/sections/wcmu/docs/c3em29p025_en.pdf

Gender-related ICT statistics and indicators of other TGG members

International Labour Organization (ILO)

All person-level official statistics compiled and disseminated by the ILO are disaggregated by sex, when this is possible and meaningful. In 1993 the ILO launched the SEGREGAT database containing statistics on employment by sex and detailed occupational groups to measure and analyse occupational segregation between men and women. The database now covers 85 developed and developing countries but has not been updated since the early 2000s.[40] Data on employment in ICT occupations are available only to the extent that the national and international occupation classifications used in the database allow for their separate identification. According to the ILO, sex-disaggregated labour statistics are becoming more widely available as many NSOs are mainstreaming gender in the production and presentation of labour statistics.[41]

The most recent ILOSTAT database includes data on employment disaggregated by sex for ICT professionals, as defined in the International Standard Classification of Occupations, 2008 (ISCO-08). Data are currently available for 25 countries globally for the years 2009 and 2010 on ICT professionals, who represent a very important component of the work force engaged in the production of ICT goods and services.[42] The ILO also disseminates statistics on employment, hours worked and earnings classified by sex, of economic activity at the most aggregate division level of the relevant version of the International Standard Industrial Classification (ISIC).

LIRNEasia[43]

LIRNEasia has a rich database of sex-disaggregated data on mobile phone use by low-income individuals in a number of Asian countries. Between 2005 and 2011 they completed four studies the Base of the Pyramid (BoP)[44] classified by socio-economic groups D & E, corresponding to an average individual income of approximately $2/day, living in both urban and rural areas.[45] The studies were multi-country, including Bangladesh, India, Indonesia, Pakistan, the Philippines, Sri Lanka and Thailand. LIRNEasia has been active in studying mobile phone ownership and use, especially for productive purposes.[46]

LIRNEasia is currently completing a BoP urban microentrepreneur survey with data disaggregated by sex in Bangladesh, India and Sri Lanka. The survey focuses on how the urban BoP microenterprises use

---

[40] Budget, human resources and technological difficulties have constrained updating.

[41] National Statistics. 2013. http://www.ilo.org/global/statistics-and-databases/statistics-overview-and-topics/gender/national-statistics/lang--en/index.htm.

[42] Not all of these 25 countries could provide data for both years. For some countries data on hours worked and earnings by sex are also missing.

[43] See www.lirneasia.net.

[44] Base of the Pyramid and Bottom of the Pyramid are both used interchangeably to describe the same population (BoP). There is some preference for "Base" rather than "Bottom" because of the negative connotation of the latter.

[45] Socio Economic Groups (SEC) are classified by level of education and occupation. Page 8, http://www.lirneasia.net/wp-content/uploads/2008/03/whos-got-the-phone-gender-bop-v18.pdf

[46] More information on LIRNEasia's research and indicator work is available at http://lirneasia.net/projects/ict-indicators/.

telecommunications, electricity and government services and interact with these service providers. LIRNEasia contributed their BoP teleuse data to the GSMA mWomen initiative.

Research ICT Africa (RIA)[47]

Based in Cape Town (South Africa), RIA is an independent network of researchers covering 20 African countries across geographical and linguistic zones. Since 2005 RIA has produced large sex-disaggregated African data sets from its ICT access and use surveys. Its samples are nationally representative of rural and urban areas for households and individuals 15 years or older and are based on census-sampling frames from national statistical offices.

RIA's survey data are unique for a region where neither special ICT surveys nor the inclusion of sex-disaggregated ICT indicators in household and individual user surveys is common. Sex-disaggregated person-level indicators cover the platforms of mobiles and computers and the topics of mobile money, e-government and e-health. In 2010 RIA published its *Gender Assessment of ICT access and usage in Africa* of 17 countries using gender analysis of sex-disaggregated ICT indicators combined with qualitative data from focus group discussions and other variables.[48] This study was updated in 2013 with the publication of *Lifting the Veil on ICT: Gender Indicators in Africa.*[49] One of RIA's findings is that "men and women are not able to access and use ICTs equally [in Africa] and that the fundamental reason for this lies in the gender disparities found in income and education." [50] Their conclusions stress the importance of policy intervention to ensure social and economic inclusion of women over targeted ICT interventions.

Women in Global Science and Technology (WISAT)

Since 2007, in cooperation with ORBICOM, Elsevier Foundation and the Organization for Women in Science for the Developing World, WISAT has developed a framework for quantitative and qualitative research on women in the knowledge society entitled *Gender Equality in the Knowledge Society* (GEKS). The framework starts with the base conditions for socioeconomic and political development that determine the ability of both women and men to contribute to the knowledge society and then incorporates indicators relating to the ability of women and men to participate in the knowledge society. The quantitative framework combines indicators available from international statistical sources on science and technology, education, gender and ICT with measures of lifelong learning and women's public access to information technology and role in management of such information centres.[51] Using the GEKS framework national researchers in seven countries and one region undertook studies in 2012 based on collecting quantitative indicators combined with qualitative research. Additional country studies were underway in 2013.[52]

---

[47] http://www.researchictafrica.net/about.php.
[48] Gillwald et al. 2010.
[49] Deen Swarray, Gillwald and Morrell. 2013. Available at http://www.researchICAafrica.net.
[50] RIA. 2013. Lifting the gender veil on ICT Indicators, 1.
[51] The indicators used are defined in Huyer and Hafkin, 2007. *Engendering the Knowledge Society: Measuring Women's Participation*, Orbicom: Montreal. Available online at: http://www.comminit.com/global/node/302008.
[52] The national assessments from the countries of the European Union (globally), Brazil, India, Indonesia, Korea, South Africa and the United States are available at http://wisat.org/programmes/national-assessments-on-gender-sti/.

World Wide Web Foundation

Founded by Sir Tim Berners-Lee in 2009, the objective of the World Wide Web Foundation is to promote an open and accessible Web. The foundation launched its Web index for 61 countries in 2012 and expanded it to 81 countries in 2013. The index combines international data from official providers with survey data gathered by a questionnaire completed by experts on ICT in that country, checked against those of peer and regional reviewers. The indicators are qualitative, based on experts' opinions.[53]

The Web Index survey questions are directed at some of the major gender issues regarding ICT and the Internet – including gender-based violence (GBV) in terms of utilization of the web as an information source rather than addressing any direct association between ICT and GBV, women's leadership position in ICT, Internet training programmes for women and government encouragement of Internet access for women. Given the Web Foundation's concern with access and affordability, as host of the Alliance for Affordable Internet the absence is notable of any question about costs of Internet access and women's disposable income to meet those costs.

Other efforts to measure ICT & Gender

This section looks at other efforts and international research studies to define indicators and measure gender and ICT ranging from the United Nations to nongovernmental organizations, foundations and the private sector.

Gender Evaluation Methodology for Internet and ICTs (GEM)

The Association for Progressive Communication Gender Evaluation Methodology for Internet and ICTs (GEM)[54] is described as an initiative to measure gender benefits from ICT. GEM is directed at the project level and combines quantitative data collection with qualitative research to evaluate the impact of ICT on the lives of women, their families and communities. It is a set of guidelines for gender analysis that is most effective in creating awareness of the need for gender analysis in ICT for development projects.

Régentic

Régentic was an ambitious project undertaken from 2003-2005 to develop gender ICT indicators in French-speaking West Africa. Supported by IDRC, it involved large-scale research with a sample of nearly 7000 persons in six West African countries. The project defined four categories for its indicators: Decision making and policy, Skills, Content and Connectivity. ICT devices (defined as computers, Internet and mobile phones) were treated as a single research entity to which all questions referred. Questionnaires were administered to men and women as well as to institutions to collect data on how men and women differ in their relationships to ICT.[16] Among the less commonly collected indicators in this study are the data on women in ICT decision-making positions and in ICT policies.

Women and the Web

Women and the Web (2013) research by Intel involved 1800 in-person and 400 online surveys, a relatively small sample for a quantitative global survey. The individual surveys of women conducted in Mexico, India, Uganda and Egypt, included questions on women's Internet usage patterns, preferences,

[53] World Wide Web Foundation. 2013. "Web Index 2013 Expert Survey Indicators Question List." Unpublished document.

[54] http://www.apc.org/en/projects/gender-evaluation-methodology-internet-and-icts-ge.

location of usage, usage platforms, perceptions of the Internet and barriers to Internet access. Most questions were qualitative, eliciting perceptions, opinions, attitudes and beliefs, e.g. what effect has the Internet had on your life? [55] Some scholars have criticized the methodology, particularly in measuring the percentage contribution to GDP of increased female Internet use. [56]

Women & Mobile: a Global Opportunity

The GSMA/Blair Foundation study on women and mobiles makes an economic case for the connection between owning mobile telephones and empowerment for BoP women. The study data posits a gender gap of 300 million fewer women users of mobiles than men in low- and middle-income countries in 2010, a figure that has come in for criticism from the academic community for its methodology.[57]

Both of these studies appear to be motivated by market opportunities among previously untapped consumer groups in developing countries and emerging markets. Intel envisions a computer market of 1.2 billion girls and women in low- and middle-income countries within three years while GSMA sees opportunities from 300 million females for mobile operators. It postulates that the road to women's empowerment is through ownership (not just use) of mobile phones, while the Intel study concludes that computer-based access to the Internet is the key to gender equality.

Gender and Development/Equality Statistics, Indicators & Indexes

There is a clear disconnect between gender statistics and ICT and gender-related ICT statistics. The Partnership and WSIS have promoted the collection of gender-related ICT statistics with the belief that disaggregation by sex is an important element in working towards inclusive economic and social development linked to ICT and the information society. The gender statistics community does not seem to have similar awareness of the importance of ICT to gender equality and women's empowerment. As the 2013 report of the Secretary General states**, "**The production of gender statistics still focuses predominantly on traditional areas and less on emerging areas."[58]

While gender statistics are concerned with integrating a gender perspective into national statistics, it might be well served to consider integrating an ICT perspective into gender statistics, particularly in view of the global importance of the information/knowledge society. While nearly 40 percent of national statistics-producing countries were producing gender statistics on ICT, slightly more said they were not producing any.[59] Few countries listed gender and ICT as a priority area.

This section briefly describes some of the major international indexes and statistical initiatives on gender and development and equality to document this disconnect. Composite gender equality indexes, most of which concentrate on economic participation and national competitiveness, are almost completely devoid of indicators or analysis of women's participation in the ICT world, whether as users or producers. The almost total absence of ICT from these composite indexes is a glaring omission. Both gender and ICT are crosscutting development areas: the intersection of the two should be a topic of

---

[55] Copies of the sample survey questionnaires were supplied by Renee Wittmeyer, director of *Women and the Web* study, Intel.

[56] Critique made by several participants at WICTAD Forum, Washington, DC, 10-11 January 2013.

[57] Hafkin, 2012, Gender, in Sadowsky, ed., *Accelerating Development Using the Web*.

[58] United Nations Statistical Commission. 2013. Gender Statistics. Report of the Secretary General. 3. E/CN.3/2013/10. http://unstats.un.org/unsd/statcom/doc13/2013-10-GenderStats-E.pdf.

[59] Ibid., Annex B.

concern for both. Just as gender has become a category of importance in ICT for development, it seems that ICT should be given adequate attention in gender statistics. Regrettably, this is not the case.

OECD Social Institutions and Gender Index

OECD has produced the Social Institutions and Gender Index (SIGI)[60] based on its Gender Institutions and Development database since 2009. SIGI looks for root causes behind inequality based on the areas of Family Codes, Physical Integrity, Son Preference, Civil Liberties and Ownership Rights. It differs from several other gender indexes for its emphasis on the social rather than the economic arena. Based on a composite of indicators of each of these areas, the index calculates an inequality score and ranks countries accordingly. None of these data refer to ICT.

Social Watch Gender Equity Index (GEI)

The Social Watch Gender Equity Index has been produced since 2007 by the Network of East-West Women, an international NGO communication and resource network that supports research and advocacy about the status of women in Central and Eastern Europe, the Newly Independent States and the Russian Federation. Presently covering 154 countries, the index aims to show statistically that economic development does not necessarily correlate with gender equality. It computes an average of gender inequalities in three dimensions: education, economic activity and participation in political and economic decision-making but omits the average level of income in a country to avoid skewing rankings towards rich countries.[61] Countries including Mongolia, Rwanda, the Philippines and Nicaragua have ranked relatively high while richer countries such as Turkey and Saudi Arabia ranked very low. There is no mention of ICT in any of the dimensions.

UNDP Gender Inequality Index (GII)

The UNDP GII is designed to be complementary to its annual Human Development Report (HDP) and Index, which is not disaggregated by sex. The GII, introduced into the HDP in 2010, replaced two earlier indices – The Gender and Development Index and the Gender Empowerment Measure (GEM),[62] both of which were criticized for being too closely tied to a country's overall level of development. The new index measures the percentage of loss in human development due to gender inequality, based on indicators of reproductive health, empowerment and labour market participation. Again, there is no discussion of ICT.

[60] http://www.oecd.org/dev/poverty/theoecdsocialinstitutionsandgenderindex.htm
[61] http://www.socialwatch.org/node/14372.
[62] Not to be confused with the Association for Progressive Communication Gender Evaluation Methodology for Internet and ICTs, also known as GEM.

World Economic Forum Global Gender Gap Index[63]

In existence since 2006, this index attempts to capture the magnitude of gender disparities in a country by looking at the distribution between men and women of resources and opportunities in the economic, political, educational and health areas. Based on internationally available statistics, the index attempts to track the correlation between a country's gender gap and its national competitiveness. The index includes the indicator of women's share of professional and technical workers but makes no specific reference to ICT in its analysis.[64]

IAEG-GS

In almost all the cases examined, there is a poor interface between gender indicators and ICT indicators especially in the area of gender equality statistics and indicators. The work of the United Nations Inter-Agency Expert Group on Gender Statistics is a significant exception to this, especially since 2012, in its realization of importance of ICT in statistics on gender. At the 2012 Global Forum on Gender Statistics meeting at the Dead Sea, Jordan the Inter-Agency Expert proposed a minimum set of 52 gender indicators, including three related to information technology. The three are:

- Proportion of population using the Internet, by sex
- Proportion of population using mobile/cellular telephones, by sex
- Proportion of households with access to mass media (radio, TV, Internet), by sex of household head[65]

This is a very important step, signalling an awakening on the part of the international gender statistics community to the significance of gender and ICT. It is hoped that this inclusion will increase general awareness of the importance of gender considerations in ICT and lead to the addition of other related indicators to the suggested minimum list of gender indicators.

EDGE

The Evidence and Data for Gender Equality (EDGE) Initiative is a new partnership organized by IAEG-GS to promote efforts towards comparable gender indicators on education, employment, entrepreneurship and assets. The fact that EDGE is strongly supported by the IAEG-GS should bode well for the collection of ICT and gender indicators by the field of gender statistics. Jointly managed by the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women) and the United Nations Statistics Division, in collaboration with member States, the World Bank, the OECD and others, the objective of EDGE is to meet the demand from member States for support in accessing and using gender statistics by helping to build national capacity and strengthen national systems on data collection in critical areas. It will also promote developing statistical standards and definitions of gender indicators.

Between 2012 and 2015 EDGE will focus on women's education, employment and entrepreneurship, all areas in which ICT should figure prominently. The long-term goal of EDGE is to secure the integration of gender issues into regular statistical production and build countries' capacities to produce gender data in all critical policy areas. It is hoped that the Partnership can collaborate with EDGE on gender and ICT statistics.

---

[63] http://www.weforum.org/issues/global-gender-gap.

[64] The World Economic Forum. *The Global Gender Gap Report*. 2012. http://www3.weforum.org/docs/WEF_GenderGap_Report_2012.pdf.

[65] http://unstats.un.org/unsd/gender/Jordan_Mar2012/Minimum List of Indicators.pdf. The list of indicators was proposed by ITU and was agreed upon to at the 4th meeting of the IAEG-GS, held from 4 to 6 October 2012.

Chapter 3 Identifying areas of demand and indicators

This chapter identifies areas of demand for gender ICT statistics and indicators based on literature in the field, describes the work of the Partnership, presents existing gender indicators in relevant areas, makes recommendations for new gender-related core ICT indicators and updating of existing indicators and notes methodological considerations for further work of the Partnership/TGG.

Identifying areas of demand for gender ICT statistics

There is demand for a great variety of information about the relationship between gender and ICT in various realms. In 2013 The Partnership organized discussions to identify demand both at the WICTAD meeting in Washington and at the panel on Measuring ICT and Gender at the WSIS Forum in Geneva.[66] In reviewing these meetings and surveying the literature on gender and ICT, the following issues, phrased in the form of questions, stand out:[67]

- What are the gender differences in the access to ICT – especially the Internet and mobile phones?
- What are the gender differences in how, where, when and why men and women use the technology?
- What barriers do women face in accessing the Internet?
- Do women have the education, training and skills required to function in the information society?
- What are the gender disparities in ICT employment and entrepreneurship?
- How can ICT help women's entrepreneurship, income generation and self-employment?
- What content do girls and women want and need? Is it accessible to them?
- How can ICTs improve the health situation of girls and women and their families in developing countries?
- What are the gendered ICT issues of privacy, safety and security?
- What is the extent of women's representation and participation in ICT policy and governance?
- What is the impact of ICT on women's empowerment?

This list of topics informs the following discussion of potential indicators.

The Partnership and gender issues

A list of gender issues in ICT for development does not always fit easily into the standard categories of the Partnership, as per the mandates of the Partner members. In order to deal with the vast amount of literature on gender and ICT for development, it is important to define what is properly the concern for the Partnership to pursue and what is not. The purpose of the gender-related data whose collection is promoted by the Partnership is to provide a picture of the situation of women and girls in comparison to

[66] Torbjörn Fredriksson, 2013. Workstream Session on: Measuring Gender and ICTs. Presentation and Women and ICT for Development Forum, 10-11 January. Washington, DC.

