# 9th World Telecommunication/ICT Indicators Meeting (WTIM-11)
**Mauritius, 7 - 9 December 2011**

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# 9th World Telecommunication/ICT Indicators Meeting (WTIM)

## Swami Vivekananda International Convention Centre, Pailles, Mauritius

## 7-9 December 2011

# Final Report

1. The 9th World Telecommunication/ICT Indicators Meeting (WTIM), organized by the International Telecommunication Union (ITU), took place in Pailles, Mauritius, from 7 to 9 December 2011. It was hosted by the Information and Communication Technology Authority (ICTA) of Mauritius.

2. The Meeting attracted 176 participants from 71 Member States, 14 public and private organizations (including academia) and 14 regional and international organizations.[1]

3. The work of WTIM was conducted under the chairmanship of Dr Krishna Oolun, Executive Director of the ICT Authority, Mauritius. The sessions were moderated by selected experts from international organizations, governments, the private sector and academia.

4. The meeting focused on the measurement aspects of five main topics: measuring global development targets; ICT infrastructure and access indicators (in particular the review of definitions and discussions on broadband capacity, mobile broadband subscriptions and tariffs, and speed and quality of service); investment and revenue in the telecommunication/ICT economy; e-waste; and household ICT surveys.

5. This report summarizes the presentations and discussions of each session and presents the main conclusions and recommendations of the meeting. Further information, such as the agenda, the presentation slides, contributing documents and the list of participants, is available at http://www.itu.int/ITU-D/ict/wtim11/index.html.

[1] Not including invited guests for the opening ceremony, ITU staff and local staff.

## Opening Session

6. The welcome address for the 9th WTIM was given by **Trilock Dwarka**, Chairman, ICT Authority, Mauritius. He highlighted the strong role Mauritius plays in ITU's work, and that it is testament to this that Mauritius is hosting the WTIM. Mr Dwarka stressed the importance of statistics and data gathering and the commitment of Mauritius, and in particular the ICT Authority, to this process. The best possible ICT policy decisions can only be taken with the facts to hand, and Mr Dwarka stressed the need to build more institutional capacity in Mauritius, in the region, and in the world, and hence to welcome and support ITU's work and initiatives in this regard.

7. **Cosmas Zavazava**, Chief a.i., Project Support and Knowledge Management Department, ITU/BDT, delivered the opening address on behalf of **Brahima Sanou, Director of ITU/BDT**. ITU is grateful to Mauritius for hosting the 9th WTIM and congratulates Mauritius on its excellent progress in terms of ICT developments. The fact that the meeting attracted more than 200 pre-registered participants from more than 80 Member States demonstrated the continuing importance of the WTIM, and confirms that it remains the leading global ICT statistics forum. No other event brings together such a distinguished group of experts to discuss information society measurement issues. Mr Zavazava emphasized that ICTs continue to grow at an extraordinary pace: the number of Internet users has doubled over the last five years, to reach an estimated 2.4 billion by end 2011. There are now close to 6 billion mobile cellular subscriptions worldwide, and 1.2 billion active mobile broadband subscriptions. Mr Zavazava stressed the importance of measurement, and the need to gather information, particularly in the area of broadband, and to look at speed, quality of service, and affordability. The Broadband Commission for Development must be commended for setting concrete targets for 2015, and for helping countries to benchmark their broadband policies, but also the affordability and availability of the service. International cooperation is essential to ensure the advancement of the global information society. The same is true for ICT measurement, and therefore ITU is pleased to see the participation of other international organizations in this meeting, including those working under the framework of the *Partnership on Measuring ICT for Development*. Mr Zavazava also highlighted the topic of e-waste featured in this year's WTIM and the need to assess it quantitatively. In closing, Mr Zavazava reiterated the importance of ICT measurement, and the responsibility of the WTIM to develop indicators and measurable targets.

8. **Bruno Lanvin**, Executive Director, e-Lab, INSEAD and a Commissioner of the Broadband Commission for Digital Development, gave the keynote address, entitled 'Measures, Indicators and Targets – sensing and shaping the future of ICT'. Mr Lanvin shared with the audience a personal story that took place in 1988 when work in Mauritius changed his professional life as a young, enthusiastic economist in UNCTAD who was sent to evaluate the country's Customs Automation Programme. At first reluctant, he discovered a (for him) new and exciting area of work: ICTs. More than twenty years later, Mauritius, which has been able to leverage the power of ICT for development, has also become a source of ICT expertise. Mr Lanvin's presentation covered four areas: measurement needs and priorities; broadband as a major challenge; recent progress and the road ahead; and additional challenges and possible action. In his speech, he

stressed the need for concrete, well-understood indicators, and the need to differentiate between indicators that are descriptive and those that are tools for action; and between those that are easy to measure, or more difficult or expensive to obtain. He highlighted some of the merits in composite indices and the value of country mappings in the global context. As a Commissioner of the Broadband Commission for Digital Development, he informed the audience of the main objectives of this recent initiative: to help the diffusion and uptake of broadband; to help achieve the Millennium Development Goals (MDGs); and to monitor progress based on objective benchmarks. In October 2011, the Broadband Commission agreed on four measurable targets for 2015 covering the areas of policy, affordability, connecting homes and getting people online. Mr Lanvin's presentation closed with four challenges to the WTIM: 1) Addressing the more difficult task of measuring content, value and impact, so as to go beyond the uptake of broadband and to understand the difference it makes; 2) Identifying new metrics for new flows and emerging trends – e.g. cloud computing, big data, e-waste; 3) Using the right tools to ensure that data are presented and analyzed in a way that helps people understand new trends and developments (e.g. through interactive /open data and visualization tools); and 4) Keeping the development dimension central to the work.

9. **H.E. Tassarajen Pillay Chedumbrum**, Minister of Information and Communication Technology, Mauritius, gave the official opening address and began by commending ICTA for hosting the WTIM. He referred to the structural changes that have taken place through globalization and how ICTs have made the world a borderless global market place. He also stressed that ICTs have been instrumental in helping achieve global development goals, including the MDGs. At the same time, ICTs create unprecedented challenges, including in the area of cyber security. Countries that adapt quickly will succeed and develop secure and trusted ICT infrastructure; others risk being left behind. Regulators and policy makers play a key role in this regard. To succeed, they need reliable indicators, which will help them define key targets for the future. The WTIM is therefore highly laudable, since it allows all Member States to address common issues from a wider perspective and ITU is recognized for providing a platform of choice. Its work is recognized beyond its own area of expertise since today, the level of ICT development has become a key performance indicator for a country's overall level of development and achievement. The Minister also highlighted the importance of indicators to measure short- and long-term requirements of consumers, and to help governments take active steps to promote competition in a secure and networked society. He informed the audience that Mauritius will soon publish a national broadband policy document which will require the country to provide ubiquitous and affordable broadband Internet access. The country is able to capitalize on previous investments in ICTs, and on sound public infrastructure, which the ICT Authority has helped to build. The contribution of ICT to GDP has surpassed the contribution of both the sugar cane and the textile industries and the ICT sector has become the 3rd pillar of the Mauritian economy, after financial services and tourism. Mauritius is also reviewing the management of its .mu TLD and, together with ITU, working on the establishment of an ICT Centre of Excellence. The Minister ended his opening address by emphasizing that the ICT Ministry is working to fulfil Mauritius' goal of 'putting people first'.

10. At the end of the opening ceremony, the Chair of the WTIM, **Krishna Oolun**, Executive Director, ICT Authority, Mauritius, delivered his statement, beginning with an 1883 quote from Lord Calvin: "When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of science, whatever the matter may be". Mr Oolun saluted the initiative to gather regulators, statisticians and policy makers here in this meeting. He called upon the audience to ensure to make indicators mainstream and impactful and closed by saying: "The task is great, the time is short, and I know I can count on you for your support".

## Session 1: Towards 2015 – joint session with the Partnership for Measuring ICT for Development

11. Ahead of the main session there was a brief presentation delivered by **Susan Teltscher**, Head of the ITU/BDT ICT Data and Statistics Division (IDS), who reminded participants of the main objectives of the WTIM. Ms Teltscher also highlighted the importance of the meeting and the contributions from member states to the statistical work of ITU. She therefore encouraged the audience to be as interactive as possible and to raise any new issues of importance to the subject matter. She also informed participants about the work accomplished by IDS (including the 2011 data collection and dissemination, the main reports published, international cooperation and technical assistance provided) since the last WTIM held in Geneva in November 2010, and introduced this year's WTIM agenda.

12. The first session was moderated by **Torbjörn Fredriksson** of UNCTAD, who holds the current chairmanship of the Steering Committee of the *Partnership on Measuring ICT for Development*. He briefly introduced the Partnership and its recent activities, including the WSIS+10 review process, and ran through the timetable towards 2015, which includes planned meetings to be organized by ITU, UNESCO and Egypt.

13. The first presentation was given by **Vanessa Gray**, ITU/BDT on 'Monitoring global development targets'. She opened by describing the purpose of setting development goals and the necessity to base them on harmonized, reliable and relevant indicators. She mentioned two key global initiatives and their ICT targets: the Broadband Commission for Digital Development's four targets (which were already presented by Bruno Lanvin in his keynote presentation), as well as the World Summit on the Information Society (WSIS)'s 10 targets to measure progress that countries have been making towards becoming information societies. The target date for both initiatives is 2015, in line with the target date of the Millennium Development Goals (MDGs) and in recognition of the fact that ICTs are important development enablers. Ms Gray presented the measurement process to track the WSIS targets, which was initiated by ITU in 2009, and has since been brought under the umbrella of the Partnership on Measuring ICT for Development,

through its Task Group on Measuring the WSIS targets (led by ITU). To help guide countries in their measurement efforts, the Task Group has produced the 'Measuring the WSIS Targets – a statistical framework' document, which was launched at the WSIS Forum 2011 and which includes indicators, definitions, benchmarks and collection methodologies. As a key reference document to track the WSIS targets, the Partnership encourages countries to use this framework to collect data on the WSIS targets and to measure progress. This will contribute towards the final assessment of progress made on the implementation of the WSIS outcomes and provide the Partnership with the data necessary to prepare a comprehensive quantitative final review. Through this, the Partnership will contribute to the overall WSIS review process, which will include an ITU High-level event in 2014, recently approved through an ITU Council Resolution. In this context, the UN Economic and Social Commission for Asia and the Pacific (ESCAP) submitted a contribution to the WTIM (available on the WTIM website), outlining its planned future activities related to the Partnership and the WSIS review process.