[67] The number of such studies is too many to list and could easily take volumes to analyze. A selected list references appears in Annex II.

that of men and boys globally, by countries, with regard to the multiple areas in which ICT enters their lives.

The Partnership aims to produce indicators that can be compared across all countries based on agreed definitions and methodologies and using data representative of a country's population. Core indicators need to be succinct and follow certain principles:

- Have information society policy importance at national, regional and international level
- Be simple, realistic and measurable indicators
- Bear a high probability of country response
- Keep the burden of data collection to a minimum

The resources of NSOs in developing countries influence whether certain gender-relevant and statistically definable indicators can be collected. The determination of which fields are the most important and the desire to collect information on a broad range of issues must be balanced with the ability to collect the data.

The Partnership is also somewhat limited in the definition of indicators to the areas in which NSOs and partners collect ICT data. The issue of mobile phones and the empowerment of women in developing countries, a topic of major interest in the field of ICT for development, illustrates this. The Partnership can define indicators that would measure male and female use and access in each of its domains—household/individual use, employment, education, business—but it would not be possible to establish the causal effects of ICT use on gender empowerment through national-level quantitative data collection following international standards.

Partnership indicators and data help to establish the basic facts and to paint the picture. The causal ("why") and impact ("to what end") questions become the work of researchers, including gender and development analysts.[68] Researchers are frequently looking for evidence of the impact of ICT on gender, both positive and negative. For instance – have women's employment opportunities or income increased as a result of their access to ICT? Do gender conflicts about ICT access and use lead to gender-based violence? Questions of impact are most easily addressed by small-scale surveys and qualitative case studies, rather than through official statistics.[69]

Many of the listed areas of concern are already addressed by existing quantitative national-level indicators, but with limited data available from developing countries. Others have been partially addressed, but require further coverage. The collection of international comparable, reliable ICT indicators cannot fulfil all the data needs for understanding gender, ICT and international development. Data on some topics fall outside of the domain of national statistics and needs to be met in other ways. For the time being the collection of sex-disaggregated ICT penetration and use statistics from all countries is sufficiently challenging in itself.

---

[68] This is particularly the case with measuring the impact of ICT on gender. The complexity of ICT impact studies is covered at length in UNCTAD. 2011, *Measuring the Impacts of Information and Communication Technology for Development*. Geneva: UNCTAD. http://unctad.org/en/docs/dtlstict2011d1_en.pdf. Quantitative ICT research can, however, answer *why* questions through responses to barriers to Internet use in household/individual use surveys.

[69] However, some statisticians have suggested impact as a possible future area of ICT indicators for NSOs. OECD. 2006. Measuring the Impacts of ICT Using Official Statistics. OECD Digital Economy Papers, no 136. http://www.oecd.org/science/sci-tech/39869939.pdf.

Identifying areas of demand and relevant indicators

A. Household access and individual use of ICT

Gender is among the classificatory variables recommended for the core individual ICT use indicators established by the Partnership to be collected by NSOs, thus opening the way to providing extensive information on the gender dimension. Such indicators are needed to assess a variety of gender and ICT issues ranging from quantifying male-female differentials in computer use, to identifying gender awareness of information and services available on the Internet, and measuring gender-based gaps in ICT skills. ITU is charged with the collection of these indicators.

A.1. Existing core ICT indicators

There are currently seven gender-related indicators among the household ICT access and individual ICT use core indicators, reflecting the latest revisions of the indicators. Methods and sources of data collection of the indicators are detailed in Core ICT Indicators 2010 and in *Manual for Measuring ICT Access and Use by Households and Individuals* (2009).[70]

Data for each of the individual use indicators are also collected and can be broken down by age and gender, urban/rural location and gender, educational level and gender, labour force status and gender, and occupation of the person and gender.[71] Since the responses are important from the gender point of view, allowing the possibility of identifying male-female differentials in use, all the response categories for the individual use indicators are shown below.

HH5 Proportion of individuals who use a computer[72]
HH7 Proportion of individuals who use the Internet
HH8 Location of individual use of the Internet

- Home
- Work
- Place of education
- Another person's home
- Community Internet access facility (typically free of charge)
- Commercial Internet access facility (typically paid)
- In mobility (i.e. during a journey in metro, bus, train etc.)

[70] Partnership on Measuring ICT for Development. 2010. *Core ICT Indicators 2010*. Geneva: UNCTAD & ITU. http://www.uis.unesco.org/Communication/Documents/Core_ICT_Indicators_2010.pdf.
Manual for Measuring ICT Access and Use by Households and Individuals. Revised edition. Geneva: 2009. http://www.itu.int/en/ITU-D/Statistics/Pages/publications/manual2009.aspx. The 2009 edition of the Manual is currently under revision and a new 2013 edition will become available.

[71] Education is classified by International Standard Classification of Education (ISCED) levels, labour force status by International Classification of Status in Employment (ISCE-93) and occupations by International Standard Classification of Occupations (ISCO) major groups.

[72] In the 1st Meeting of the EGH the definition of a computer was updated to include tablets and similar handheld computers. ITU. 2013. Final Report of the 1st Meeting of the ITU Expert Group on ICT Household Indicators (EGH) São Paulo, Brazil, 4-6 June 2013.

HH9 Internet activities undertaken by individuals

Getting information about goods or services
Seeking health information (on injury, disease, nutrition etc.)
Making an appointment with a health practitioner via a website
Getting information from general government organizations
Interacting with general government organizations
Sending or receiving e-mail
Telephoning over the Internet/VoIP
Participating in social networks (creating user profile, posting messages, or other contributions to Facebook, Twitter etc.)
Accessing chat sites, blogs, newsgroups or online discussions
Purchasing or ordering goods or services
Selling of goods or services (e.g. eBay, Facebook)
Using services related to travel or travel-related accommodation
Internet banking
Doing a formal online course (in any subject)
Consulting wikis (e.g. Wikipedia), online encyclopaedias or other websites for formal learning purposes
Listening to web radio
Watching web television
Playing/streaming or downloading games, images, videos or music
Downloading software and applications
Reading or downloading on-line newspapers or magazines, electronic books
Looking for a job or sending a job application
Participating in professional networks (creating user profiles, posting messages or other contributions to LinkedIn, Xing etc.)
Teleworking
Managing personal/own homepage
Uploading self/user-created content (text, images, photos, videos, music, software etc.) to any website to be shared
Blogging (maintaining or adding content to a blog)
Posting opinions on civic or political issues via websites (e.g. blogs, social networks, etc.)
Taking part in on-line consultations or voting to define civic or political issues (e.g. urban planning, signing a petition)
Using storage space on the Internet to save documents, pictures, music, video, other files (e.g. Google Drive, Dropbox, Windows SkyDrive, iCloud, Amazon Cloud Drive)
Using software run over the Internet for editing text documents, spreadsheets or presentations (e.g. Google Docs, Office 365)

This indicator comprises an extensive list of individual activities on the Internet, the responses to which disaggregated by sex go a long way towards supplying information on the topic of women and sufficient relevant content. A separate, sex-disaggregated sub-indicator can be computed for each of these categories. For example, the demand for data on women's use of ICT for health is expressed frequently, especially with regard to seeking health-related information or services. The second and third responses to HH9 cover these concerns.

Another important gender issue covered in HH9 is access of women to e-government services and information. Four of the responses are potential sources of data on male-female differentials in the use

of e-governance services. The gender equitable utilization of e-government services has substantial policy significance because women in developing countries frequently have less mobility and income than men and may experience discrimination or harassment in utilizing government services in person. Data in this area can also identify gender awareness or lack thereof in the services and information provided. It is desirable to know whether an equitable number of females are accessing government information and services using the Internet and whether they are finding the information and services they need. This aspect of e-governance is addressed in the responses to household and individual use indicator HH9, which include using the Internet to get information from general government organizations and to interact with general government organizations. HH9 can also provide gender-related information and illustrate gender differentials on the utilization of social media.

HH10 Proportion of individuals who use a mobile cellular telephone

This is an important indicator on which to examine gender differentials because of the intense interest in the mobile phone as an instrument for women's empowerment.[73]

HH12 Frequency of individual use of the Internet

At least once a day
At least once a week but not every day,
At least once a month but not every week, or less than once a month

HH15 ICT skills of individuals

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

Added to the list of Core ICT indicators in 2013, HH15 is significant because it is the first core ICT indicator that measures ICT skills of individuals, with a breakdown by sex. Until now this was an area missing from the Partnership core list of indicators. In view of the lack of data on ICT skills, adult literacy rates and gross secondary and tertiary-level enrolment rates were used as proxy indicators for ICT skills in the ICT Development Index (IDI).[74] ICT skills information has also been largely absent from international standard statistics, except for those of highly developed countries and economies. Eurostat's household and individual usage questionnaire first collected data in 2011 on e-skills related to

[73] See particularly GSMA, 2010. *Women & Mobile: A Global Opportunity* on the association between mobile phones and women's empowerment. Given the plethora of references on this subject, an extended list of references of gender issues in mobile telephony appears in Annex II.
[74] ITU. 2012. Measuring the Information Society. ITU: Geneva. http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2012/MIS2012_without_Annex_4.pdf.

both computer use in general and Internet skills. Eurostat collected data on ICT skills, disaggregated by sex through two indicators for the first time in 2011.[75]

While the ICT skills in HH15 are listed more or less in ascending order of difficulty, the first three could be regarded as basic skill level, while the next five require a low to moderate level of skills and the last can be regarded as high level, involving a substantial increase in skill level from those that have gone before it.

The presence of the existing individual-level indicators on the core list of the Partnership does not guarantee their being collected by many developing countries. They are being collected by some, but not many (fewer than one-third in all cases), countries in Africa, the Arab States and Asia and the Pacific, as illustrated by Table 3. In the Americas and CIS roughly two-fifths of countries collect ICT use indicators.

The basic problem is that NSOs in many developing countries do not collect ICT indicators in the first place or collect only a few indicators on household access to ICT but not on individual usage of ICTs. Those few that do collect usage data normally can disaggregate them by sex since it is a standard classificatory variable in the household survey. Of those that report ICT use indicators, nearly 90 per cent disaggregate ICT them by sex. The individual indicator least likely to be collected was that on mobile phone use, which was collected by only 30 per cent of the countries that collected ICT use indicators. Only in Europe are the large majority of countries reporting ICT use indicators, disaggregated by sex (Table 3).

The data collection gap on individual use indicators has obvious implications for the paucity of gender and ICT data. The general lack of individual ICT statistics results in the specific lack of internationally comparable, quality data on gender and ICT for informing policy and long-term planning, particularly for low-income countries.

Table 3: Countries reporting on the core ICT access and use indicators to ITU, 2009-2011[76]

Region (1)	Total countries	No. of countries reporting ICT use indicators	Proportion of countries reporting ICT use indicators (%)	No. of countries reporting ICT use indicators disaggregated by sex
Africa	44	2	4.5	2
Arab States	21	4	19.0	4
Asia & Pacific	40	11	27.5	10
CIS	12	5	41.7	4
The Americas	35	14	40.0	13
Europe	43	36	83.7	36
	195	72		69

Source: Data supplied by ITU.[77]

(1) ITU definition of regions.

[75] http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/documents/Tab/Breakdowns%20summary%20HH%202003_2012.pdf.
http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/isoc_bde15c_esms.htm.

[76] Based on ITU country groupings.

[77] Data supplied by ITU. More data may be available.

Household composition

This has been recently added as a classificatory variable in the household information. The gender-related purpose was to determine whether female-headed households are disadvantaged in comparison to other types of households in ICT access and usage. ITU has already moved in this direction with its proposal to the IAEG-GS to add *by sex of household head* to the indicators on proportion of household with radio, TV and Internet. The United Nations regards the collection of statistics and indicators on female-headed households as an important aspect in poverty alleviation and the achievement of Millennium Development Goals.[78] Statistical evidence of disparities between female-headed households and other households could lead to policy and programmes that facilitate female-households access to ICT, also likely increasing the access and usage by girl children. This addition could bring interesting results to HH16 on household expenditures on ICT, enumerating possible differences between female-headed households and other household and also to HH11 on type of Internet access, exploring possible differences in access to broadband.

One of the methodological difficulties would be the identification of female-headed households, especially in the case where a male adult was present. It would be important to avoid gender bias on the part of enumerators who may assume that no female can be head of household if an adult male is present. Enumerators and even respondents may simply take such an assumption for granted, but demographic changes particularly in the economic roles of women call this into question.[79]

A second difficulty is that of defining the list of categories of household composition. The traditional notion of the existence of a head of household assumes that most households are family and that one person has primary authority and responsibility for household affairs and its economic support is no longer relevant in many countries. There are multiple forms of households that were not common in the past, such as same-sex households, with and without children, child-headed households,[80] jointly headed households and households of unrelated individuals, among others. It is often very difficult to get respondents in household surveys to designate a household head according to objective criteria or even to find objective criteria that could be used for definition. In the absence of clear criteria, the household reference person in household surveys and censuses is often used for family coding purposes but this can be arbitrary. More research needs to be done in order to know country practices in identification of household heads or the equivalent as categories of household composition before this variable can be finalized.

The concept of household composition would need to be clarified, but would include female-headed households as one of the categories of households. This variable would allow a gendered comparison for purposes of identifying any disadvantages to female-households in their ICT access and use. A further point of controversy is whether, in contrast to the accepted orthodoxy on the subject, female-headed households as a whole are more likely to be disadvantaged than male-headed households.[81]

---

[78] United Nations. 2010. The World's Women 2010. New York: United Nations. http://unstats.un.org/unsd/demographic/products/Worldswomen/WW_full%20report_BW.pdf.

[79] United Nations. 2010. Principles and Recommendations for Population and Housing Censuses, Revision 2 2.116. para 2.114-2.119. http://unstats.un.org/unsd/publication/SeriesM/Seriesm_67rev2e.pdf.

[80] This is a statistical category used in South Africa where in HIV/AIDS-affected areas child-headed households have become common. In other countries with the presence of an aged grandparent, children are actually heading the household.

[81] Sylvia Chant, 2004. Dangerous Equations? How Female-headed Households Became the Poorest of the Poor: Causes, Consequences and Cautions. *IDS Bulletin*, 35, 4, 19-26.

A.2. Additions/changes to household/individual use indicators

Proposed additional indicators:

A.2.1 Proportion of individuals using a mobile phone by type of activity

A.2.2 Proportion of individuals who own a mobile phone

A.2.3 Proportion of individuals not using the Internet, by type of barriers

A.2.1. Proportion of individuals using a mobile phone by type of activity

An indicator of how both males and females use their phones is important in itself and for analysis of the gender differentials in their use. This indicator will illustrate the range of activities they have on mobiles as well as the limitations thereto. It will also indicate differentials between males and females in mobile skill sets. It is particularly important for developing countries where the mobile phone is the dominant ICT, and where a much higher proportion of women use mobile phones than use computers. The indicator will need to consider both Internet-enabled phones and those that are not. A sub-indicator of activities by those using unconnected phones, disaggregated by sex, would be very interesting for analysis of gender differentials.

The question and responses will need to be defined. They should address educational activities including mobile learning. Given the global proliferation of mobile phones, it is difficult to define a comprehensive list of activities, which vary greatly from country to country and by age, gender, geographical location, income, education, etc. Since the core indicators concentrate on economic and social development, it is important to include development-directed categories. Following Amartya Sen's argument that development is freedom, a variety of leisure activities as well as more purposeful ones should be included.[82]

Possible responses with gender issues:

- Sending or receiving text messages
- Undertaking financial or banking transactions
- Making voice calls or SMS for business purposes
- Accessing social media
- Downloading mobile applications
- Accessing videos
- Taking photographs
- Sending photographs
- Leisure activities
- Getting information:
    - About goods or services
    - Related to health or health services
    - From governmental organizations

Some of the gender issues in these responses include:

[82] See Kleine. 2013. *Technologies of Choice* on this point.

If women's use of mobile phones were limited only to sending or receiving text messages, this might be related to a low level of skills, but would generally require literacy in an international language.

If women's use were limited to voice calls only, this would indicate a low level of functionality.

Some of the other activities, such as undertaking financial transactions, downloading mobile applications and sending photographs would indicate a higher skill level.

Many studies of ICTs have looked at gender differentials in usage, with women credited with more purposeful use (e.g. getting information for family well-being, using the phone for business purposes) while men spent more time on leisure pursuits. Comparison of gender differentials on these responses would provide data to test these assumptions. Use of social media might indicate girls' and women's attempts to bypass the cultural and mobility isolation from which they may suffer. It would also lead of comparisons of male and female use of this media.

A.2.2. Proportion of individuals who own a mobile phone

The question addressed to the individual would be whether or not he/she presently owned a mobile phone. The definition of mobile phone owner would have to be worked out, with consideration of whether it was dependent on ownership of a handset and a SIM, whether shared ownership could be included and whether it could include SIM card owners without their own handsets. The period of ownership would also need to thereto be defined (e.g. over the last 12 months).

Also to be considered is whether a phone supplied by an employer constitutes ownership. It may be difficult to arrive at consensus on the definition of phone ownership as this may vary from country to country. If a strict definition is adopted, this may lead to undercounting of individuals in developing countries. An alternate method to using a single definition of mobile phone ownership would be to divide the question into various categories of ownership as described below.

What constitutes ownership?. . . and how to measure it?