14. The second presentation was made by **Álvaro Armijos**, from the Ministry of Telecommunication and Information Society in Ecuador, on "Measuring the WSIS targets in Ecuador". The presentation showed how Ecuador has used the Partnership's framework document on 'Measuring the WSIS Targets' to track the progress that the country has made towards meeting the ten WSIS targets. The results demonstrate clear progress but considerable work still to be done in a number of areas, for example on ICTs in education, with data showing that only a small proportion of schools in Ecuador are connected to the Internet today. The presenter highlighted the importance of the data produced to design and evaluate concrete policies to increase access to and use of ICTs in the country. To coordinate statistical matters and to evaluate progress across different sectors in the area of ICTs, and as part of its "Digital Ecuador" project, the government has set up a Technology Observatory.

15. The final presentation was made by **Makane Faye** of the UN Economic Commission for Africa (UNECA), on 'E-government core indicators'. He briefly reviewed the main objectives and the process of identifying the core list of e-government indicators by the Partnership on Measuring ICT for Development Task Group on e-Government (TGEG), led by UNECA. The final list of e-government indicators, which was developed through an extensive consultation process over several years and discussed in a number of regional and international meetings, includes a total of seven indicators. These indicators, which range from measuring the availability of ICTs in government organizations to the availability of e-government services broken down by the level of sophistication, were briefly described and are presented in a background document (available on the WTIM meeting website). Besides plans to present the core list of e-government indicators to the next session of the UN Statistical Commission in February 2012, the TGEG plans to produce a more detailed 'Manual for Measuring e-Government', which will include statistical standards, data sources, and other methodological material related to collecting the indicators through official surveys. The TGEG plans to finalize the Manual, which will guide countries in their data collection process, during 2012.

16. Discussions following the presentations included a question from Mexico concerning how ITU monitors governments' progress towards the UN MDGs, as well as the WSIS targets. ITU covers the MDG indicators through both its telecommunication/ICT infrastructure questionnaires and its household questionnaire. The Partnership Task Group on Measuring the WSIS targets is considering sending out a questionnaire for the WSIS+10 review process.

17. Brazil offered to translate the Partnership document on measuring e-government into Portuguese and the delegates from Palestine and Egypt offered their help with the Arabic translation. ECA informed delegates that the French version will be provided by ECA.

18. Cameroon expressed great interest in Ecuador's work, but said that some developing countries might not have the necessary resources to carry out detailed measurement projects. The delegate also requested advice on how countries can increase their level of Internet uptake and Ecuador highlighted the importance of a comprehensive national plan, which includes programmes to increase awareness and educational levels and provides training opportunities to the community at large.

19. The moderator closed the session with some **breaking news**: as the Partnership continues its work on developing action-oriented and forward-looking statistical indicators, it is happy to welcome a new member as of today: the UNEP/Secretariat of the Basel Convention (SBC) on the Control of Transboundary Movements of Hazardous Wastes and their Disposals, which is in charge of monitoring the international agreement on disposal of hazardous waste. Mr Fredriksson stressed that the inclusion of the Secretariat of the Basel Convention in the Partnership was particularly valuable at a time when growing attention is being paid to the measurement of the environmental implications of ICT, such as the growth of electronic waste. **Matthias Kern**, who will be representing the Secretariat of the Basel Convention in the Partnership, commented that SBC will bring to the Partnership its expertise and experience with e-waste issues on a global level, and its network of national and international institutions, academics, industry and civil society.

## Session 2: ICT Infrastructure and access: indicators and definitions

20. The session was moderated by **Christoph Legutko** of INTEL Corporation, who opened the session with some remarks on the importance of measuring ICT developments, particularly in view of the convergence phenomenon.

21. The first presentation was given by **Hock Eng Koay**, Malaysian Communications and Multimedia Commission and Chair of the ITU Expert Group on Telecommunications/ICT indicators (EGTI) meeting, which was held on 5-6 December 2011, back-to-back with the WTIM. He presented the outcomes of this second face-to-face EGTI meeting. The subsequent discussions focused on some of the indicators that had been identified by the EGTI as indicators that needed further

work: (i) fibre-optic indicators; (ii) mobile-broadband tariffs; (iii) quality-of service (QoS) indicators; and (iv) community access indicators.

22. Concerning fibre-optic indicators, the EGTI concluded that FTTN (fibre-to-the-node) subscriptions would not be classified as a separate indicator, but rather included in already existing indicators (e.g. DSL, if the last part of the connection is through DSL technology). Mobile-broadband tariffs will be collected by ITU following the methodology agreed by the EGTI, which was further detailed in Session 4 (see below). Several QoS indicators for mobile-cellular services were agreed upon and will be included in the ITU Long Questionnaire as of 2012, while most Internet-related QoS indicators need further discussion. Due to the low response-rate obtained for community access indicators over the last seven years, the EGTI agreed to no longer include them in the ITU's WTI questionnaire. However, information on the use of the Internet at commercial and public community access centres will continue to be captured through the ITU ICT household questionnaire.

23. Mr Koay presented the proposals for future work agreed by the EGTI, including: development of quality of service (QoS) Internet indicators; discussion on the methodologies of the ICT Development Index (IDI) and the ICT Price Basket (IPB); review of investment indicators; and sharing of experience on the collection of the recently revised mobile-broadband indicators, which refer to active mobile-broadband subscriptions. The EGTI chair also highlighted the agreement reached in the EGTI meeting on continuing the work of the group, especially on the issues mentioned above. Finally, delegates were encouraged to participate actively in the EGTI discussion, and to submit their comments through the online discussion forum.