The question of mobile phone ownership is a difficult one. In Europe and North America, the most common mobile phone ownership pattern is a single subscriber with one subscription on a single handset. Elsewhere, patterns of ownership are more heterogeneous. Without owning a handset, an individual can own a SIM card that they use in a handset owned by someone else. In developing countries the ownership of SIM cards (which often retail for as little as US$1 or are sometimes distributed free of charge in promotional offers) is more common than that of handsets. In Africa, many individuals regard themselves as mobile phone owners if they own a SIM card. Possessing a SIM card gives them an address that makes them reachable (if only through messages and voice mail) and the possibility of a bank account facilitating financial transactions and. credit to make a call on any borrowed mobile phone device. In Kenya, a fifth of the population own a SIM card, but not a mobile phone. By adding the SIM-card-but-no-handset owners to those who own a phone, Kenya's mobile ownership penetration rate becomes 80 per cent.[83] In Asia, however, the use of SIM cards to confer mobile phone ownership status is disappearing as cheap Chinese handsets have become available, for as little as $10 in Sri Lanka. Data is needed to show where there are gender differentials in the ownership of SIM cards without handsets and how this evolves over time.

[83] World Bank. 2013. Mobile usage at the base of the pyramid in Kenya. http://www.infodev.org/infodevfiles/final_kenya_bop_study_web_jan_02_2013_0.pdf

Some analysts have suggested using SIM card registrations as a way to get sex-disaggregated data on mobile phone owners.[84] Using this approach, one possible definition of a mobile phone owner could be: a person who owns a handset and one or more active SIM card or simply owns one or more active SIM cards. The biggest problem with using SIM card registrations, which are required in most African countries and which generally do register the sex of the registrant, is that they do not identify unique users. In Africa, Asia and Latin America many people own multiple SIM cards. Estimations of mobile penetration rates based on SIM card registration can erroneously double the number of unique owners.[85] In Kenya 15.2 per cent of BoP people surveyed had two active SIM cards, while in India, 71 million subscribers in 2012 used multiple SIM cards.[86] The world average is 1.85 SIM cards per individual while in developed countries, 80 per cent are single subscribers to networks.[87]

Some of the reasons for having multiple SIM cards are:

To take advantage of free or reduced intra-network calls or free or reduced costs from introductory cards

Network unavailability in given areas

Functional advantages of using a specific phone and its related SIM

Status symbols

Possession of dual or triple SIM phones[88]

A further gender-related problem with using SIM card registration for ownership is that men often purchase the card in their names and give them to women. For both of these reasons, SIM card registration would not work as an accurate indicator of mobile phone ownership by sex.

The most feasible method to collect data on individual mobile phone ownership by sex is through the household/individual use survey. A number of recent private surveys of mobile phone owners in Africa and other developing areas have produced large samples of sex-disaggregated data.[89] Most simply

---

[105] Sonia Jorge and Ronda Zelezny-Green. 2011. mWomen in Africa: Counting Who Has Access. http://www.pyramidresearch.com/points/print/120213.htm.

[85] GSMA. 2013. Global Mobile Penetration – subscribers versus connections. https://gsmaintelligence.com/analysis/2012/10/global-mobile-penetration-subscribers-versus-connections/354/.

[86] RIA. 2012. Neilsen. 2012. The Rise of Multi-Sim Users: Customers Shifting to Dual Sim Phones to Have Effective Control Over Costs. http://www.nielsen.com/in/en/insights/reports/2012/multi-sim.html.

[87]GSMA. 2013. Global mobile penetration. Alison Gillwald reports that RIA research revealed Uganda mobile phone users with as many as seven SIM cards, while four per person was not unusual in South Africa.

[88]InfoDev World Bank. 2013. Mobile Usage at the Base of the Pyramid in South Africa. http://www.infodev.org/infodev-files/final_south_africa_bop_study_web.pdf. Examples of Dual SIM card phones are the Dual SIM Nokia X1-01 and Nokia C2-00.

[89] Dejan Zurovac, Gabriel Otieno, Samuel Kigen, Agneta M. Mbithi, Alex Muturi, Robert W Snow & Andrew Nyandigisi. 2013. Ownership and use of mobile phones among health workers, caregivers of sick children and adult patients in Kenya: cross-sectional national survey. *Globalization and Health*, 9:20. http://www.globalizationandhealth.com/content/9/1/20. World Bank. 2013. *Mobile usage at the base of the pyramid in Kenya.* The Kenya study wanted to have a 50-50 gender balance but had difficulty in achieving this because, as they reported, "in a number of the survey points, the males were perpetually drunk throughout the day." http://www.infodev.org/infodev-files/resource/InfodevDocuments_1196.pdf, 23. Amy Wesolowski, Nathan Eagle, Abdisalan M. Noor,

asked individuals whether they owned a mobile phone while others included the distinction of whether the individual owned a SIM card but not a handset. Some simply used global subscriber data from websites such as www.census.gov. The large-scale Blair Foundation/GSMA study defined a mobile phone owner as a subscriber to mobile services. This would imply that a SIM-card owner would qualify as an owner, but this was not specified.[90]

Demand for gender-related mobile phone data

The heaviest demand for gender data related to household and individual use indicators is on mobile phone usage, as this is indisputably the most discussed gender and ICT for development area and to the access to and use of the Internet. This includes mobile phone activities, ownership of mobile devices (a particularly gender-sensitive area) and barriers to Internet use (for those with Internet-enabled phones). While there is a core mobile phone indicator (HH10 -- those who use a mobile phone), there is no comparable indicator on mobile phone activities to HH9 that delineates Internet activities by individuals. This is an especially important subject for developing countries where most mobile phones are not Internet connected, as well as for mobile phone users in developed countries who choose non-Internet connected phones. With regard to ICTs in general, the question of the possible disadvantage of female-headed households is also of gender concern.

Mobile phones as a gender issue

Gender-related core indicators related to mobile phones are essential because mobiles are the predominant ICT globally, far more numerous than computers. Mobile cellular penetration rates in developing countries far surpass those of the Internet. In Africa, for example, while only 16 per cent of the population has access to the Internet, the mobile penetration rate is 63 per cent. In the rest of the developing world the penetration rates are 89 per cent for mobiles and 31 per cent for the Internet.[91] In comparison to the Internet or computers in general, women are more numerous in mobile use, and sometimes are in the majority. In South Africa, Mozambique and Cameroon, for example, more women than men own mobile phones, while gender differentials are small in Ethiopia, Cote d'Ivoire and Rwanda and statistically insignificant in Botswana and Namibia.[92] Internet access in general and especially mobile broadband Internet access remain low among both men and women in developing countries compared to that of narrowband mobile phones, but it are lower among women.[93]

HH9 details Internet activities of individuals in depth, but not mobile phone activities, whether using Internet or non-Internet applications. While smartphone users may be accessing the Internet on their phones, few women in developing countries have smartphones or use other means of accessing the

---

Robert Snow and Caroline Buckee, 2013, 13. Heterogeneous Mobile Phone Ownership and Usage Patterns in Kenya, PLOS, http://www.plosone.org/article/info:doi/10.1371/journal.pone.0035319. In the public sector, in 2009 The Financial Sector Deepening Survey in association with the Kenya National Bureau of Statistics, based on a large-scale, randomized survey with gender as a variable, included questions on mobile ownership. See www.fedkenya.org for details on the study.

[90] GSMA. 2010.

[91] ICT Facts and Figures 2013. http://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx. Estimates refer to end 2012.

[92] Gillwald, Milek & Stork. 2010. *Gender Assessment*.

[93] Broadband Commission for Digital Development. 2013. *Doubling Digital Opportunities: enhancing the inclusion of women & girls in the information society*. Geneva: ITU and UNESCO. http://www.broadbandcommission.org/documents/working-groups/bb-doubling-digital-2013.pdf

Internet on their mobile cellular phones. They are also less likely than men to have computer access to the Internet, and, for those who are not literate in international languages, the mobile phone is the most accessible ICT.

The importance of mobile learning is becoming an increasingly important medium for girls and young women in developing countries who find their education and mobility limited, at times because of pregnancy and childbirth that leads to multiple difficulties in returning to school. Many new applications are being developed to make education available to females who are unable to go to school. UNESCO and International Telecommunications Union (ITU) are encouraging gender and mobile learning.[94]

Among the reasons why mobile phones are the most important ICT to the majority of women in developing countries are:

- Lower initial capital costs than those of computers
- Less steep learning curve than that of computers.
- Can be used regardless of literacy levels
- Available while working in the fields or when away from home or office
- Serve as aids to safety and security.
- Enable greater freedom and mobility.

Research from Africa has shown that even low-income women would pay a substantial portion of their income to acquire a mobile phone, if they do not already have one.[95] Other developing country research shows use of mobile phones leading to employment more for women than men, increases in household earnings resulting in better health, nutrition and education outcomes for children, higher earnings from marketing of agricultural produce from mobile-accessed information on market prices and ability to contact suppliers and customers, increased economic opportunities from mobile-based microbusinesses, such as phone access, rentals, recharging and operating information kiosks, ability to carry out business activities while engaged in domestic activities, providing a way to circumvent gender-based social conventions restricting women's mobility and contacts with men, providing an address and a bank for women previously without one and increased well-being benefits from access to health information and providers.[96]

Why mobile ownership?

While the importance of using mobile phones is recognized in HH10 on mobile phone usage, for many girls and women, particularly in developing countries, ownership of a mobile phone is superior to simply having access to one. Mobile phone access through sharing or borrowing rather than owning often entails dependency relationships and obligations that may be uncomfortable for women while owning a phone confers privacy, convenience and greater security. Other benefits of ownership include acquisition of a unique address, through the phone number, which could substitute for an office and a bank account, as well as a being a vector for microinsurance and increased economic and professional

---

[94] UNESCO, 2013. Mobile Phone Literacy - Empowering Girls and Women. http://www.unesco.org/new/en/unesco/themes/icts/m4ed/policy-research-and-advocacy/mobile-phone-literacy-project/. See www.girlsinict.org, www.techneedsgirls.org.

[95] Gillwald & Stork, 2010. GSMA, 2010.

[96] References for these statements are found in the references on gender and mobile telephony in Annex II.

opportunities especially for entrepreneurship or self-employment. While shared relationships can frequently entail pressures on girls and women, unfortunately this also can occur with ownership when females need to ask males for assistance in purchasing airtime for their phones. On balance, however, it appears that mobile phone ownership offers greater possibilities of privacy and autonomy than shared usage.

In early twentieth century England Virginia Woolf held out for "a room of one's own" as the standard of women's autonomy. In the 21st century, the aspiration for a room would most likely be replaced by a mobile phone of one's own. In view of the cultural difficulties women face if they only use mobile phones without owning them, mobile phone ownership can advance gender equality.

Using but not owning a mobile phone generally implies sharing the use of the phone of another individual or using a phone that is available for public access (such as those in the Grameen Village Phone programme).[97] However, recent research from Africa indicates that sharing may not be readily available. A survey of mobile phone owners in Kenya indicated that only one quarter shared their phone with anyone else, when it was shared, it was usually with a spouse. In South Africa nearly four-fifths of BoP mobile phone owners said that they did not share their phone with anyone.[98] The shared relationships that do occur almost entirely are between male owners and female recipients.[99] Among both men and women phone sharing tends to be more common in poor and rural areas as well and varies in prevalence from country to country.

Another recent study from Kenya showed that mobile phone sharing correlated with scarcity of phones as the percentage of mobile phone owners increased, instances of sharing decreased.[100]

The presence of a mobile phone in the household is no assurance that female household members will have access to it. June 2013 revisions to core ICT household indicators stipulate that any ICT device in a household be "available for use of any member of the household at any time." While this is reassuring, it is operationally very hard to ascertain, as cultural gender bias is difficult to establish in an interview. Householders are unlikely to say that preference goes to the boys and men in the house in accessing ICT, or that socio-cultural differences, such as greater workloads for females, constrain girls and women from having equal access to ICT. This pattern undoubtedly holds true for mobile phone access, particularly when cost-per-use is involved.

The third additional gender-related individual indicator proposed is the following:

A.2.3 Proportion of individuals not using the Internet , by type of barriers

---

[97] Grameen Bank. 2013. Village Phones. http://www.grameen-info.org/index.php?option=com_content&task=view&id=540&Itemid=598.

[98] InfoDev World Bank. 2013. Mobile usage at the base of the pyramid in Kenya. http://www.infodev.org/infodevfiles/final_kenya_bop_study_web_jan_02_2013_0.pdf. . InfoDev World Bank. 2013. Mobile Usage at the Base of the Pyramid in South Africa. http://www.infodev.org/infodev-files/final_south_africa_bop_study_web.pdf.

[99] Joshua Blumenstock & Nathan Eagle. 2010. Mobile Divides: Gender, Socioeconomic Status and mobile Phone use in Rwanda. Proceedings of the 2010 International Conference of Information and Communication Technologies and Development. http://www.gg.rhul.ac.uk/ict4d/ictd2010/papers/ICTD2010 Blumenstock et al.pdf.

[100] Amy Wesolowski, Nathan Eagle, Abdisalan M. Noor, Robert W. Snow and Caroline O. Buckee. 2012. Heterogeneous Mobile Phone Ownership and Usage Patterns in Kenya. *Plos One*. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0035319 pone-0035319-g005.

To uncover gender issues in Internet use, it is desirable to address the question to individuals in the household as well as the household as a whole in order to have responses that might vary by the sex of the individual. Eurostat addresses barriers to Internet use at the individual level, and OECD has recommended this approach to developing countries.[101] The HH14 questions on barriers to household Internet access applied to the individual level might result in different responses by sex, for example, on "privacy or security concerns" and "cultural reasons (e.g. exposure to harmful content)" that could identify important gender concerns. The current household-level response about lack of confidence and knowledge or skills to use the Internet would also be of interest to gender analysts at the person level, given the body of research that shows that low self-esteem and underestimation of computer skills is prevalent among girls and women.[102] This new indicator at the individual level could open the possibility to consider such areas as parental or partner attitudes towards females using the Internet.

The questions and response categories will need to be defined. The questions should include many of the issues that have been discussed as barriers to female access to the Internet, including awareness of the Internet, literacy and education level, international language skills, digital skills, time, cost, geographical location (e.g. urban vs. rural), social and cultural norms and skills.

One methodological difficulty is that girls and women in the household might not talk freely with the enumerator or might not be allowed to speak by themselves without the presence of male members of the household.

Barriers to girls and women's access to Internet use

The household surveys already address this issue at household levels. However, given the difference barriers to Internet use that males and females face, it is important to look at it at the individual level, disaggregated by sex.

This is a topic that has been discussed in length in the literature of gender and ICT. The barriers have been defined for girls and women in developing countries as literacy, education, language, time, cost, geographical location (e.g. urban vs. rural), social and cultural norms and skills.[103] Another important aspect is the societal and women's attitudes towards information technology, notably the often-held gendered attitude that the anything to do with computers is a male domain and the prevalence of technophobia among females.[104] Eurostat's questions on individual barriers to Internet use include two response items that frequently appear as gender issues in Internet access—women's lesser likelihood of knowing international languages most common on the Internet and women's lack of time for accessing the Internet.[105] On both of these issues there are clear gender differentials in developing countries.[106]

---

[101] Eurostat. 2013. ICT usage in households and by individual; OECD. 2011. *Guide to Measuring the Information Society*. http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/isoc_bde15c_esms.htm.

[102] See, for example, M. Sáinz & J.S. Eccles, J.S. 2012. Self-concept of computer and math ability: gender implications across time and within ICT studies. *Journal of Vocational Behavior*, 80, 486-489. file://localhost/http::dx.doi/10.1016:j.jvb.2011.08.005.

[103] Hafkin and Taggart, *Gender, Information Technology and Developing Countries*. 2001.

[104] Hafkin, *Gender,* 2012*. Loc. Cit.*

[105] EUROSTAT. 2013. Variables collected in the Household/Individuals surveys 2003-2012. http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/documents/Tab/Variables%20summary%20HH%202003-2012.pdf.

[106] Hafkin and Nancy Taggart, *Gender, Information Technology and Developing Countries*: *an analytic study*. 2001. Washington DC: Learn Link; Huyer and Hafkin et al. 2005. *Women in the Information Society*.

A.3. Potential household/individual indicators for future consideration

A.3.1 Broadband

At its meeting in Mexico City in 2013 the United Nations Broadband Commission adopted as one of its five targets: Gender equality in Broadband by 2020. However, it did not identify any indicators related to this target in its subsequent report, *Doubling Digital Opportunities*. [107]

While both Eurostat and OECD collect indicators on individual access to broadband, it would be very difficult to collect this indicator in developing countries. Despite the desirability of having an indicator to measure progress towards the attainment of the Broadband Commission target, the most apt indicator – users of broadband Internet connections, by sex – is not a feasible indicator to collect either from administrative data or through the household survey in developing countries. Service providers could provide information on types of service provided to subscribers, but this would be only at the subscriber level, which would include entire households and offices, and not the individual level. In household surveys to date, it has been found that many respondents generally do not know the type or speed of the connection they have. People use the Internet in many different places, from different and multiple devices, with different speeds often without knowing the specific speed/type of connection they have.

Discussion took place in 2013 on the ITU-D Expert Group on ICT Household Indicators Forum on the inclusion of a question on broadband at the household level, but the consensus was that this would be very difficult to do at the person level because of the difficulty for individuals to distinguish between narrowband and broadband. Given the difficulties in collection of this indicator, particularly in developing countries, it is not recommended for inclusion in the core list at this time. However, gender and broadband household access could be partially covered by addition of the sex of the household head classification to indicator HH11 on household access.

A.3.2 Gender-based violence

New indicators considered for future development by 2013 meeting of the ITU Expert Group on Household Indicators on children and youth online protection (CYOP) and on Internet security and privacy could include gender issues, including cyberbullying of girls, exposure and victimization of girls and women through pornography, sexual solicitation and trafficking of girls and women. Security and privacy issues might also include references to domestic violence.[108]

A.4. General methodological considerations in gender statistics

In conclusion of the section on gender-related household and individual indicators of ICT usage, some additional general principles of the collection of gender statistics and indicators that are pertinent to individual and household indicators should be reviewed. The introduction of gender in ICT statistics

[107] Broadband Commission Working Group on Broadband and Gender. 2013. *Doubling Digital Opportunities: Enhancing the inclusion of women & girls in the information society*. Geneva and Paris: ITU and UNESCO. http://www.broadbandcommission.org/documents/working-groups/bb-doubling-digital-2013.pdf-

[108] ITU, EGH, 2013.

introduces a unique set of challenges taking into account that girls and boys, women and men do not necessarily engage in the same activities, nor necessarily behave in the same way. Boys and men are generally not subject to same constraints as girls and women, and they do not necessarily share the same needs opportunities and needs.