24. The second presentation was made by **Esperanza Magpantay**, ITU/BDT, who presented the launch of a new ITU publication, the ITU *Handbook for the Collection of Administrative Data on Telecommunications/ICT 2011*. The Handbook was developed in close collaboration with the EGTI, and includes 81 indicators on telecommunications/ICT. In addition to the definitions of the indicators, the Handbook includes clarifications and scope, method of collection, and methodological issues related to each indicator. Moreover, the Handbook includes examples of national experiences on the collection of these indicators.

25. Countries are encouraged to use the Handbook as a reference document for the collection of administrative data in order to ensure international comparability of data. ITU will continue to work with the EGTI and relevant international and regional organizations to monitor the changes in the ICT sector and reflect them in future revisions of the indicators and definitions.

26. The round of questions from the floor was opened by the delegate from Trinidad and Tobago, who asked about the method to compute total broadband Internet subscriptions. ITU responded that the Handbook included two separate indicators for each type of broadband Internet subscriptions: one for mobile-broadband subscriptions and another for fixed-broadband subscriptions. They were not added into one indicator in order to avoid double-counting.

27. South Africa inquired how ITU indicators took into account the development path being followed by many developing countries, which is not necessary the same as that followed by developed countries in the past. The moderator and ITU responded that the indicators included in the Handbook were the ones discussed and agreed within the EGTI, which includes more than 150 members from all countries. Countries are invited to submit their proposals and to actively engage in the discussion of the EGTI.

28. Egypt acknowledged the valuable task carried out by the EGTI, and proposed to develop an action plan for the revision of the IDI, with a view of revising if necessary the index in time for its next release. ITU informed that the IDI was a discussion item in the EGTI online forum, and invited countries to consider the feasibility of proposals concerning the IDI prior to submitting them.

29. Japan referred to the discussions on prepaid and postpaid tariffs that took place in the EGTI meeting, and asked to include in the summary of the EGTI meeting a note on the need to also consider postpaid tariffs for mobile services in the case of Japan and the Republic of Korea, where postpaid subscriptions account for almost 100% of all subscriptions.

30. Tunisia inquired about the unification of definitions across countries, especially for indicators on mobile-cellular subscriptions. ITU responded that this was one of the objectives of the Handbook. The Republic of Korea mentioned that they had adapted their definitions to the internationally agreed methodologies proposed by ITU, and that the main purpose of the WTIM was indeed to progress towards the international harmonization of ICT data collection.

31. South Africa commented that they do not use the industry classification ISIC Revision 4, but a version adapted to national specificities. ITU clarified that it is understood that many countries apply national industry classifications, but that these can usually be mapped to internationally-agreed classifications, such as ISIC.

32. Saudi Arabia highlighted the need to study the relationship between economic indicators and ICT development. ITU and others informed that considerable work on this had been carried out at the national and international level and that it had been addressed at the 8$^{th}$ WTIM in 2010.

33. The moderator closed the session stressing the importance of monitoring broadband development, and the participation of the industry in this process.

## Session 3: Measuring ICT infrastructure and access: broadband capacity

34. The session on measuring broadband capacity was moderated by **Vanessa Gray** of the ITU.

35. The first presentation was given by **Martin Hilbert**, University of Southern California and author of the ITU working paper "Mapping the dimensions and characteristics of the world's technological communication capacity during the period of digitization", which was prepared as

an input to the WTIM (see http://www.itu.int/ITU-D/ict/wtim11/documents/inf/015INF-E.pdf). Mr Hilbert described three distinct indicators to be considered when measuring the world's technological communication capacity: (1) the number of subscriptions and devices; (2) the installed capacity in kbps; and (3) the effective usage of the available capacity. He argued that the number of subscriptions in a given country is becoming increasingly meaningless since it reflects population figures and that detailed information about available communication capacity and its usage is more meaningful, although this information is difficult to quantify. Advances in hardware and in software compression and encoding technologies, such as MPEG-4 (ITU-T Rec. H.264) for videos and JPEG (ITU-T Rec. T.81) for images have contributed to increasing communication capacity and efficient bandwidth usage. Mr Hilbert's research covers 31 telecommunication and 12 broadcasting technologies and the period of digitization from 1986 to 2010.

36. A key finding from Mr Hilbert's work is that data on the effective usage of communication capacity show different results than the data on the number of subscriptions and devices. The first difference can be highlighted in terms of the different technologies: While 2G and 3G mobile cellular technologies dominate in terms of the number of subscriptions – indeed they currently make up about 70% of the world's key voice and data subscriptions – they represent only a very small share (less than 30%) in terms of the effective capacity that they deliver. On the other hand, fixed broadband technologies (such as cable, DSL and FTTX), which represent only about 30% of the total share of voice and data subscriptions, make up for about 70% of the world's share of effective capacity. This finding also has a significant impact on the analysis of the digital divide, which Mr Hilbert measures as the difference in effective capacity between the OECD countries, on the one hand, and the non-OECD countries on the other hand. While digital divide analyses based on the number of subscriptions generally point to a decrease in the divide over time, Mr Hilbert's work shows that in terms of effective capacity, the OECD countries still largely dominate, and a decrease in the digital divide over the last ten years is not clearly visible. A country-based comparison shows similar results, with India and China, for example, holding a much lower share of the total effective capacity, compared to the number of subscriptions. Japan, the United States and the Republic of Korea, on the other hand, have larger shares of effective capacity than their subscription numbers would suggest. Mr Hilbert's findings not only suggest that more must be done to increase the effective capacity of developing countries, in particular by focusing on broadband technologies and reducing prices, but also that it is necessary to analyze the digital divide through the lens of effective capacity.