The recently issued United Nations *Gender Statistical Manual* (2013) recommends that data collection tools involving gender should take into account stereotypes and social and cultural factors that might introduce gender bias into data.[109] The success of collecting the data requires that girls and women are able to talk freely to an interviewer. Are they interviewed separately from a male head of the household? Are they at ease in talking to a male interviewer? The ability to randomly select individuals in household surveys can be constrained if it is culturally unacceptable to a male head of household to have his wife or daughter selected for individual questions rather than him. In such a case OECD recommends making appropriate adjustments so that results remain representative of the population.[110]

Although it doesn't refer specifically to gender, the ITU *Manual for Measuring ICT Access and Use by Individuals and Households* recommends that either all members of the household be interviewed and respond about themselves or that one individual be randomly selected and respond about her/himself.

B. Education and ICT Indicators[111]

B.1. Existing indicators that can be disaggregated by sex

Core ICT Education Indicators

The UNESCO Institute for Statistics is responsible for the collection of core indicators on ICT in education.[112] Among the core indicators on ICT in education, there are currently three gender-related indicators on which the UIS is currently collecting sex-disaggregated data on two:

ED6: Proportion of learners who have access to the Internet at school

ED8: Proportion of ICT-qualified teachers in primary and secondary schools

In the case of ED6, the difference between the language of the Partnership core indicator and UNESCO data collection on two other indicators of access to the Internet at school is very little. UNESCO has refined the indicator and uses two of its conceptually and methodologically similar indicators to collect the data desired for ED6, viz.:

Proportion of pupils enrolled (by sex) in programmes offering Internet-assisted instruction

---

[109] United Nations. 2013. Gender Statistical Manual: Integrating a Gender Perspective into Statistics. http://unstats.un.org/unsd/genderstatmanual/A-guide-to-the-manual.ashx. Notably, the manual makes no reference to ICT statistics among areas of interest.

[110] OECD. 2011. *Guide to Measuring the Information Societ*y.

[111] UIS supplied the data for the following section. Countries/groupings are based on UNESCO categories. http://portal.unesco.org/en/ev.php-URL_ID=22249&URL_DO=DO_TOPIC&URL_SECTION=201.html.

[112] See UNESCO. 2009. *Guide to Measuring Information and Communication Technologies (ICT) in Education*. Montreal: UNESCO Institute for Statistics. www.uis.unesco.org/Library/.../ICT_Guide_EN_v19_reprintwc.pdf.

Proportion of pupils enrolled (by sex) in programmes offering Internet-assisted instruction (with broadband)

UIS determined that these indicators are preferable to ED6 since they better reflect an emphasis on pupils' access and participation in programmes offering the Internet for pedagogical purposes rather than for non-pedagogical and/ or administrative activities. Regarding ED8, UNESCO uses nationally adopted standards to identify ICT qualified teachers.

The remaining Partnership core education indicator is:

ED7: Proportion of learners (by sex) enrolled at the post-secondary non-tertiary and tertiary level in ICT-related fields (for ISCED level 4 and levels 5-6)

UNESCO is not collecting ED7 now because of its emphasis on primary and secondary level education. There is a strong case, however, for the collection of ED7 as it is a much-in-demand indicator of the potential for countries to successfully compete in the information society and is of particular interest for gender statistics, given the small numbers of girls and women in these fields. It will also be very useful to be able to compare the number of girls enrolled in ICTs with the number of girls who graduate and who are then employed in ICT jobs.

Based on a data scoping survey completed in 2007, only eight per cent of Least Developed Countries (LDCs) and 11 per cent of all African countries had data on this indicator, with 20 per cent and less reporting from countries in Asia, Latin America and the Caribbean and Oceania. There was no region where a majority of countries reported data. Even looking at all developed economies, only 40 per cent of economies supplied this data. Much work remains to be done to stimulate the collection and reporting of this data in both developed and developing countries and economies.

Data on countries reporting on core ICT in education indicators ED6 and ED8 to UIS show the availability of sex-disaggregated data (Tables 3 and 4). Both indicators measure ISCED levels 1-3.

Table 3: Proportion of learners enrolled in programmes offering Internet-assisted instruction - ED6[113]

[113] Data is collected for the methodologically similar indicator Proportion of learners enrolled in programmes offering Internet-assisted instruction (IAI).

Region	Total countries	No. of countries reporting data	No. of countries reporting sex-disaggregated data
Arab States	20	5	5
Central and Eastern Europe	21	0	0
Central Asia	9	2	2
East Asia and Pacific	34	5	5
Latin America and the Caribbean	43	21	16
North America and Western Europe	29	0	0
South and West Asia	9	0	0
Sub-Saharan Africa	46	0	0
Total	211	33	28

Note: Partnership members differ in their definitions of regions. UNESCO's regions are defined at http://www.unesco.org/new/en/unesco/worldwide/.

Table 4: Proportion of ICT-qualified teachers in primary and secondary schools - ED8

Region	Total countries	No. of countries reporting data	No. of countries reporting sex-disaggregated data
Arab States	20	5	5
Central and Eastern Europe	21	0	0
Central Asia	9	2	1
East Asia and Pacific	34	5	5
Latin America and the Caribbean	43	21	11
North America and Western Europe	29	0	0
South and West Asia	9	3	2
Sub-Saharan Africa	46	0	0
Total	211	36	24

On both of these indicators, the majority of regions submitted no data at all. No data was available at all from most of the world. All of the Arab States, Central Asian and East Asian-Pacific countries reporting (but with only 25, 22 and 15 per cent reporting, respectively) submitted sex-disaggregated data on ED6 -- teachers using Internet-assisted instruction; with only one country less, the reporting situation was the same for ED8. Most of those who reported data on both of these indicators reported it disaggregated by sex. As in other sectors, the outstanding challenge in education remains the collection of individual ICT use data.

B.2. Additional non-core ICT education indicators that can be disaggregated by sex

In addition to the core ICT indicators, the UIS is currently collecting sex-disaggregated data for the following indicators that are contained in the UNESCO *Guide to Measuring ICT in Education*:[114]

ED35: Proportion of primary and secondary school teachers trained via ICT-enabled distance education programmes
ED36: Proportion of primary and secondary teachers who teach basic computer skills (or computing)
ED37: Proportion of primary and secondary school teachers who currently teach subjects using ICT facilities
ED38: Proportion of primary and secondary school teachers trained to teach subjects using ICT facilities
ED45: Proportion of learners enrolled in grades where basic computer skills (or computing) are currently taught (for ISCED levels 1-3)[115]

While it not explicit in the *Guide*, additional indicators beyond the core may be collected using sex-disaggregated data. Due to general unavailability of data and its focus on primary through secondary education, UIS is not collecting any of the following indicators:

ED41: Proportion of learners entitled to use computer laboratories at school as a pedagogical aid (by gender, and by type of institution for ISCED levels 1-3)
ED46: Proportion of learners (by gender) who graduated last academic year in ICT-related fields at the post-secondary non-tertiary and tertiary level (for ISCED level 4 and levels 5-6)
ED47: Proportion of learners (by gender) enrolled at the tertiary level in ICT-enabled distance education programmes (for ISCED levels 5-6)
ED48: Proportion of learners who successfully completed a basic computer skills (or computing) course at the end of the last academic year (for ISCED levels 1-3)
ED49: Promotion rate of learners in grades receiving ICT-assisted instruction (by gender, by type of institution and by grade) (for ISCED levels 1-3)
ED50: Promotion rate of learners in grades not receiving ICT-assisted instruction (by gender, by type of institution and by grade) (for ISCED levels 1-3)
ED51: ICT-assisted instruction performance ratio (by gender, by type of institution, and by grade) (for ISCED levels 1-3)
ED53: Number of female graduates per 1000 male graduates in ICT-related fields (for ISCED level 4 and levels 5-6)

Although not currently in the *Guide to Measuring ICT in Education*, UIS also collects the following gender-related education indicators:

Proportion of students enrolled (by gender) in programmes having access to electricity (ISCED levels 1-3)
Proportion of students enrolled (by gender) in programmes having access to telephone communication facility (ISCED levels 1-3)
Proportion of students enrolled (by gender) in programmes with radio(s) for pedagogical use (ISCED levels 1-3)

[114] UNESCO Institute for Statistics (UIS), Montreal. 2009. http://unesdoc.unesco.org/images/0018/001865/186547e.pdf
[115] UIS collects data on enrolment in programmes offering basic computer skills or computing at these primary and secondary levels.

Proportion of students enrolled (by gender) in programmes with television(s) for pedagogical use (ISCED levels 1-3)
Proportion of students enrolled (by gender) in programmes with computer(s) for pedagogical use (ISCED levels 1-3)
Proportion of students enrolled (by gender) in programmes with broadband Internet for pedagogical use (ISCED levels 1-3)
Proportion of students enrolled (by gender) in programmes using open educational resources (ISCED levels 1-3)
Proportion of students enrolled (by gender) in courses offering basic computer skills or computing (ISCED levels 1-3)

B.3. Proposed additional indicators in education

Beyond the three existing core ICT indicators in education, five new indicators are suggested:

Proportion of primary and secondary school teachers trained to teach subjects using ICT facilities (ISCED 1-3) (based on UNESCO indicator ED38)
Proportion of pupils enrolled in programmes offering computer-assisted instruction (ISCED levels 1-3)[116]
Proportion of pupils enrolled in programmes offering Internet-assisted instruction (ISCED levels 1-3)
Proportion of pupils enrolled in programmes offering courses in basic computer skills or computing (ISCED 1-3)
Proportion of graduates in ICT-related fields at post-secondary non-tertiary and tertiary levels (based on UNESCO indicator ED46)

Justification of indicators

The first four proposed indicators share the same justification. They measure the preparation of the next generation to enter information society, identifying countries that are giving learners an early start to acquire ICT skills and benefit from computer and/or Internet assisted instruction from primary through advanced secondary levels. These indicators go well beyond the current core indicator that identifies only those learners with access to the Internet at school. These additional indicators that show the proportion of enrolments in schools and programmes using ICT for learning are fundamental to measuring capacity for building digitally literate citizens able to perform in the "knowledge economy". Using ICTs for learning requires teachers trained to use computers and the Internet not only to teach computer skills but all subjects, pupils not only learning computer skills but using computers and the Internet to study no-matter-what subject. For information society to take form, ICT-assisted education needs to begin at primary school level and continue through the secondary level. Countries that are able to institute this in their education systems will have a major advantage in building their global competitiveness. To have this data on both boys and girls will be an important addition to the gender-related indicators.

[116] This and the following two indicators, all of which use sex-disaggregated data, are UNESCO-recognized indicators but do not have an official ED number in the UNESCO *Guide to Measuring ICT in Education*.

Methodological considerations

Many countries can and already do report data on the first four indicators—especially middle-income and higher income economies. LDCs tend to be the most challenged in this regard. The gender problem with this data is that participation rates among boys and girls may differ due to differential out-of-school numbers that vary from country to country. The above indicators measure participation amongst those already enrolled and ignore the gaps in access across the entire population, which are generally manifested in higher out-of-school rates among girls. One way to solve this would be to use the same enrolment rates and calculate participation indicators using overall population data as published by the United Nations Population Division (UNPD, which take into consideration out-of-school children, thus provide even better measurement differentials in boys and girls' participation in ICT-assisted instruction. The two different enrolment indicators use different denominators, based on enrolment and on UNPD data, meaning that if one can be calculated then so can the other.

Graduates in ICT-related fields

While there is already a core indicator of learners by sex *enrolled* in ICT at the post-secondary level Proportion of *graduates* in ICT-related fields at post-secondary non-tertiary and tertiary levels would be highly desirable to show the numbers and relative percentages by sex of post-secondary and tertiary-level graduates in ICT-related fields, highlighting the female share of the population that has the formal training to become ICT professionals.

The number of women graduates in ICT-related fields has been falling rather than increasing over the past two decades, in line with the "leaky pipeline" phenomenon[117] that finds fewer girls and women at each successive level of education, employment and responsibility in scientific and technical fields, especially those related to ICT. Given this phenomenon, the number of graduates is dependent on the number originally enrolled and therefore the gender result is affected by the lower levels of enrolment of girls in technical subjects at increasingly higher levels of pre-tertiary education. It is insufficient to know only the number of females who have enrolled in ICT-related fields at post-secondary level.

[117] The first reference to women and the leaky pipeline that I can find is T. Camp, (1997). The Incredible Shrinking Pipeline, *Communications of the ACM*," 40(10), 103-110.

It is vital to know how many males and females in ICT-related studies actually graduate in order to follow their progression into the labour force and to higher levels of skills and responsibility. This is particularly important in view of the enormous shortfalls of ICT-qualified personnel, male and female, in most countries in the world. Statistics on the number of female graduates in ICT-related fields would indicate the numbers that could fill existing vacancies. If the numbers fall short of expectations, then policy measures could be put in place (from institutional to national levels) to keep more girls and women enrolled in school until graduation in ICT fields.

Additionally, the comparison of education data (both enrolment and graduation rates) on girls/women studying in ICT fields with labour force data on those actually working in the field will also provide information to inform policy, especially with regard to the aspect of the leaky pipeline that sees a significant numbers of female graduates in ICT fields not joining the labour force or joining it and then dropping out.[118]

Methodological considerations

This is an indicator that has been much in demand but is difficult to collect because of the variety of fields and institutions that are sources of data. As with many others, it may be hard to collect in developing countries. Cross-country classifications may not be entirely comparable, as countries may not have used consistent definitions and classifications of fields of study or may not have adapted the new classification of fields of studies that should be considered ICT-related. Also, as UNESCO is concentrating on primary through secondary education, this particular indicator would not be a priority for UNESCO. In the case of all five of these indicators, there may not be accurate student data from all institutions on the gender of the students.

C. Employment

This section brings together two different measurement aspects of ICT employment: employment in ICT professional and technical occupations (across many sectors) and employment in the ICT sector. In the area of gender-related indicators on ICT employment, one new indicator is proposed along with the revision of an existing core indicator to add disaggregation by sex.

C.1. Employment in ICT Occupations

C.1.1. Existing indicators

There are no ICT occupational employment core ICT indicators as yet.

However, there is strong demand for data, especially disaggregated by sex, on employment in ICT occupations.[119] Following further methodological work and in cooperation with ILO, this would be a valuable addition to the Partnership's work.

---

[118] The Democratic Republic of Korea is a case in point. Korea has a relatively large percentage of its female students graduating in ICT-related fields, but a much smaller percentage in the work force. See Young-Ock Kim & You-Kyung Moon, 2011. National Assessment on Gender and Science, Technology and Innovation: Republic of Korea. http://wisat.org/data/documents/RepKorea_GE-KS.pdf.

[119] There are near daily articles in newspapers and journals on this topic. Most recent at the time of this writing was A Striking Absence of Women, *New York Times,* 12 October 2013.

This is an area with important policy relevance. In view of the continuous growth globally of the ICT industry, the intensive use of ICT in other industries and the importance of ICT skills across myriad occupations, there is a need to know the gender distribution of ICT employment and skills in order to assess and take action to ensure women's competitiveness in the marketplace and to augment the supply of ICT-skilled workers at all levels.

Despite the importance of this area as a whole and for gender statistics in particular, the implementation of data collection on these indicators is greatly hampered by the lack of a unified, internationally accepted definition of ICT employment and the structure of the ICT labour market. As a result, the measurement of women's ICT employment is not easy. Women's ICT employment has to be set in the discussion of the statistical definition of ICT employment in general and awaits internationally accepted standard definition.

Among the complexities of the definition of ICT employment is the variety of approaches from which it can be measured, including:

- Employment in ICT occupations
- Employment in the ICT sector (by industry)
- Employment using ICT skills and tools

ICT jobs are found in the ICT industry as well as in virtually every other area of the economy. ICT-trained men and women are employed in ICT-intensive occupations both inside and outside of the ICT sector, reflecting the deployment of ICT-enabled innovations across the economy. In addition, there are many men and women working using ICT skills gained through ICT education, but neither working in the ICT sector nor occupying ICT jobs. This paper will propose new gender-related indicators in ICT occupations and in the ICT sector. Employment using ICT skills is not covered at this time because of the vastness of such an undertaking that would require surveying virtually the entire working world on its use of ICT skills and tools.

There is a need for sex-disaggregated indicators on both employment in ICT occupations and in ICT-sector employment. Statistics compiled by OECD show substantial differences, which vary by country, between these two categories in the employment of women. In advanced and emerging countries for which data is available on employment in both the ICT sector and in ICT occupations, women's share of employment was significantly less than that of men.[120] In 2010, in these countries women's share of employment in the ICT occupations was 18 per cent while in the ICT sector it was just over 30 per cent. Estonia and Hungary were particularly high in the ICT sector at over 40 per cent, while the leaders in women as ICT specialists at 25 per cent and over were the United States, Bulgaria and Romania.[121]

C.1.2. Proposed additional indicator: Proportion of employees in ICT occupations [by sex]

In response to rapid changes in technology, particularly with regard to professional and technical occupations, a new International Standard Classification of Occupations known as ISCO-08 was adopted in 2007 and made available in the public domain in 2008.[122] ISCO-88, the former standard, was found to

[120] OECD. 2012, 16.

[121] *Ibid*. 16. The ICT sector in European countries was defined as the sum of ISIC. Rev. 4 sections 26, 61, 62 and 63. The definition of the sector varied in other countries. For ICT specialists, European countries used the sum of ISCO-08 codes 213, 312, 313 and 724.