37. Addressing the WTIM via audio link from the United States, **Robert Pepper and Arielle Sumits** of Cisco presented the findings of the Visual Networking Index (VNI), a Cisco tool for measuring global Internet Protocol (IP) traffic. Commenting on the session's first presentation, Mr Pepper pointed out the significance of communication capacity – an approach, which was also shared by the Broadband Commission for Digital Development. According to Cisco, global IP traffic will increase four-fold from 2010 to 2015, by when it will total more than a zettabyte. The highest growth rates are expected to be found in emerging economies. In these countries access will be

dominated by mobile data and fixed-wireless (Wi-Fi, etc.) technologies. The rapid IP traffic growth is driven by increasing figures of Internet users and devices per user, faster broadband speeds and the dominance of rich media content, in particular Internet video.

38. The third presentation was given by **Paul Hamilton**, of Hamilton Research and Africa Bandwidth Maps, on 'Measuring backbone transmission networks'. High-capacity fibre-optic backbone networks catering for national and international capacity are crucial to increasing the number of consumers potentially benefitting from broadband. Too often the focus of policy makers and regulators was limited to broadband capacity at the level of consumers. To assess backbone networks in Africa, Hamilton Research applies indicators such as fibre route kilometres, fibre reach (the number of people living in proximity to fibre nodes) and different levels of international Internet bandwidth. A number of web-based maps and repositories are available today to illustrate global broadband capacity, including ITU's Broadband Atlas (at http://itu.int/ITU-D/treg/atlas/broadbandatlas.asp).

39. Discussions following the presentations included a question from ITU concerning the methodology of the VNI. Cisco's VNI and detailed information about the methodology applied are available at http://www.cisco.com/go/vni. Upcoming Cisco indices will focus on mobile data and on cloud computing. Intel invited delegates to consider the introduction of tangible and consumer-oriented indicators. Mr Hilbert stressed the importance of the current indicators as a basis, and to explore indicators to measuring installed capacity and effectively used capacity. Participants noted a transition from 'traditional' metrics such as minutes of usage and number of subscriptions, towards availability and usage of capacity as meaningful indicators for measuring broadband.

40. Looking at his own country's VNI outlook, the South African delegate asked Cisco for specific recommendations to increase high-capacity broadband access. Mr Pepper replied that while the situation may vary from country to country, the availability of international capacity and the use of policy and regulatory instruments, including handling of spectrum issues are key success factors. Some countries address these and other items in national broadband plans. In response to a question from ITU, Paul Hamilton elaborated on the notion of 'network adequacy', which is derived from the reach and the capacity of different transmission networks.

41. The moderator closed the session by reflecting on some points raised in the session: the need for meaningful indicators for broadband capacity; addressing broadband market trends; keeping an eye on IP traffic growth; and the imperative to make available international and national capacity in order to deliver high-capacity broadband to the consumer.

### Session 4: ICT Infrastructure and access: measuring mobile broadband

42. The session was moderated by **Esperanza Magpantay**, ITU/BDT, who opened the session with some remarks on the importance of measuring active mobile-broadband subscriptions instead

of potential mobile-broadband subscriptions. The new ITU definition of mobile-broadband subscriptions reflects this change, and is aligned with the OECD work on these indicators.

43. The first presentation was given by **Seung Keon Kim**, Korea Association of Information & Telecommunication (KAIT). The Republic of Korea is the leading country in the OECD in terms of wireless-broadband subscriptions, with almost 90% penetration. Mr Kim explained the breakdown of the wireless-broadband indicator as defined by ITU and OECD. KAIT conducts surveys with IP service providers and mobile network operators to count active mobile-broadband subscriptions, excluding narrowband technologies such as CDMA 1x. The speaker stressed the importance of international harmonization of indicators, and encouraged countries to adopt the ITU definition of mobile-broadband subscriptions in order to enhance reliability and comparability.

44. The second presentation was made by **Hock Eng Koay**, Malaysian Communications and Multimedia Commission, in his capacity of Chair of EGTI (see above). Mr Koay presented the outcomes of the EGTI discussion concerning mobile-broadband prices (or tariffs), with a particular focus on the agreed methodology for the data collection. In this regard, mobile broadband tariff data should be collected from the largest mobile-broadband operator (or largest mobile-cellular operator if mobile-broadband market share is not available) in each country and reflect the cheapest plan based on 1GB of monthly data volume. Prepaid tariffs for both smartphones and dongles/USB keys should be collected separately (unless in those cases where only postpaid subscriptions are available). The EGTI agreed that this methodology would be used in the 2012 data collection, and will be reviewed in the future in view of the results obtained.

45. The third presentation was given by **Iñigo Herguera**, Comisión del Mercado de las Telecomunicaciones, Spain. He opened by highlighting that the methodology to measure mobile-broadband price data used by ITU and OECD is converging. Mobile-broadband tariffs are much determined by usage (i.e. the volume of data used per month), unlike the fixed-broadband tariffs. Usage differs significantly between smartphone users on the one hand, and USB/dongle users, on the other hand: compared to smartphone users, USB/dongle users connect about four times as much, spend around three times as much, and consume ten times the amount of data volume. Mr Herguera finished by suggesting to separate smartphone prices and USB/dongle prices in order to enhance comparability.

46. The Chair of WTIM (Dr Krishna Oolun) started the round of questions by mentioning the data protection issues that may arise when measuring active use. Mr Kim highlighted the importance of differentiating between active and potential mobile-broadband subscriptions. Ecuador asked whether countries control that a minimum speed of 256 kbit/s is guaranteed to users. Mr Herguera responded that there is no regulatory guarantee that users will have a given speed, but with the rollout of UMTS networks, speeds in Europe are usually well above 256 kbit/s.

47. The delegate of Palestine asked about the information that can be obtained on the type of technology of mobile-broadband subscriptions. ITU responded by referring to the ITU data on household surveys collected from countries, which includes a specific question on the type of broadband access/technologies that households subscribe to.

48. Botswana asked about the possibility to reconsider the exclusion of tariff data based on hours of use. ITU clarified that data based on volume caps allows for better comparability at the international level. The WTIM Chair mentioned that there is a need to start monitoring progress in terms of real speeds (rather than advertised speeds), and that this task should not be left to market players only.

49. Saudi Arabia asked for more details on how to collect the indicator that measures subscriptions with 'potential' mobile-broadband access. ITU clarified that this indicator should be measured based on active subscriptions, and not based on the number of handsets. LIRNEasia highlighted the difficulty faced by some South-Asian operators to differentiate between data and voice usage, and therefore the difficulty to report on (active) standard mobile-broadband subscriptions. Mr Kim responded that operators should be able to provide the data.

50. The moderator closed the session by encouraging countries to use the definition of active mobile-broadband subscriptions that is included in the ITU Handbook and of mobile-broadband tariffs agreed by EGTI and to work on future improvements.

## Session 5: ICT infrastructure and access: measuring speed and quality of service

51. The session was moderated by **Piers Letcher** of ITU, who emphasized the importance of measuring speed and quality of service, especially in the area of broadband. Mr Letcher observed that in terms of quality of service, some things were quite easy to measure, for example the time delay for initial connection, the time for problem resolution, or the length and frequency of outages. He pointed to the ITU-T Study Group specifically dedicated to 'Performance and Quality of Service'. However, other elements of quality of service are harder to measure and much more subjective. The measurement issue is not made easier by the general consumer expecting continuous performance improvements, particularly in the area of speed.

52. The first presentation was given by **Carlos Perez Maestro** from the European Commission (EC), on "Measuring Broadband Performance". He highlighted the importance of broadband in the ICT policy discussions and the Digital Agenda for Europe of the EC. Broadband indicators used to benchmark countries include the areas of broadband coverage and prices, take into account the consumer perspective and are collected through quality surveys. To evaluate progress, the EC has set up the Digital Agenda Scoreboard which benchmarks countries according to a number of indicators. The EC also collects data on fixed-broadband subscriptions broken down by speed. Data show that high-speed broadband subscriptions (above 10 Mbit/s) are increasingly available

in the EU countries and by early 2011, about 40% of all subscriptions provided speeds above 10 Mbit/s. Surveys on consumer satisfaction reveal that many users are dissatisfied with their broadband connections, and that many are not aware of the advertised speed of their connection, nor the technology they are subscribing to. Dissatisfaction is also created through different results revealed by speed tests widely available online. Although such speed tests are one recognized way of revealing trends, they often show mixed results, are not entirely reliable, and should not be relied on for policy purposes. To test the quality of broadband services, the EC provides a representative number of Internet users with a device ("white box") which helps measure actual speeds, and user experiences based on several quality of service parameters. One challenge is to convince users to install this device, which measures network performance, not consumer behaviour. The results from this exercise could be used to redefine advertising rules and to encourage operators to provide consumers with accurate and clear information.

53. The second presentation was made by **Hock Eng Koay**, the chair of EGTI, who presented the EGTI results concerning the quality-of-service (QoS) indicators. He presented the definitions of the indicators that were discussed and the type of mobile-cellular and fixed-broadband QoS indicators to be added to the ITU questionnaire. Some fixed broadband QoS indicators should first be collected at the national level and countries are encouraged to share their experiences with the EGTI. Other QoS indicators, including in the area of mobile-broadband services, should be discussed further in the EGTI and results will be shared at the next WTIM.

54. The third presentation was made by **Shazna Zuhyle** from LIRNEasia. She presented a number of QoS indicators to measure fixed- and mobile-broadband services that LIRNEasia included in its Broadband Quality of Service Experience project. Tests on download, upload, latency, jitter, packet loss and availability were carried out over several time periods in several South Asian economies. Key results were that real speeds substantially differed from advertised speeds, and that international Internet bandwidth remains one of the major bottlenecks in providing services. A calculation was done to rate operators based on the value of money (bits per dollar) that consumers get. While QoS tests can be done by users themselves (usually through speed tests), and operators, only regulators can test the entire network and have a particular interest in carrying out unbiased, comprehensive tests. Regulators should also ensure to use a clear, comparative, and openly available methodology. Tests need to be carried out from undisclosed locations (randomly), and results should be made available, and feed into policies.