[122] Although the standard was published only in 2012, it was adopted by many countries before then.

be out of date in some areas as a result of developments in technology in professional, technical and clerical work that now require substantial use of computers and telecommunications.

ISCO-08 updated and expanded the categories for ICT professional and technical occupations (Table 4). *ICT professionals* (the sub-major category in the major group Professionals) are comprised of the minor groups of software and applications developers and analysts *and* database and network professionals. *Technicians and associate professionals (ICT technicians)* are divided into the minor groups of ICT operations and user support technicians and telecommunications and broadcasting technicians. The distinction between Professionals and Technicians/associate professionals is based on education (tertiary-level education being required for the Professional category) and skills. The division between professionals and technicians/associate professions allows for the classification of high and intermediate levels of ICT skills. This is potentially very helpful for the identification of gender differentials of the levels of employment and skills of men and women respectively are working in ICT occupations.[123]

ICT occupations are also included in the major group Managers, with ICT Managers comprising a minor group under the sub-major group of production and specialized service managers. The Managers major group shares with the Professional group the requirement of tertiary-level education.

Table 4: Categories for ICT professional and technical occupations

Major groups	Major/sub-major Occupational Groups	Minor groups	Education requirement	ICT Skills requirement
Professionals	ICT professionals	Software and applications developers and analysts	Tertiary-level	High-level
		Database and network professionals	Tertiary-level	High-level
Technicians and associate professionals	ICT technicians	ICT operations and user support technicians	Tertiary-level not required	Intermediate level
		Telecommunication and broadcasting technicians	Tertiary-level not required	Intermediate level
Managers	Managers-Production and specialized service managers	ICT managers	Tertiary-level required	Not defined

Source: ISCO-08. ILO. 2012. International Standard Classification of Occupations: Structure, group definitions and correspondence tables. ISCO-08. Vol. I. Geneva.[124]

[123] ICT occupations with the lowest skill levels — ICT installers and servicers — are likely to be male-dominated. Cisco Systems, for example, set up a networking academy training programme to encourage girls and young women globally to enter the field in part because it took a limited amount of technical training and required no tertiary-level education.

[124] http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572.pdf.

Beyond these changes introduced in ISOC-08, ILO has attempted to define ICT occupations broadly throughout all International Standard Classification of Occupations groups as "all occupations that require skills in the production of ICT goods and services." The acceptance of this would go a long way toward permitting the collection of an indicator of women's employment in ICT occupations, in particular to assess the representation of women in the higher skill and managerial levels.[125] Final agreement on the specific occupational groups to be included is still needed.

According to ILO, data on employment classified by industry and occupation are available for many countries at a sufficient level of detail to allow the production of statistics on ICT employment, although ILO does not habitually collect such information. In a growing number of countries, these data are disaggregated by sex. Data from European OECD countries and the United States from 2010 showed that women in ICT occupations tended to be most prevalent (in order of importance) in education and health, finance and insurance and public administration. Although a higher percentage of American ICT specialists (over 30 per cent of both males and females), work in professional and business services, in Europe there are more women than men working in this generally well-paid area.[126]

ILO already publishes data on employment disaggregated by sex for ICT Professionals in its ILOSTAT database. This indicator should be added to the Partnership core indicators, including the Professional, Technicians/Associate Professionals and Managers categories.

Data will be disaggregated by sex and by occupational levels (Managers, Professionals, Associate Professionals and Technicians). Possible data sources include Labour Force Surveys, official estimates and censuses, national statistical offices publications and websites. The major statistical issue is that the finalization of the definition of specific occupational groups to be included is still needed.

The critical methodological issue is to achieve agreement on the definition and measurement of ICT employment. Once that is sorted out then the gender breakdown would not normally be difficult for labour data sourced from households.

C.2. ICT Employment

C.2.2. Revision of existing core indicator ICT1:

Proportion of total business sector workforce involved in the ICT sector [by sex]

In response to a growing demand for employment data relating to ICT ISIC Rev. 4 now identifies the ICT sector as an "alternative aggregation" that member States could use in statistical data collection. The ICT sector is defined as that part of economic activity that is generated by the production of ICT goods and services and grouped into ICT manufacturing, trade and services industries and telecommunications, computer programming, data processing and computer and communications

[125] ILO is also considering a thematic view for ICT occupations that would include a number of other unit groups that primarily involve the production of ICT goods and services, such as ICT service managers, electronic engineers, ICT sales professionals and IT trainers. Anna Sabadash, 2012. ICT Employment Statistics in Europe: Measurement Methodology. European Commission. JRC Technical Report. ftp://ftp.jrc.es/pub/EURdoc/JRC76385.pdf.

[126] OECD. 2012. ICT Skills and Employment: New Competences and Jobs for a Greener and Smarter Economy. OECD Digital Economy Papers, No. 198, OECD Publishing. http://dx.doi.org/10.1787/5k994f3prlr5-en, 16.

equipment repair. In addition, software publishing, computer programming, data processing and web portals have been added to the sector definition.[127] If member States comply with this classification of the ICT sector and disaggregate data by sex, that would provide a significant indication of women's share of employment in this sector.

ILO recognizes the significance of disaggregation by sex of the indicator category Employment by sector, of which the ICT sector is a part:

> . . . Allows for analysis of gender segregation of employment by specific sector. Are men and women equally distributed in certain sectors, or is there a concentration of females [among other sectors].[128]

As the ICT sector is a major driver of the economy in many countries, and developing countries seek its growth to gain competitive advantage, the degree of participation of women in this sector is important to document in order to determine whether a country is fully utilizing its human resources to its best advantage.

ICT1 is a core indicator that UNCTAD has collected since 2004. Data availability remains scarce in developing countries, where it ranks with the lowest availability of any business indicators, albeit it is improving gradually (Table 5).

Table 5: Economies reporting official data on core indicator ICT1, 2008-2011

Proportion of total business sector workforce involved in the ICT sector	
Economy	**No. of economies reporting**
Developed	34
Developing	11
LDC	0

Source: UNCTAD data.

While many countries collect employment data, these are not always available with sufficient level of detail on all ISIC Rev.4 industries that are part of the ICT sector definition. In most developed countries these data are available. ICT1 can be disaggregated by sex of persons employed if the underlying data are obtained from Labour Force Surveys (effectively household surveys). UNCTAD currently collects this data by asking countries in its enterprise surveys to report the number of persons employed in the sector.[129] Collaboration is needed between UNCTAD and ILO to help developing countries measure

[127] The major difference between ISIC Rev. 4 and the previous version with regard to the ICT sector is the removal of the stipulation that products of the ICT sector include those that " . . . use electronic processing to detect, measure and/or record physical phenomena or to control a physical process." ISIC Rev. 4 is available from the United Nations Statistical Office on its website: http://unstats.un.org/unsd/cr/registry/isic-4.asp.

[128] ILO. 2013. KILM 4. Employment by sector, 1. http://kilm.ilo.org/manuscript/kilm04.asp.

[129] Partnership, *Core ICT Indicators*, 2010.

employment in the ICT sector disaggregated by sex. Results of this collaboration can be reflected in the 2nd TGG report on methodological issues for measuring ICT and gender core indicators. Countries/economies will also need to adopt the ICT sector definition of ISIC Rev. 4. Difficulties in comparability of data might emerge from some countries not including the self-employed and contributing family members in employment figures, areas in which women are prominent.

D. Business and Entrepreneurship/Small Business Owners

Two major gender issues that could be addressed by internationally comparable statistics are the use of ICTs by women in the business workforce and in women's entrepreneurship.

A distinction needs to be made between "business use indicators" and "entrepreneurship". The first category is aimed at measuring the use of ICT by the business sector in a country, and representativeness of the data is achieved by drawing a stratified random sample from an official registry of all active national businesses. In the second category, indicators are aimed at measuring ICT use by entrepreneurs and micro and small businesses, using sampling techniques in which the target population is not known (for example cluster sampling) and covers also the informal sector. In addition to representativeness and sampling, the two related but distinct areas of measurement may differ in terms of questions asked and policy issues monitored. Data for the first category of indicators should ideally be collected through enterprise surveys. Data for the second category would need to be collected through surveys of business owners or entrepreneurs.

Why we need gender-related business use indicators

We need to know how men and women in the workforce differ in their access to and use of ICTs. Are women workers as likely as men to use the Internet in their work? Do women and men both use it to its full potential? Are there differences in workforces composed primarily of men or primarily of women in their access to and use of computers? Are women as likely as men to exploit the capacities of the technology to further their productivity for the success of the enterprise? Gender-related business use indicators can produce data that would answer these and other related questions.

The work of UNCTAD work on measuring the information economy focuses on how businesses and their employees access and use ICT.[130] Its data collection efforts in this area face the general difficulty in collecting ICT statistics from developing countries, although in the past decade the number of such economies, as well as transition economies, collecting the data has increased.

In the latest reference year 2008- 2011, 22 developing economies, two LDCs and 8 transition economies reported data on the proportion of businesses using computers (B1). The highest level of response from developing countries was on Proportion of businesses using the Internet (B3), whereas the lowest was on Proportion of business using the Internet, by type of access (B9). The response rate from LDCs was very low throughout all the business indicators, with Africa being by far the lowest region. An overall picture by regions and economies shows the following data availability (Table 6):

[130] WSIS also charged UNCTAD with developing indicators to monitor progress in the use of ICT for development.

Table 6: Regions/Economies reporting official data for core indicators on ICT use in business, B1 to B12, 2008-2011

	No of economies	No of economies reporting B1	No of economies reporting B2	No of economies reporting B3	No of economies reporting B4	No of economies reporting B5	No of economies reporting B6	No of economies reporting B7	No of economies reporting B8	No of economies reporting B9	No of economies reporting B10	No of economies reporting B11	No of economies reporting B12
Africa	58	6	5	6	5	5	5	5	5	1	3	3	4
America	49	5	5	7	4	6	5	5	5	2	5	5	6
Asia	50	16	13	17	11	16	15	16	15	6	15	14	15
Europe	45	35	34	34	33	35	33	31	32	31	34	33	34
Oceania	23	2	2	2	2	2	2	2	2	0	2	2	2

	No of economies reporting B1	**No of economies reporting B2**	**No of economies reporting B3**	**No of economies reporting B4**	**No of economies reporting B5**	**No of economies reporting B6**	**No of economies reporting B7**	**No of economies reporting B8**	**No of economies reporting B9**	**No of economies reporting B10**	**No of economies reporting B11**	**No of economies reporting B12**
Developed	32	31	33	31	33	32	31	32	29	32	33	32
Developing	22	19	24	17	21	21	22	21	6	19	18	20
LDC	2	1	2	1	2	1	1	1	0	1	1	2
Transition	8	8	7	6	8	6	5	5	5	7	5	7

Source: UNCTADStat.

Note: Tables based on the UNCTAD classification of countries and territories available at: http://apps.unctad.unctad.org/en/Intrastat----UNCTADs-statistical-resource-center/Classifications/Country-and-region/.

There are presently no sex-disaggregated indicators among the 12 business category core indicators on ICT use in business. The basic question to be addressed is whether there are gender differentials in the way companies with male and female-dominant workforces, respectively, use ICT? In the next section, it is proposed to include a filter question relating to the gender composition of the workforce to address them.

D.1. Revision of existing indicators: measuring business ICT use, by gender composition of the workforce

Adding a filter question to the basic information section in the UNCTAD enterprise survey of ICT use on the gender composition of employees, asking enterprise respondents to report not only on their total number of employees but also to give a breakdown on the number of men and women in the workforce would make possible the disaggregation by sex of employees: total number of employees of each sex. This data should be readily available to NSOs.[131] Businesses could then be categorized by varying levels of female participation (e.g. majority female, majority female, gender-balanced). This would also allow comparison of ICT usage in companies with different gender composition among the employees and an examination of all existing business ICT indicators not only by enterprise size, industry and location (urban/rural) but also by gender composition of the workforce.

In terms of feasibility of measurement, it should be relatively easy to obtain nationally representative data on the use of ICT by enterprises dominated by male/female workers in a given economy. This information is complementary to data obtained on informal or semi-informal women entrepreneurs. Both categories of women form part of a country's potential to develop.

Such data could produce an analysis of, for example, whether male-dominated enterprises tend to use the Internet more for interacting with the government or for making online payments than female-dominated ones. Another question could be if, within a given industry, female-dominated enterprises are more likely to have a website than male-dominated ones. Whether female-dominated workforces have lesser access to computer and the Internet and whether they use the Internet in different ways could also be examined. The resulting data would help to identify the viability and competitiveness of women's MSEs and take measures to encourage their ICT adoption and upgrading where needed.

Why we need gender-related ICT indicators on entrepreneurship

There is great interest in the development community about ICTs and women entrepreneurship, particularly in developing countries.[132] ICT is increasingly seen as a powerful catalyst for women's entrepreneurship, particularly in micro and small enterprises (MSEs) as well as in medium enterprises. The topic has become a priority for a number of development agencies, including the World Bank,

---

[131] RIA has this information for micro and small business by sex of owner. RIA, Household and Small Business Access and Usage Survey 2011. 2011 Brief Survey Methodology. Unpublished paper.

[132] A list of references of women, ICTs and entrepreneurship in developing countries could take many pages. The topic was a leitmotiv of UNCTAD's 2010 and 2011 *Information Economy Reports*, particularly Ch 5, 2011, Leveraging ICTs to support women's entrepreneurship. http://unctad.org/en/Docs/ier2010_en.pdf, http://unctad.org/en/PublicationsLibrary/ier2011_en.pdf. Of interest among publications of other TGG members is LIRNEAsia, 2013. Helping BoP microentrepreneurs to do business through mobiles: Innovation brief. http://Lirneasia.net/projects/icts-the-bottom-of-the-pryamid.

USAID and DFID, and a major theme of foundations such as the Cherie Blair Foundation for Women, whose objective is to support women's entrepreneurship in developing countries, particularly by helping them to increase their business skills, technology, networks and access to finance.[133]

UNCTAD emphasizes the importance of gender, ICT and entrepreneurship, stressing the use of ICT in businesses owned and run by women entrepreneurs:

> The evolving ICT landscape is offering women entrepreneurs new opportunities to strengthen their businesses and become more effective. Through mobile phones, electronic platforms and networks, radio, TV, blogs and the Internet, women entrepreneurs are reaching out to customers and building their businesses in ways they could not do before. Effective use of ICTs is now helping to overcome several challenges that women entrepreneurs in developed and developing countries face.
>
> At the same time, there is evidence of a 'gender digital divide' wherein women entrepreneurs due to lack of literacy, skills, access, resources and other factors are excluded from the opportunities and benefits offered by ICTs. UNCTAD is mandated to promote more effective application of ICTs for enterprise development, including women's entrepreneurship, in developing countries.[134]

A recent study prepared for UNCTAD recommended the use of ICT as one of the three major catalysts for accelerating women's entrepreneurship.[135]

Women's businesses that do not use or that underutilize ICTs represent untapped potential for enterprise success and economic growth. A country grows by the production and employment generated by its businesses, no matter what the gender of the business owner. UNCTAD describes succinctly the advantages for success that ICTs can bring to businesses:

> ICT use can lower transaction costs, help firms obtain information about new market opportunities, improve their communication along the value chain, and broaden the ways in which products and services are provided to the customer. Private firms invest in ICTs to become more productive and more competitive.[136]

If women-owned businesses are less up-to-date and less efficient as a result of less than optimal ICT use, the overall development of the country suffers. The success of women-owned businesses has implications greater than profit, production and employment. Women's business success tends to translate into gains for the family – providing role models for girls, education for all their children and improved well-being of the family as a whole. ICT-based support can also help to overcome barriers and constraints that women entrepreneurs uniquely face, notably, lesser access to finance than men, time constraints due to family and domestic responsibilities, restricted physical mobility, cultural restrictions on meeting with unrelated men and limited skills and training.[137]

---

[133] http://www.cherieblairfoundation.org/about-us/.

[134] UNCTAD. 2013. ICTs and Women's Entrepreneurship. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Women.aspx.

[135] Julie Weeks. 2012. UNCTAD's Research Project on Women Entrepreneurship and Innovation. http://unctad.org/sections/wcmu/docs/ciimem1_4th_Weeks_en.pdf

[136] UNCTAD. 2011. *Information Economy Report*, 6. Geneva: UNCTAD. http://unctad.org/en/PublicationsLibrary/ier2011_en.pdf.

[137] UNCTAD, *Information Economy*. 2011, Chapter 5.

For all these reasons, data is needed to see if there are male-female differentials on the part of entrepreneurs in adopting and using ICTs.

D.2. ICTs and women's entrepreneurship/small business owners

In considering indicators of gender differentials in ICT adoption by business owners/entrepreneurs, the basic question in which data is needed is: How do male and female-owned micro and small enterprises use ICT? Data on this could answer some of the following questions:

What proportion of women-owned businesses are using ICT and at what level, for what purposes?

Are the businesses using the Internet?

Are they using it mainly to send e-mail and look for information? Or are they engaging in e-business and/or e-commerce?

How does the proportion of women-owned businesses using ICT, for various purposes, compare to that of male-owned businesses?

The question of differentials between male and female business owners in the degree of use and exploitation of the Internet for business purposes is a policy issue. One study from Africa found that women's use of ICTs decreases as technologies and services become more sophisticated.[138] Another recent study of small businesses in the UK showed female entrepreneurs to be more likely than men to use technology innovation in their products and service.[139] Large-scale, comparable data collection across countries is needed to discover if either of these findings can be generalized. Once reliably documented, whether disfavouring either men or women, such data may then be used to recommend policy and actions for the benefit of the entire society. This is important because enterprises can profit from doing more with ICTs than sending and receiving e-mail or looking for information on the Internet. Both male and female-owned enterprises in developing and transition economies can advance by moving towards applications such as e-business, including business-to-government (B2G) and e-commerce.

The data collection should be done through surveys of micro and small business owners, disaggregated by sex, with questions on the use of ICT. However, data are often difficult to collect and hard to come by for micro and small enterprises, particularly in developing countries, where they often fall into the unregistered category.