55. The discussions following the presentations highlighted a number of national initiatives to measure QoS. Brazil, for example, has developed software that is installed on users' computers to measure their network's experience. The country uses its (face-to-face) household survey data collection to encourage users with Internet access at home to install the software. ITU suggests that it could be interesting to use these channels, not only to test the network's performance but also the users' online behaviour, for example in terms of the language of webpages that are consulted. The representative of the EC responded that this could prove difficult since it leads to privacy issues that users might worry about. More clarifications were

asked about the EC's consumer satisfaction survey, which is carried out by a market research company and developed together with members of the EC.

56. A number of delegates highlighted the need to identify mobile-broadband QoS indicators, given the importance of this service for bringing people online, particularly in developing countries. While it may be more difficult to test the performance of mobile-broadband services, it is possible and some countries, including the United Kingdom's regulatory authority, have started measuring this area. The EGTI will also include mobile-broadband indicators in its future discussions.

57. The delegate from Togo inquired whether the EC worked together with ISPs in testing their networks and to ensure that it does not create any technical conflicts. The EC delegate explained that the white box had been tested extensively in the United States, where it had been used by the FCC, and that further tests with European ISPs had therefore not been carried out. Following a question from Russia, the EC further clarified that sampling of tests were done based on the actual distribution of broadband subscriptions by technology. Finally, the discussions highlighted that while different countries have discussed or implemented different minimum QoS standards, there are only very few internationally harmonized indicators, or standards and that further work was necessary in this regard.

## Session 6: Measuring revenue and investment in the telecommunication/ICT economy (1)

58. The first session on Measuring revenue and investment in the telecommunication/ICT economy was moderated by **Susan Teltscher,** of ITU/BDT. She introduced the session by highlighting that ITU is collecting data on revenue and investment in its long questionnaire that it sends to countries every year. However, data submission for the two indicators varies considerably among countries. The issue of convergence imposes a new challenge to the compilation of the data. At the same time, data on ICT investment and revenue was critical for carrying out impact analysis, assessing the evolution of the sector and making effective policy and investment decisions. Therefore, two sessions were dedicated to the subject matter to take stock of the current situation and to come up with suggestions on how to improve the data in the future.

59. The first presentation was given by **Frederic Bourassa**, of the OECD, who provided an overview of investment and revenue measurement of the telecom sector. He highlighted that telecom sector revenues have been growing continuously despite the economic crisis and falling prices, reflecting the growth in the number of subscriptions. However, data also show that the level of telecom investment in the OECD countries is stagnating. Mobile services revenue is growing and accounts for almost half of total telecom sector revenues. OECD collects data on revenue and investment every two years. While this includes a number of indicators, only data on mobile revenue, total revenue, total investment and investment on mobile infrastructure are published. OECD applies an "ad hoc" definition that corresponds to the data published by operators and that is available for publicly listed companies, facilitating the data collection. OECD and ITU use

the same definitions of revenue and investment. Concerning international classifications, such as ISIC or CPC, in the past these have not been detailed enough to capture certain telecommunication activities; however, more recent revisions are more detailed, in particular CPC Ver.2. For investment data, national regulatory authorities are the main sources, together with ICT Ministries. Confidentiality remains one of the barriers for collecting financial data while differences in fiscal years can be an issue for data comparability. The exclusion of spectrum fees from investment data is a problem for some countries. Overall, investment data are difficult to get; however, OECD is confident that they will be able to improve their data series for both revenue and investment data, specifically for fixed- and mobile-broadband services.

60. The second presentation was given by **Nagwa El Shenawy**, MCIT, Egypt, sharing Egypt's experience in measuring ICT economic indicators. She started by noting the excellent work that international organizations (e.g. ITU, OECD) have done on measuring ICT indicators. MCIT started collecting data to measure the economic contribution of the ICT sector. This includes measuring ICT output, ICT investment and ICT trade. She emphasized that the cooperation with ICT sector companies is important to receiving the data. The classifications and definitions provided by international organizations serve as the basis for the data collection. In Egypt, the ICT sector is dominated by telecommunication services, which represent 80%, compared to the 20% for the ICT manufacturing sector. Revenue coming from telecom companies includes both fixed operators (both retail and wholesale) and mobile operators (both 3G and GSM). The speaker highlighted that the ICT sector's real growth showed a decrease after the recent political revolution. Concerning investment data, Ms El Shenawy noted that the data differ considerably according to the source (operators, investment associations or Ministry of Planning). She pointed to the challenges Egypt faces in collecting the data, including the definition of investment, which can include payments of licenses. Companies are reluctant to share the data if they are not publicly listed and it was therefore necessary to make estimations. The speaker concluded by emphasizing that there is a need to discuss the definition of investment in the EGTI, and to encourage countries to unify and update the national accounting framework.

61. The last presentation of the session was delivered by **Torbjörn Fredriksson** from UNCTAD on measuring foreign investment in the ICT sector. He noted that 16 out of the of top 100 transnational companies are in the ICT sector, with Asia dominating the list. Between 1996 and 2006, foreign companies, as shown by the World Bank data, invested more than 100 billion dollars in telecommunication infrastructure projects in developing countries. There are several sources that can be used for investment data, each measuring different things (such as FDI, cross-border mergers and acquisitions or FDI greenfield). Ideally, operational activities should be collected, however, data are very scarce. Cross-border merger and acquisitions (M&A) measure the value of transaction but not how capital flows across borders. At the country level, official data on investment are collected by different agencies, including the national statistics offices, national banks and ministries. Only few developing countries report FDI on telecommunications to UNCTAD and most countries combine them with data on the transport sector. Cross-border

M&A are collected by UNCTAD from the private sector, including Thomson Reuters, but the quality of the data is not guaranteed. To conclude, there are multiple data sources on FDI. Official sources are the most widely available but they are not sufficiently disaggregated. Finally, there is no core indicator on ICT investment as part of the Partnership's core list of ICT indicators.