An example of this methodological approach is a survey is the survey of ICT use by women entrepreneurs in Malaysia.[140] Pending the analysis of comparability, data could also come from official informal sector data in a number of countries. Small business owner data are available from these UK and US surveys, but they do not yet include ICT-related questions. Such surveys include:

---

[138] This appears not to be based on anything inherent in ICTs, but rather that higher levels of technology require more education and more income to access and use, and women tend to have less of each than men. RIA. 2013. *Lifting the Gender Veil.*

[139] Prowess 2.0 Women in Business. 2013. Facts, 1. www.prowess.org/uk/facts.

[140] Nelson Ndubusi et al. 2005. Malaysian women entrepreneurs: understanding the ICT usage behaviors and drivers, *Journal of Enterprise Information Management*, 18 (6) 721-739. http://www.researchgate.net/publication/220306216_Malaysian_women_entrepreneurs_understanding_the_ICT_usage_behaviors_and_drivers.

US: Survey of Business Owners run by the US Census Bureau[141]

UK—several sources including:

Small Business Survey (Department for Business Innovation and Skills)[142]

Women's Entrepreneurship Facts and Statistics from Prowess, the former National Association for the Promotion of Women's Enterprise [143]

A number of relevant surveys, some of which focus on business owners, are also available from developing countries.[144] The World Bank extracts data and publishes sex-disaggregated indicators including firms with female participation in ownership from its Micro-Small and Medium Enterprises (MSME) Surveys, even though these data are not nationally representative. The size definitions of enterprises in these surveys also differ from those used by UNCTAD and are not based on official statistics, but rather on data collection by a consultancy firm.145 ILO, RIA and LIRNEasia are also involved in identifying and/or collecting ICT indicators of micro and small enterprises.

Further development work is needed to consider what would be the best survey vehicle for dealing with ICT and MSE entrepreneurship data and indicators. The work of ILO on measuring informal enterprises and operators opens possibilities for producing useful data on male and female differentials related to ICT in the workplace. Its *Manual on Informality* suggests sex of the entrepreneurs and use and access to mobile phones and Internet as variables and indicators for characteristics of informal sector business enterprises.[146] An example using this approach is the Colombia survey of the business environment of microestablishments.[147] While the ILO *Manual* suggests indicators of Internet and mobile phone use for informal sector enterprises and entrepreneurs, and a number of countries include this variable in the informal survey questionnaires, the indicators are not part of the standard ILO Labour Force Survey, and it is unlikely that ILO would be able to include this in its regular collection from countries in the near future.

Experience with sex-disaggregated data collection on ICT use at MSEs is available from two TGG members. In 2012, Research ICT Africa completed nationally representative business surveys in 12

---

[141] http://www.census.gov/econ/overview/mu0200.html

[142] https://www.gov.uk/government/publications/small-business-survey-2012-businesses-led-by-women-and-ethnic-minorities. The Small Business Survey (BIS) defines the enterprise sizes in the same way as UNCTAD but uses women-led businesses as their gender category, concentrating on women managers or a majority of women in the management team, rather than women owners. In many micro and small enterprises the manager may also be the owner.

[143] http://www.prowess.org.uk/facts

[144] A list of these can be found in ILO, *Measuring Informality* (see reference below) Another is Statistics South Africa. 2009. Survey of Employers and the Self-employed. http://www.datafirst.uct.ac.za/catalogue3/index.php/catalog/180/overview.

[145] See International Finance Corporation. 2013. MSME Country Indicators. http://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators, IFC and World Bank. 2013. Enterprise Surveys. http://www.enterprisesurveys.org.

[146] ILO, 2012. *Measuring informality: A statistical manual on the informal sector and informal employment* Geneva: 2012. http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_182300.pdf.

[147] Colombia. Departamento Administrativo Nacional de Estadistica (DANE). 2009. Metodología: Encuesta de microestablecimientos.

African countries, classifying businesses as informal, semi-formal and formal, largely on the basis of registration (with informal enterprises usually being unregistered, not paying taxes and operating from temporary structures).[148] Businesses were also identified by size of enterprise and form of ownership, and breakdowns were done on ownership by sex and by level of education. Only businesses with a physical presence were sampled, with sample sizes ranged from about 375 to 850.[149] As the vast majority of businesses (90 per cent) fell into the informal or semi-formal category, RIA excluded formal businesses from their analysis. The indicators provide data on whether the several areas of ICT use including:

Having a website[150]
Employees business use of e-mail
Use of mobile phones and/or social media for advertising
Online banking, e-mail, mobile, SMS for communication with suppliers
Online banking and mobile money transfer with customers

LIRNEasia also ran a microentrepreneur survey in 2013 to understand the use and interactions with service providers of ICTs (general and mobile specific), electricity and government services in urban settings of India, Bangladesh and Sri Lanka.[151]

D.3. Proposed additional indicators on entrepreneurship/small business owners and ICT

Proportion of micro, small business owners/entrepreneurs using the Internet, by sex of owner
Proportion of micro, small business owners/entrepreneurs using mobile phones, by sex of owner
Proportion of micro, small business owners/entrepreneurs using the Internet by type of activity and by sex of owner
Proportion of micro, small business owners/entrepreneurs using the Internet by type of activity and by sex of owner

For micro and small businesses the most relevant ICTs are mobile phones and the Internet. In a study of women's increased opportunities for entrepreneurship through ICT at the micro and small enterprise level in India, researchers identified connections between mobile phones and women's business success that included the lifting of barriers and increased opportunities as well as impact on women's empowerment in general and on the well-being of the families.[152] A survey of ICTs in informal businesses

[148] The follows the approach of Stork and Esselaar (eds.). 2006. *Towards an African e-Index: SME e-Access and Usage*. Witwatersrand: Link Centre. http://www.researchictafrica.net/images/upload/SME_book-Web.pdf.

[149] RIA. Survey Methodology. 2013. Household and Business Surveys in African Countries. Unpublished paper.

[150] In Uganda, more women owners than men in informal and semi-formal businesses had websites. Ibid.

[151] LIRNEasia. 2013. Improving service delivery for e-inclusion. http://lirneasia.net/projects/2012-2014-research-program/improving-service-delivery-for-e-inclusion/.

[152] Anju Malhotra, Anjala Kanesathasan and Payal Patel. 2012. How mobile phones, computers and the Internet can catalyze women's entrepreneurship: the case of India. Washington DC: International Center for Research on Women.[152] http://www.icrw.org/publications/connectivity-how-mobile-phones-computers-and-Internet-can-catalyze-womens-entrepreneurs.

in Africa showed that mobile phones were the only ICT widely used, with the use of fixed lines, computer and the Internet being negligible.[153] This is an area where it appears that there are gender divides in developing countries. In a recent study of African countries, a much higher share of male-owned informal sector businesses used mobile phones than female-owned businesses.[154] While microbusinesses would be less likely to use the Internet (although the number that do so increases daily), Internet use is likely to be significant globally in the operation of small businesses, particularly those that deal with international clients and suppliers.

In the proposed indicators, the emphasis would be on the use of ICT on each of these platforms, by the purpose of use, i.e. the business process, such as obtaining information, locating and contacting clients.[155] These choices are not platform-specific given that a non-Internet enabled mobile phone as well as an Internet-enabled mobile phone or computer could be used for the same purposes. This raises the problem of possible redundancy of questions, but few women in developing countries yet own Internet-enabled mobile phones. RIA's 2013 study found that in ten of 12 African countries, women were less likely to own Internet-enabled mobile phones than men.[156]

In each case the data would be disaggregated by sex. Sub-indicators could be calculated by size of enterprise. Information on the age and education level of the entrepreneur would also be valuable. As noted the question on the Internet could be redundant in cases of entrepreneurs using Internet-enabled mobile phones. The list of usage activities would be reviewed but could generally follow UNCTAD indicator M4 for mobile phones and Core ICT indicator B12 for the Internet.[157] Desirably the activity lists would vary in the level of digital skills required and the variety and sophistication of business purposes. These are matters to be that worked out in the forthcoming methodological exercise. The major difficulties are identifying unregistered microbusinesses and assuring the undertaking of surveys of micro and small enterprises with ICT modules in developing countries.

E. E-government

Among the seven e-government core indicators that were added to the Partnership's core list of indicators in 2012, there are two individual level core e-government indicators can be disaggregated by sex.[158] These two, which are also WSIS target indicators, are:[159]

---

153 Research ICT Africa. 2013. Gender and Entrepreneurship in the Informal Sector: An African perspective. Presented at Communication Policy Research Asia/Africa conference on Innovation & Entrepreneurship in ICT: Changing Asia/Africa, 5-7 September 2013, Mysore, India. Unpublished.

154 The inequality was most pronounced in Ethiopia where 46.4 per cent of male-owned businesses used mobile phones for business purposes in comparison to 3.2 per cent of female-owned businesses. RIA. 2013. Gender and Entrepreneurship in the Informal Sector.

155 The UNCTAD ICT questionnaire defines use of ICTs for business processes for the following purposes: Customer relationship management, Finance, budget and account management, Human resource management, Product design & development, Logistics (inbound & outbound) and inventory control, Product service and support and Knowledge management. UNCTAD. 2009, *Manual*.

156 The gap was biggest in Uganda where men were more than twice as likely as women to own Internet-enabled phones. RIA. 2013. Lifting the Gender Veil on ICT indicators in Africa. Gender and Entrepreneurship in the Informal Sector: An African perspective. Unpublished paper.

157 This indicator has been suggested by UNCTAD by not yet collected. UNCTAD, 2009. *Manual.*

158 See Partnership on Measuring ICT for Development and Economic Commission for Africa. 2011. *Framework for a set of e-government core indicators*. 2011). http://www.itu.int/ITU-

EG1 Proportion of persons employed in central Government organizations routinely using computers

EG2 Proportion of persons employed in central Government organizations routinely using the Internet

The new Partnership core indicators on e-government are supply- rather than demand-side indicators and do not look at users of their services. While it is of interest to know whether more male than female government employees are routinely using computers and the Internet and vice-versa, these person-level indicators do not shed any light on e-government as a service area directed at citizen users. Nor do they show occupation or skill level of the persons employed, also decreasing their utility. More relevant and of greater importance, because of its wider impact than the above two indicators, is knowing whether an equitable number of females are accessing government information and services using computers and the Internet and whether they are finding the information and services they need. As noted in the section on household and individual use indicators, this aspect of e-governance is addressed in the responses to household and individual use indicator HH9, which include using the Internet to get information from general government organizations and to interact with general government organizations.

Collection and disaggregation of these two indicators would provide information on the presence of ICT skills of men and women working in central Government organizations. The comparison of gender differentials might lead to efforts to improve the ICT skills of whichever sex lagged behind the other. For this and other reasons, collection of these two core e-government indicators would increase the number of gender-related core indicators.

D/ict/partnership/material/Framework_for_a_set_of_E-Government_Core_Indicators_Final_rev1.pdf. United Nations. 2011. Report of the Partnership.

[159] ITU/Partnership on Measuring ICT for Development. 2011. *Measuring the WSIS Targets: a statistical framework*, p.60. http://www.itu.int/dms_pub/itu-d/opb/ind/D-IND-MEAS_WSIS-2011-PDF-E.pdf.

Chapter 4 Conclusions and Recommendations

Conclusions

The suggested changes comprise revisions to two existing areas of ICT measurement (employment in ICT sector and the business access indicators) and 13 additional indicators, of which ten need further development work. In addition, the report identified three existing Partnership core indicators, allowing for sex-disaggregated reporting, for which the data is not yet being collected at the international level (on education and e-government). The report recommends that data collection on these indicators should start as soon as possible. Two areas were highlighted for consideration in future revisions and indicator development work: gender equality in access to broadband and gender-based violence.

In addition to the suggested changes, the report acknowledges and builds on 20 existing Partnership core indicators that already allow measuring gender and ICT.

Table 7 shows a summary of suggested changes and existing Partnership indicators on gender and ICT.

Table 7. Existing core indicators, suggested revisions and proposed new indicators on measuring gender and ICT

Indicator no.	Indicator	Existing/Proposed revisions to existing indicator/Proposed new indicator	Further work needed
Household/individual ICT usage			
HH1, HH2, HH3, HH4, HH6, H11, HH13, HH14, HH16	Households access indicators	Existing Filter question on sex of household head	No change
HH5	Proportion of individuals using a computer	Existing	No change
HH7	Proportion of individuals using the Internet	Existing	No change
HH8	Proportion of individuals using the Internet, by location	Existing	No change
HH9	Proportion of individuals using the Internet, by type of activity	Existing	No change
HH10	Proportion of individuals using a mobile cellular telephone	Existing	No change
HH12	Proportion of individuals using the Internet, by frequency	Existing	No change
HH15	Individuals with ICT skills, by type of skills	Existing	No change
	Proportion of individuals who own a mobile phone	*Proposed new indicator*	*Definition of mobile phone ownership*
	Proportion of individuals using a mobile phone, by type of activity	*Proposed new indicator*	*Development of responses on mobile phone activities*

Indicator no.	Indicator	Existing/Proposed revisions to existing indicator/Proposed new indicator	Further work needed
	Proportion of individuals not using the Internet , by type of barriers	*Proposed new indicator*	*Development of list of barriers to Internet access by individuals*
Education			
ED6	Proportion of learners who have access to the Internet at school	Existing	No change
ED7	Proportion of learners enrolled at the post-secondary level in ICT-related fields	Existing	Data are currently not available for this indicator. UNESCO to collect data on this indicator.
ED8	Proportion of ICT-qualified teachers in schools	Existing	
	Proportion of primary and secondary school teachers trained to teach subjects using ICT facilities (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on non-core indicator ED38
	Proportion of pupils enrolled in programmes offering computer assisted instruction (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on existing indicator
	Proportion of pupils enrolled in programmes offering Internet-assisted instruction (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on existing indicator
	Proportion of pupils enrolled in programmes offering courses in basic computer skills or computing (ISCED levels 1-3) (sex disaggregated)	*Proposed new indicator*	Based on existing indicator
	Proportion of graduates in ICT-related fields at post-secondary non-tertiary and tertiary levels (sex disaggregated)	*Proposed new indicator*	Based on non-core indicator ED46
Employment			
ICT1	Proportion of total business sector workforce involved in the ICT sector	*Proposed revision:* sex disaggregation	
	Proportion of employees in ICT occupations	*Proposed new indicator*	Definition and measurement of ICT occupations
Business			
B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12	Business access indicators	*Proposed revision:* addition of filter question on gender composition of business employees	Precise formulation of filter question to be determined: male/female dominated, neutral
Entrepreneurship/ small business owners			
	Proportion of micro, small business owners/ entrepreneurs using the Internet (sex disaggregated)	*Proposed new indicator*	*Elaboration and implementation of a survey instrument for micro and small*

Indicator no.	Indicator	Existing/Proposed revisions to existing indicator/Proposed new indicator	Further work needed
	Proportion of micro, small business owners/ entrepreneurs using mobile phones (sex disaggregated)	*Proposed new indicator*	*businesses with an ICT module* *Development of responses on Internet by type of activities*
	Proportion of micro, small business owners/ entrepreneurs using mobile phones by type of activity (sex disaggregated)	*Proposed new indicator*	
	Proportion of micro, small business owners/ entrepreneurs using the Internet by type of activity (sex disaggregated)	*Proposed new indicator*	
E-Government			
EG1	Proportion of persons employed in central Government organizations routinely using computers	Existing	No change in definition. Data are currently not available and should be collected for this indicator.
EG2	Proportion of persons employed in central Government organizations routinely using computers	Existing	No change in definition. Data are currently not available and should be collected for this indicator.

The basic purpose of this exercise has been to assess current gender-related indicators and identify additional ones in an effort to improve the coverage and availability of internationally comparable, reliable data on gender and ICT. The most important application of these data is to create awareness of differential access and use of ICTs by males and females and to bring them to the attention of researchers, planners and policy makers.

If the suggested changes are endorsed and data collected by countries, we can gain considerable knowledge on areas where we presently do not have internationally comparable data. These will help us answer questions such as the following:

In education:

Are female teachers trained to the same extent as males to teach using ICTs?
Are girls learning computer skills in school?
Are girls as likely as boys to benefit from computer-assisted learning in school?
How many girls are graduating in ICT-related fields?

In accessing and using ICTs:

What are common barriers to accessing and using the Internet among girls and women?
Are female-headed households and their members less likely than other types of households to access and use ICTs? At what level are they using them?
Are women entrepreneurs using mobile phones and the Internet to their advantage in business to the same extent as men?
To what extent do girls and women own mobile phones?
What activities are females using their mobile phones for?
In small business, do men and women differ in the access to and use of mobile phones?

In employment in the ICT sector and ICT jobs across many sectors:

Do young women have the necessary credentials for this work?
What is the gender composition of the workforce using ICT?
To what extent are women represented among ICT specialists?
What is the female share of employment in the ICT sector?

Collection of data on all these areas would be important steps towards the process of building inclusive information societies. In order to arrive at the collection of these and other gender-related ICT statistics and indicators, the following recommendations are made.

Recommendations

Overall

Improving collection of ICT individual-level data, particularly from developing countries, is key to obtaining gender-related ICT statistics. The experience of the Partnership is that the biggest problem is not in obtaining data disaggregated by sex, but rather the collection of individual-level ICT data in the first place. Once individual data is scheduled for collection, its disaggregation by sex need not be a difficult matter.

Partnership efforts

Promote the collection of individual use data

Especially in developing countries the most important activities for the Partnership to pursue are its efforts to encourage NSOs and other official statistical entities in developing countries to collect individual-level ICT data, with sex as a classificatory variable.

The advocacy role of the Partnership is crucial for the strengthening of capabilities and the will to collect ICT indicators at national level, especially those on individual use. This requires not only a continuation but also a reinforcement of training efforts on the part of the Partners, including publication of manuals and other guides in support of technical workshops and training courses. Efforts will need to be made to secure donor funding to facilitate ICT data collection in developing countries, in addition to funds that may already be available for developing general statistical expertise. Regional economic commissions can help with awareness raising and dissemination efforts as well as with capacity building. It is necessary to continue to coordinate efforts on measuring ICT with the work of agencies responsible for other statistical surveys. This will strengthen outcomes both from the perspective of boosting expertise in national statistical systems and that of efficient spending of donor funding.

Build awareness of gender-related ICT statistics

The Partnership as a whole and its members individually need to raise awareness among policy makers and data producers of the importance of gender ICT statistics, emphasizing the importance of having gender and ICT data for policy making and implementation, and the fact that this can be done without the allocation of additional resources through the collection of individual-level ICT statistics in such a way that they can be easily disaggregated.

Interact with the gender statistics community

The Partnership, through the Task Group of Gender, should continue and increase its interaction with the gender statistics community, especially through the IAEG-GS to foster awareness of the importance

of ICT to gender issues. While gender statistics efforts are concerned with integrating a gender perspective into national statistics, they would be well served considering integration of an information technology perspective into gender statistics, in view of the global importance of an inclusive information/knowledge society.

Promote data collection on multiple aspects of mobile telephone

Efforts should be made especially to collect data on individual mobile cellular indicators, particularly in developing countries, as they are the most widely available ICT globally, and they are developing into the standard mode of Internet/broadband access in much of the world. In many developing countries, and especially among girls and women, they are the ICT used by most people.

National efforts

Coordinate with ICT policy makers to get gender in from the beginning

NSOs, in collaboration with ICT policy makers, should take into account the integration of a gender perspective into ICT data from the first stage of planning data collection and setting out the objectives of the survey or census.

Adhere to international standards

As important as promoting an awareness of gender is an emphasis on the collection of internationally comparable statistics, in order to facilitate sound analysis and the development of successful policies and programmes. In doing this, the utilization of internationally agreed standards, definitions, guides and manuals are paramount.

What kinds of surveys?

While ICT surveys are most desirable for the number of questions that can be included, the inclusion of individual-level ICT questions a module in existing NSO surveys, such as a census or labour force survey, is also valuable. Given the expenses involved in national data collection, adding items to existing instruments is far preferable to initiating new surveys. This is particularly true for developing countries, where few stand-alone ICT surveys have been undertaken.

Avoid gender bias

These are general principles for gender statistics that need to be transmitted to supervisors and field personnel collecting data and conducting interviews to guarantee that the situation of women and girls is properly reflected in individual-level ICT data. Gender-related measurement issues and gender stereotypes should be addressed, and clear explanations given on questions that may have gender issues. Language should be vetted for gender-based biases or other stereotypes, and the examples given should not reinforce gender stereotypes. Field personnel need to be trained to appreciate the different experiences and realities of men and women, so that, in conducting interviews, they do not incorporate biases that interfere with an accurate determination of the inequalities between men and women.

Annexes

Annex I Revised and extended core list of ICT indicators (2013)

A1 Fixed telephone subscriptions per 100 inhabitants
A2 Mobile cellular telephone subscriptions per 100 inhabitants
A3 Fixed Internet subscriptions per 100 inhabitants
A4 Fixed broadband Internet subscriptions per 100 inhabitants
A5 Mobile broadband subscriptions per 100 inhabitants
A6 International Internet bandwidth per inhabitant (bits/second/inhabitant)
A7 Percentage of the population covered by a mobile cellular telephone network
A8 Fixed broadband Internet access prices
A9 Mobile cellular telephone prepaid prices
A10 Percentage of localities with public Internet access centres (PIACs)
HH1 Proportion of households with a radio
HH2 Proportion of households with a television
HH3 Proportion of households with telephone
HH4 Proportion of households with a computer
HH5 Proportion of individuals using a computer
HH6 Proportion of households with Internet
HH7 Proportion of individuals using the Internet
HH8 Proportion of individuals using the Internet, by location
HH9 Proportion of individuals using the Internet, by type of activity
HH10 Proportion of individuals using a mobile cellular telephone
HH11 Proportion of households with Internet, by type of service
HH12 Proportion of individuals using the Internet, by frequency
HH13 Proportion of households with multichannel television, by type
HH14 Barriers to household Internet access
HH15 Individuals with ICT skills, by type of skills
HH16 Household expenditure on ICT
B1 Proportion of businesses using computers
B2 Proportion of persons employed routinely using computers
B3 Proportion of businesses using the Internet
B4 Proportion of persons employed routinely using the Internet
B5 Proportion of businesses with a Web presence
B6 Proportion of businesses with an Intranet

B7 Proportion of businesses receiving orders over the Internet
B8 Proportion of businesses placing orders over the Internet
B9 Proportion of businesses using the Internet by type of access
B10 Proportion of businesses with a local area network (LAN)
B11 Proportion of businesses with an Extranet
B12 Proportion of businesses using the Internet by type of activity
ICT1 Proportion of total business sector workforce involved in the ICT sector
ICT2 ICT sector share of gross value added
ICT3 ICT goods imports as a percentage of total imports
ICT4 ICT goods exports as a percentage of total exports
ED1 Proportion of schools with a radio used for educational purposes
ED2 Proportion of schools with a television used for educational purposes
ED3 Proportion of schools with a telephone communication facility
ED4 Learners-to-computer ratio in schools with computer-assisted instruction
ED5 Proportion of schools with Internet access by type of access
ED6 Proportion of learners who have access to the Internet at school
ED7 Proportion of learners enrolled at the post-secondary level in ICT-related fields
ED8 Proportion of ICT-qualified teachers in schools
EG1 Proportion of persons employed in central Government organizations routinely using computers
EG2 Proportion of persons employed in central Government organizations routinely using the Internet
EG3 Proportion of central Government organizations with a local area network (LAN)
EG4 Proportion of central Government organizations with an Intranet
EG5 Proportion of central Government organizations with Internet access, by type of access
EG6 Proportion of central Government organizations with a Web presence
EG7 Selected Internet-based online services available to citizens, by level of sophistication of service

Annex II. Selected bibliography on gender, ICT and international development

General references on gender and ICT for development

Acharya, K., 2003. Flaws in Bhoomi, India's model e-governance project, Pune, India. *Infochange India*. http://www.infochangeindia.org/features120.jsp.

Association for Progressive Communication. 2010. Case Study of the Grameen Gyan Abhiyan Rural Knowledge Centre Movement – MSSRF. http://www.apc.org/en/system/files/APCProPoorKit_Advocacy_CaseStudy_MSSRF_EN.pdf.

Beardon, Hannah. 2004. *ICT for Development: Empowerment or Exploitation*? London: Action Aid.

Best, Michael & Sylvia G. Maier. 2007. Gender, Culture and ICT Use in Rural South India. *Gender Technology and Development*, 11, 137-155.

Bonder, Gloria. 2002. From access to appropriation: Women and ICT policies in Latin American and the Caribbean. http://www.mujeresenred.net/zonaTIC/IMG/pdf/GBonder.pdf.

Bonder, Sophia Huyer and Nancy Hafkin. 2010. UNDESA. Information and communications technology and gender equality: new opportunities and challenges for public administration to implement Millennium Development Goals. 2010. (E/C.16/2010/4). http://www.unpan.org/DPADM/CEPA/9thSession/tabid/1136/language/en-US/Default.aspx.

Buskens, Ineke and Anne Webb. 2009. *African Women & ICTs: Investigating Technology, Gender and Empowerment*. Zed Books, IDRC and UNISA Press: Pretoria.

Chodhury, Naziat. 2009. The Question of Empowerment: Women's Perspective on Their Internet Use, *Gender, Technology and Development*, 13, 341-363.

De', Rahul. 2006. The Impact of Indian E-Government Initiatives: Issues of Poverty and Vulnerability Reduction and Conflict. In *Regional Development Dialogue*, 27, 2 (2006), 88-100. http://www.uncrd.or.jp/pub/rdd/rdd27_2.pdf.

Etta, F.E & S. Parvin-Wamahiu. 2003. *The experience with community telecentres*. Ottawa: International Development Research Centre.

Fidzani, Babbakisi T. 2006. Sub-Saharan Africa. Information Literacy: State-of-the-Art Report. In Information Literacy: An International State-of-the-Art Report. www.uv.mx/usbi.ver/unesco.

Gadio, Coumba Mar. 2001. Exploring the Gender Impacts of WorldLinks in Some Selected Participating African Countries: a Qualitative Approach. http://worldlinks.org/English/assets/gender_study_v2.pdf.

Gerster, Richard and Sonja Zimmermann. 2003. ***Building Digital Opportunities (BDO) Programme: Information and communication technologies (ICTs) and poverty reduction in Sub Saharan Africa: a learning study (synthesis)***. Richterswil, Switzerland: Gerster Consulting.ICTs for Poverty Reduction.

Gillwald, Allison, Anne Milek, A. & Christopher Stork. 2010. *GeGSMnder Assessment of ICT Access and Usage in Africa*. Vol. 1, Policy Paper 5. Johannesburg: Research ICT Africa. http://lirneasia.net/wp-content/uploads/2010/09//Gender_P.

Gillwald, Allison and Christopher Stork. 2008. *Towards Evidence-Based ICT Policy and Regulation: ICT access and usage in Africa*. Vol. 1, Policy Paper 2. Johannesburg: Research ICT Africa.

http://www.researchictafrica.net/new/images/uploads/ria-policy-paper_ict-access-and-usage-2008.pdf.

Green, Lindsey & Lowry Trevor-Deutsch. 2002. Women and ICTs for open and distance learning: Some experiences and strategies from the Commonwealth. http://www.col.org/colweb/webdav/site/myjahiasite/shared/docs/Women and ICTs.pdf.

Gulati Institute of Finance and Taxation. 2011. *Commercial Taxes- Akshaya Synergy: a success story of an e-governance initiative of Government of Kerala.* gift.kerala.gov.in/docs/final_report.pdf.

Gurumurthy, Anita. Gender and ICTs: Overview Report. 2004. http://www.itforchange.net/sites/default/files/ITfC/CEP-ICTs-OR.pdf

Gurumurthy, Anita, Parminder Jeet Singh, Anu Mundkur & Mridula Swamy, editors. 2006. *Gender in the Information Society*: *Emerging Issues*. Chennai: APDIP & Elsevier. http://www.unapcict.org/ecohub/resources/gender-in-the-information-society-emerging-issues.

Gurumurthy, Anita, M. Swamy, R. Nuggehallli, & V. Vaidyanathan. 2008. *Locating Gender in ICTD Projects: Five Cases from India*. Bangalore: IT for Change. http://www.nisg.org/docs/ICTD_Locating_Gender_Case_Study.pdf.

Hafkin, Nancy. 2002. Are ICTs Gender Neutral: A gender analysis of six case studies of multi-donor ICT projects. UN/INSTRAW Virual Seminar Series on Gender and ICTs.

Hafkin. 2002. Some thoughts on gender and telecommunications/ICT statistics and indicators. *3rd World Telecommunication/ICT Indicators Meeting Geneva: ITU*. http://www.itu.int/ITU-D/ict/WICT02/doc/pdf/Doc27_E.pdfHafkin.

Hafkin. 2003. Gender issues in ICT statistics and indicators, with particular emphasis on developing countries. JointUNECE/UNCTAD/UIS/ITU/OECD/EUROSTAT Statistical Workshop: Monitoring the Information Society: Data, Measurement and Methods. www.unece.org/**stats**/documents/ces/sem.52/3.e.pdf.

Hafkin. Gender. 2012. In G. Sadowsky, N. Al-Shorbaji, R. Duncombe, T. Fredriksson, A. Greenberg, Hafkin, & R. Zambrano, R. 2012. *Accelerating development using the web: empowering poor and marginalized populations*. New York: Rockefeller Foundation. http://public.webfoundation.org/publications/accelerating-development/.

Hafkin and Sophia Huyer. 2008. Women and Gender in ICT Statistics and Indicators for Development. 2008. *Information Technologies and International Development,* 4, 2. http://itidjournal.org/itid/article/viewFile/254/124.

Hafkin & Huyer. 2007. *Engendering the Knowledge Society: Measuring Women's Participation*. Montreal: ORBICOM. http://www.orbicom.ca/en/research/62-engendering-the-knowledge-society-measuring-women-s-participation.html.

Hafkin & Huyer, eds. 2006. *Cinderella or cyberella? Empowering women in the knowledge society*. Kumarian Press.

Hafkin & Huyer. 2002. Lessons on Gender in ICT Applications: Case Studies of infoDev Projects. infoDev Working Paper No. 18. http://inforesources.assyst-uc.com/infodev-files/resource/InfodevDocuments_539.pdf.

Hafkin & Nancy Taggart. 2001. *Gender, Information Technology and Developing Countries.* Washington: Academy for Educational Development. http://ict.aed.org/infocenter/pdfs/Gender_Book_Photos.pdf.

Huyer, Sophia. 2009. We are no longer ignorant. E-governance strategies to overcome the gender divide. Unpublished paper.

Huyer, Sophia, Nancy Hafkin, Heidi Ertl and Heather Dryburgh. 2005. Women in the Information Society. In Sciadas, G. (Ed). *From the Digital Divide to Digital Opportunities: Measuring Infostates for Development,* pp. 135-196. Québec: Claude-Yves Charron. http://www.itu.int/ITU-D/ict/publications/dd/material/index_ict_opp.pdf.

International Telecommunications Union (ITU). 2011. ICT services getting more affordable worldwide. 16 May. http://www.itu.int/ITU-D/ict/ipb/.

Intel Corporation and Dalberg Associates. 2013. *Women and the Web*. http://www.intel.com/content/dam/www/public/us/en/documents/pdf/women-and-the-web.pdf.

Johnson, Kelby S. 2003. Strategic Thinking: Telecenters and the Gender Dimension: An Examination of How Engendered Telecenters are Diffused in Africa. M.A. Thesis, Georgetown University. http://cct.georgetown.edu/thesis/KelbyJohnson.pdf

Joshi, Ila. ed. Asian women in the Information Age: new communication technology, democracy and women. Singapore: Asian Media and Communication Centre.

Kalam, A P J Abdul & Y S Rajan. 2003. *India 2020: A Vision for the New Millennium.* New Delhi: Penguin Books India.

Khan, Farida & Rehana Ghadially. 2010. Empowerment through ICT Education, access and use: a gender analysis of Muslim youth in India. *Journal of International Development*, 22, 659-673.

Kaul, Malvina. 2003. The World in an ICT Pouch. http://www.boloji.com/index.cfm?md=Content&sd=Articles&ArticleID=6361.

Kleine, Dorothea. 2012. Technologies of Choice. Cambridge: MIT Press.

Kuga Thas, A.M., Chat Garcia Ramilo & Cheekay Cinco. (2007). Gender and ICT. Bangkok: UNDP-APDIP. http://www.apdip.net/publications/iespprimers/eprimer-gender.pdf.

Madanda, Aramanzan, Dorothy Okello, & Grace Bantebya-Kyomuhendo. 2009. A Gender Critique of Uganda's Rural ICT Access Policy: Opportunities and Challenges. *International Journal of Computing and ICT Research*, 3,1, 42-52. http://www.ijcir.org/specialissue2009/article5.php

Masethlha, Kgatliso Pleasant and Stephanie Gingras. 2002. Rural South African women join information age through telecentres. http://www.lolapress.org/elec1/artenglish/step_e.htm.

Melhem, S., & N. Tandon. (2009). Information and Communication Technologies for Women's Socio-economic Empowerment (No. 176). World Bank.

Menou, Michel. 2001. Digital and Social Equity? Opportunities and threats on the road to empowerment. Paper presented at LIDA Conference on Libraries in the Digital Age, Dubrovnik, Croatia, 23-27 May. www.ffzg.hr/infoz/lida/lida2001/present/menou.rtf.

Mottin-Sylla, Marie-Helene, ed. 2005. The gender digital in francophone Africa: a harsh reality. http://www.famafrique.org/regentic/indifract/africa_gender_divide+en.pdf. Dakar: Enda ThirdWorld.

Mwesige, Peter. 2004. Cyber elites: a survey of Internet Café users in Uganda. *Telematics and Informatics - TELE*. 21, 83-101.

Nadamoto, S. 2006. Empowerment of women in telecentres in Jamaica. Unpublished presentation. www.womenictenterprise.org/NadamotoWorkshopPresent.ppt.

Nanda, Suchit & Subbiah Arunachalam. 2010. *Reaching the Unreached: Community Based village Knowledge Centres and Village Resource Centres*. Chennai: Jamsetji Tata National Virtual Academy, M S Swaminathan Research Foundation, http://www.suchit.net/books/Reaching-the-Unreached.pdf.

Odame, Helen Hambly. 2005. Gender and ICTs for development: setting the context. *Gender and ICTs for development: A global sourcebook*, 13-24.

Parmentier, J. & S. Huyer. 2008. Female Empowerment and Development in Latin America: Use versus Production of Information and Communications Technology. *Information Technologies and International Development,* 4, 2.

Rathgeber, Eva. 2002. Gender and Telecentres: What Have We Learned. World Bank Group Digital Divide Seminar Series. http://www.worldbank.org/gender/digitaldivide/Eva%20Rathgever.ppt.

Rathgeber, Eva and Edith Ofwona Adera, editors. 2000. *Gender and the Information Revolution in Africa.* Ottawa: IDRC.

Rodriguez, Nidia Bustillos. 2001. ICTs for the empowerment of indigenous women in Bolivia. An experience in Omak. http://www.eldis.org/fulltext/ict_bolivia.doc.

Sen, Amartya. 1999. *Development as Freedom.* Oxford: Oxford University Press.

Slater, Don and Jo Tacchi. 2004. ICTs at work in the hands of the poor. Innovation and research in South Asia. *I4D*, I, 5, 6-13. http://www.i4donline.net/issue/may04/may-04.pdf.

Srinivasan, Janaki. 2010. Looking beyond 'information provision': The importance of being a kiosk operator in the Sustainable Access in Rural India (SARI) project, Tamilnadu, India. Paper presented at ICTD2010 conference, University of London, Royal Holloway. http://www.gg.rhul.ac.uk/ict4d/ictd2010/papers/ICTD2010%20Srinivasan%20A.pdf

Sundararajan, Aruna. 2006. Empowering Communities through IT: Multi-stakeholder Approaches and the Akshaya Experiment, 65-73. In Gurumurthy et al., 2006, *Gender in the Information Society*, Chennai: APDIP & Elsevier.

Tilvawala, Khushbu, Michael D. Myers & Antonio Diaz Andrade. 2009. Information Literacy in Kenya. *The Electronic Journal on Information Systems in Developing Countries*, 39,1,1-11. http://www.ciisdc.org.

Umrani, F. 2007. Computer adoption among Mumbai Muslim youth: empowerment and impact assessment. Unpublished document, Indian Institute of Technology, Mumbai, India. Cited in Khan & Ghadially, 2010, Empowerment through ICT Education, access and use: a gender analysis of Muslim youth in India. *Journal of International Development*, 22, 659-673.

Wakunuma, Kutoma J. 2007. Gender and Information Communication Technologies (ICTs) in the Developing World: A Case Study of Zambia. Ph.D. dissertation, University of Coventry (UK).

Woldekidan Kifle Amde. 2008. Exploring how Gender mediates ICT Access and Use in Ethiopia. Unpublished paper for Research ICTAfrica.

World Bank. 2005. ICTs and economic empowerment of women in South Asia. Gender Digital Divide Seminar. 2 March. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTGENDER/0,,contentMDK:20363909~menuPK:489311~pagePK:148956~piPK:216618~theSitePK:336868,00.html.

World Bank. 2003. *Engendering ICT*: Ensuring Gender Equality in ICT for Development. Gender and ICT Toolkit. Nancy Hafkin, study coordinator. http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/EngenderingICTFinalDraft.pdf;

http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTGENDER/EXTICTTOOLKIT/0,,contentMDK:20272986~menuPK:562601~pagePK:64168445~piPK:64168309~theSitePK:542820,00.html.

Zulu, Edwin & Kutoma Wakunuma. 2006. Kalomo Bwacha Women's ICT Club in Zambia. University of Manchester Women's IT Sector Enterprises Case study no. 11. http://www.yasni.com/ext.php?url=http%3A%2F%2Fwww.womenictenterprise.org%2Fkalomo.htm&name=Edwin+Nyam+Ndela+Zulu&cat=other&showads=1

References on gender and mobile phones in developing countries

Aminuzzaman, S., Baldersheim, H., & Jamil, I. (2003). Talking back! Empowerment and mobile phones in rural Bangladesh: A study of the Village Phone Scheme of Grameen Bank. Contemporary South Asia, 12(3), 327-348.

AppLab. 2009. Mobile Tech for Community Health. http://www.grameenfoundation.applab.org/section/ghana-health-worker-project.

Bowen, Hannah. 2010. African Development Research Series: Kenya. Information at the Grassroots: Analyzing the Media Use and Communications Habits of Kenyans to Support Effective Development. www.intermedia.org/brochures/AudienceScapes_Kenya%20Quant.pdf.

Buskens, Ineke and Anne Webb. 2009. *African Women & ICTs: Investigating Technology, Gender and Empowerment*. Zed Books, IDRC and UNISA Press: Pretoria.

Chib, Arul. 2010. The Aceh Besar midwives with mobile phones project: Design and evaluation perspectives using the information and communication technologies for healthcare development model. *Journal of Computer Mediated Communication*, 15, 3, 500-525.

Comfort, Kazanka & John Dada. 2009. Women's Use of Cell Phones to Meet Their Communication Needs: A Study of Rural Women from Northern Nigeria. In Buskens & Webb, *African Women & ICTs*, 44-59, London: Zed Books.

Creighton, K., M. del Mar Gutierrez, & L. Agi. 2012. Information and Communication Technologies for Development: Gender Equality and Women's Empowerment. http://milanoschool.org/wp-content/uploads/2012/06/UNGAID-white-paper-gender3.pdf.

Datta, Dipankar, Anne Ejakait and Monica Odak et al. 2009. Mobile phone-based cash transfers: lessons from the Kenya emergency response. *Concern Worldwide – Kenya Programme in Humanitarian Exchange Magazine*. http://www.odihpn.org/report.asp?id=2936.

Diga, Kathleen. 2008. Poverty Level Change among Households in Uganda. Paper presented to Workshop on the Role of Mobile Technologies in Fostering Social Development, Sao Paulo, Brazil. http://www.w3.org/2008/02/MS4D_WS/papers/position_paper-diga-2008pdf.pdf.

Gillwald, Allison, Anne Milek, A. & Christopher Stork. 2010. *GeGSMnder Assessment of ICT Access and Usage in Africa*. Vol. 1, Policy Paper 5. Johannesburg: Research ICT Africa. http://lirneasia.net/wp-content/uploads/2010/09//Gender_P.

Gillwald and Christopher Stork. 2008. *Towards Evidence-Based ICT Policy and Regulation: ICT access and usage in Africa*. Vol. 1, Policy Paper 2. Johannesburg: Research ICT Africa. http://www.researchictafrica.net/new/images/uploads/ria-policy-paper_ict-access-and-usage-2008.pdf.

GSM Association and Cherie Blair Foundation for Women. 2010. *Women & Mobile: a Global Opportunity: A Study on the mobile phone gender gap in low and middle-income countries*. London: Vital Wave

Consulting. http://www.cherieblairfoundation.org/our-work/women-and-mobile-a-global-opportunity.

Gumede, NomPumelelo P., Bob Urmilla, and Roselyne N. Okech. 2009. Women and Technology in South Africa: A Case of Four Communities in Kwazulu-Natal. G*ender, Technology and Development*, 13, 103-125.

IRIN. 2009. Lesotho: Women farmers get mobile phone know-how. Humanitarian news and analysis, 18 March 2009. http://www.irinnews.org/Report.aspx?ReportId=83535.

Jorge, Sonia and Ronda Zelezny-Green. 2011. mWomen in Africa: Counting Who Has Access. http://www.pyramidresearch.com/points/print/120213.htm.

Kiplang'at, Joseph. 2004. Bringing agricultural information to rural women via ICTs in South Africa. Paper presented at AITEC conference on Women and ICT: Challenges and Opportunities on the Road to Tunis 2005, www.genderwsis.org/187.0.html.

Klonner, Steven and Patrick Nolen. 2008. Does ICT Benefit the Poor? Evidence from South Africa. http://privatewww.essex.ac.uk/~pjnolen/KlonnerNolenCellPhonesSouthAfrica.pdf.

Lee, Dayoung. 2009. The Impact of mobile phones on the status of women in India. Unpublished paper, Stanford University, Department of Economics. http://mobileactive.org/research/impact-mobile-phones-status-women-india.

Macueve, Gertrudes, Judite Mandlate, Lucia Ginger, Polly Gaster & Esselina Macome. 2009. Women's use of information and communication technologies in Mozambique: a tool for empowerment, 21-32. In Buskens and Webb, *African Women & ICTs*.

Makeni, John. 2011. Girls who created social network for farmers. *Daily Nation* [Nairobi], 10 January. http://allafrica.com/stories/201101100964.html.

Malhotra, Anju, Anjala Kanesathasan and Payal Patel. 2012. How mobile phones, computers and the Internet can catalyze women's entrepreneurship: the case of India. Washington DC: International Center for Research on Women. Anju Malhotra, Anjala Kanesathasan and Payal Patel. 2012. How mobile phones, computers and the Internet can catalyze women's entrepreneurship: the case of India. Washington DC: International Center for Research on Women. http://www.icrw.org/publications/connectivity-how-mobile-phones-computers-and-Internet-can-catalyze-womens-entrepreneurs.

M-Pesa is bottom-up. 2009. http://timbuktuchronicles.blogspot. 22 October.

Ramey, Corinne. 2009. ZMQ: Prenatal care through SMS. http://mobileactive.org/tagging/zmq.

Srinivasan, Janaki. 2010. Looking beyond 'information provision': The importance of being a kiosk operator in the Sustainable Access in Rural India (SARI) project, Tamilnadu, India. Paper presented at ICTD2010 conference, University of London, Royal Holloway. http://www.gg.rhul.ac.uk/ict4d/ictd2010/papers/ICTD2010%20Srinivasan%20A.pdf.

Wesolowski, Amy, Nathan Eagle, Abdisalan M. Noor, Robert Snow and Caroline Buckee, 2013. Heterogeneous Mobile Phone Ownership and Usage Patterns in Kenya, *PLOS*, http://www.plosone.org/article/info:doi/10.1371/journal.pone.0035319.

World Bank. 2013. *Mobile usage at the base of the pyramid in Kenya.* http://www.infodev.org/articles/mobile-usage-base-pyramid-kenya.

World Bank. 2012. Mobile usage at the base of the pyramid in South Africa. http://www.infodev.org/infodev-files/final_south_africa_bop_study_web.pdf.

Zainudeen, Ayesha, Tahani Iqbal, Rohan Samarajiva & Dimuthu Ratnadiwakara. 2010. Who's got the phone? The gendered use of telephones at the bottom of the pyramid. *New Media & Society*, 12, 549-566. http://www.lirneasia.net/wp-content/uploads/2008/07/tbop-gk3.pdf.

Zelezny-Green, Ronda. The Potential Impact of Mobile-assisted Language Learning on Women and Girls in Africa: A Brief Literature Review. http://www.pixel-online.org/ICT4LL2010/common/download/Proceedings_pdf/IBL23-Ronda,Zelezny,Green.pdf.

Zurovac, Dejan. Gabriel Otieno, Samuel Kigen, Agneta M. Mbithi, Alex Muturi, Robert W Snow & Andrew Nyandigisi. 2013. Ownership and use of mobile phones among health workers, caregivers of sick children and adult patients in Kenya: cross-sectional national survey. *Globalization and Health*, 9:20. http://www.globalizationandhealth.com/content/9/1/20.

11th World Telecommunication/ICT Indicators Symposium (WTIS-13)

Mexico City, México, 4-6 December 2013

Contribution to WTIS-13

Document C/28-E
16 December 2013

English

SOURCE: Information Technology Organization of Iran (ITO)

TITLE: ICT Measurement for Iran: A Progress Report

ICT Measurement for Iran: A Progress Report

Amirhossein Mohebali
Head of Strategic Planning
and Monitoring Center
Information Technology
Organization of Iran (ITO)
mohebali@itc.ir

Mohammad Reza Ayatollahzadeh Shirazi
ICT Department Manager and
ITO Consultant
Data Processing Company
(Parvaresh Dadeha)
ashirazi@dpco.net

1. An Introduction to ICT Measurement for Iran

It is internationally accepted that measuring and monitoring information society has an important role in supporting and guiding policy makers and in determining progress as well as gaps and areas for further development and investment. A well-formed set of ICT indicators can assess the current and potential impact of ICTs on development and promotes capacity building in this domain. In Islamic Republic of Iran, policy makers have recognized the importance of measuring and monitoring ICTs and they have considered a specific article in the Fifth Socio-Economic and Cultural Development Plan of Iran (2011-2015) that instructs ICT ministry to develop a system for ICT measurement in the country till the end of second year of the plan. According to the plan, ICT ministry is responsible for measuring, monitoring and providing analytical reports and feedbacks for the decision makers.

ICT ministry has assigned one of its subsidiaries named Iran Information Technology Organization (ITO) to develop the ICT measurement system for Iran. This organization performed this assignment in the Fourth development plan and based on its previous experiences, this organization that acts as national coordinator for ICT measurement in Iran, has started this task with the help of Information Technology Research Center of Tarbiat Moddares University and Iran University of Science and Technology and Data Processing company (Parvaresh Dadeha). This initiative is an excellent successful working example of cooperation among government, academic and research bodies and private sector in Iran for achieving the country goals and objectives.

Designing a system for ICT measurement has been done in three stages: Planning, Design and Measurement. At the planning phase, the following activities were performed:

1- Identifying stakeholder needs
2- Study and analysis of Iran's high-level documents.
3- Study and analysis of some similar countries for using their experiences in this field.
4- Study and analysis of international reports, rankings and indicators.
5- Benchmarking and study of chosen countries.

In design phase, according to the outputs of phase one and existing experiences, architecture of ICT measurement system were designed. The main components of this architecture are the conceptual framework of ICT Measurement for Iran (IMI), Iran's ICT core indicators, periodic data collection processes and procedures, rules and regulations, international communications, and capacity building. The conceptual framework specifies the main priority areas for definition of indicators. This framework has been defined based on Iran's high-level policy documents and supply-demand model. The priority areas in this framework are as follows:

1- National facilitating Infrastructures
   1-1 ICT infrastructures
   1-2 Cyber security
   1-3 Revenue and investment in ICT
   1-4 ICT R&D
   1-5 Legal framework
   1-6 Culture and content in cyberspace
2- Key Functional areas
   2-1 e-government
   2-2 e-health
   2-3 e-learning
   2-4 e-commerce
   2-5 e-banking
   2-6 e-justice
3- International ICT indictors and readiness models (ITU IDI and EIU Digital Economy)

After defining and verifying this framework, 93 indicators were proposed. For each indicator, definition of that indicator, desired target for that indicator in each year of the Fifth Development Plan, measurement method and roles and responsibilities related to that indicator has been defined. In phase 3, measurement of indicators was performed for determining the value of each indicator in the first year of the plan. According to this measurement, some definitions and/or measurement methods were modified. Some of the indicators were measured by Statistical Center of Iran (SCI).

2. Organizational Structure for IMI

One of the key compoents of IMI is the organizational structure that is responsible for governing the initiative, managing the process and performing the necessary activities for realizing IMI in the country. In designing the the organizational structure and the national coordination mechanisms and processes, we have adopted the templates and supporting mechanisms that has been proposed UNSD National Quality Assurance Framework.

In the degined strcuture, Information Technology of Iran (ITO) is a governing body and in this organiztion, Strategic Planning and Montoring Center (SPMC) is a managing body for IMI that performs all the planning and execution activities for IMI.

As discussed in the Joint ITU-UNCTAD Capacity Building workshop for ICT measurement for Iranian delegation in October 2012, ITO has mandated by the ICT ministry to coordinate the production and dissemination of ICT statistics in Iran. It was recommended by ITU-UNCTAD that a national coordination mechanism should be established led by ITO which brings together regularly all stakeholders involved in ICT statistics. For using all capacities in the country and for a better coordination, ITO has established the IMI National Coordination Committee. The members of this interagency committee are representative from the related ministries, Statistical Center of Iran, Communication Regulatory Authority, ITO consultants and other related stakeholders. The main task of this committee is high-level planning, making high-level decisions, national coordination among the data sources, resolving conflicts and facilitaing the process. Also, there is another consultancy committee for giving consultancy, reviewing the results, auditing and verifying the collected data and finalizing and approving the final annual report of IMI.

All organizational bodies (e.g. ministries, organizations, etc.) that act as a data source in the data collection process should introduce a representative and contact point to ITO. This contact point acts as a coordinating body in each responsible organization for collecting, aggregating, verifying and reporting the data to ITO according to the defined set of indicators related to that organiztion. The budget for collecting and processing the needed data in each organization should be allocated in the annual budget of that organization.

3. International Communications for IMI

One of the key components of IMI is international communication. The objective of international communications in this domain is optimizing information flow among Iran and international stakeholders of IMI. Effective and efficient international communications creates a sound and clear image of Iran and helps IMI national stakeholders to take advantage of international experiences and best practices. Providing accurate and up-to-date information in response to the request of international bodies, participating in international events, participation in international workshops, active participation in the forums, preparing needed reports for reporting to the international bodies are among the most important activities in this area. Till now, the following activities have been done by ITO:

- Answering various ITU BDT questionnaires such as short questionnaire, long questionnaire, 2013 WSIS targets, and ICT Price Basket 2013.
- Continuos interaction with ITU-D for providing the needed information and using the existing experinces and best practices.
- Conducting ICT Measurement workshop in WSIS Forum 2012 (17 May 2012) for reporting the progress in Geneva.

- Active participation in a two days joint ITU-UNCTAD Capacity Building workshop on ICT indicators for the Iranian delegation in October 2012 in Geneva.
- Active participation in WSIS Forum.

4. Capacity development for IMI

Capacity development is another component of IMI. Capacity building in at this stage and in this context is the development of conditions that allow individuals to build and enhance existing ICT measurement knowledge and skills. Conducting necessary trainings for the organizational bodies that are involved in IMI processes, preparing the needed content for capacity development (e.g. training material, awareness and communication material, etc.), conducting national and regional capacity development workshops, translating and publishing international publications in Persian language, and preparing analytical report are among the most important activities in this area. ITO has done the following activities till now:

1- Analyzing the Measuring the Information Society 2012 report for extracting best
2- Translation of Measuring the Information Society 2012 report to Persian.
3- Translation of Measuring the Information Society 2012 Executive Summary to Persian.
4- Translation of Information Economy 2011 report to Persian.
5- Translation of Information Economy 2012 report to Persian.
6- Translation of ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT, 2011.

ITO have planned to use international consultancy and organizing workshops and training courses about ICT measurement in Iran.

Contact

Iran Information Technology Organization (ITO)
Strategic Planning and Monitoring Center (SPMC)
Amir Hossein Mohebali
Manager of SPMC and Program Director of IMI
Tel: +98 21 88 49 83 86
Fax: +98 21 88 49 83 86
e-mail: mohebali@itc.ir, ashirazi@dpco.net
Web site: www.itc.ir
Address: Tehran-Iran, Dr. Shariati st., Near Seyyed Khandan Bridge, Entry #22, ITO headquarter