62. The presentations were followed by a lively debate and sharing of experiences. To start, the Chair of WTIM requested the OECD to clarify whether the data they collect on revenue refer to accounting or economic revenue. OECD explained that the data refer to accounting revenue made by operators.

63. The delegate from Mexico informed the audience that CPI data in Mexico are produced by the NSO. He asked the presenter from Egypt whether there is a similar institution in Egypt, and emphasized that the NSO is the most suitable agency to collect these data. Egypt mentioned that the information centre of the MCIT is responsible for collecting the data but is collaborating with the NSO for other ICT data collections, such as the household and business surveys. Investment data are under the responsibility of the Ministry of Planning and are considered as underestimated because the Ministry is using the CPI to deflate the values to constant prices.

64. Mexico requested UNCTAD to clarify the calculation of FDI and whether the ownership of foreign companies is limited to a certain percentage. According to UNCTAD, it is important to determine the source of the investment, and if the investment is coming from inside the country, then it is not considered FDI. However, if the investment is coming from the parent company outside of the country, it is counted as FDI.

65. Botswana requested clarification on how to take into account investments made by national regulators, for example for monitoring equipment. OECD mentioned that the investment data that OECD collect do not include investments made by regulators since they only take into account investments made by operators. OECD explained that public investments made by the regulator should be accounted for in investment data reported by national accounts and cover the entire telecommunication sector.

66. Spain shared its experience in collecting data on investment and revenue, which are both well covered and of very high quality. The National Observatory for the Information Society collects ICT sector data. The delegate emphasized that not telecommunications, but ICT content and manufacturing, are the major source of ICT sector revenue in the country. Given the importance of manufacturing and computer-related activities in the ICT sector, international data collections should be expanded to account for these activities.

67. The moderator closed the session by concluding that a lot of work remains to be done to improve the availability and quality of investment and revenue data. Disaggregated and comparable data on investment are needed, and clear concepts on what needs to be measured, possible sources of data, and compilation issues need to be addressed. She highlighted that one possible way forward is to bring the topic to the attention of the EGTI, to discuss definitions,

classifications and data collection. She further encouraged the active participation of countries in the EGTI.

## Session 7: Measuring revenue and investment in the telecommunication/ICT economy (2)

68. The second session on "Measuring revenue and investment in the telecommunication/ICT economy" was moderated by **BN Satpathy** of the Department of Information Technology, Ministry of Communication & Information Technology in India. The moderator started by describing the size of investment and revenue generated in the ICT service sector in India and highlighted the necessity of collecting data in this area.

69. The first presentation was made by **Guillermo Gonzalez Robledo**, from Cofetel, Mexico, on "Measuring ICT investment and revenue – the case of Mexico". He started by describing the work of Cofetel in collecting and disseminating data on telecommunication services in Mexico. Cofetel ensures that data from operators are collected on time and processed so that they can be used for analysis. Regarding revenue and investment data, Cofetel requests the operators to provide a printed copy of their annual report. The data reporting for the annual reports ensures that revenues for different services are reported separately and that licensed service providers have no difficulties in providing the data, including data on value-added services. The presentation included data showing the increasing revenue of the sector. Furthermore, revenue data collection is coordinated with the tax office and can be broken down by service. Mr Robledo also showed some investment data, which are disseminated together with notes specifying what is included. Mexico is a good example on how to successfully collect and disseminate data on revenue and investment.

70. The second presentation was given by **Gangamah Appadu**, from the Central Statistical Office (CSO), Mauritius, on "Measuring investment and revenue – the case of Mauritius". Ms Appadu provided information on the availability of ICT sector data in the CSO, which is being monitored since 2006, due to its strong growth. This includes statistics on employment, revenue, investment and subscriptions. Since 2007, the CSO regularly produces a publication reflecting the latest ICT statistics. The speaker presented the different surveys carried out by the statistical office to collect ICT data, including the continuous household survey (which started in 2006 and which is carried out every two years and includes a module on ICT statistics), the Census of Economic Activity (which collects data on the different industry groups, including ICT, in order to determine the contribution of ICT to GDP), the annual economic survey (which is done on a sample basis of large establishments and collects data to help estimate the size of the ICT market), an annual survey on ICT usage in schools, and lastly the housing and population census conducted 2011 (which included questions on availability of ICT in households). Data on turnover, gross output and value added, are defined according to national accounts. The CSO uses ISIC Revision 3 to classify the sector, covering manufacturing, wholesale and retail, and telecommunication services. Some of the challenges faced include the lack of resources, the

unavailability of data, response burden, and timeliness of the data. In terms of investment data, she reported that they are not ready for publication since the CSO is still working on the methodology. She further highlighted that possible sources of investment data in the country include the census of economic activities, trade statistics, building permits and government expenditures. In 2010, the CSO set up an ICT focus group to review the definition, scope, and coverage of the ICT sector (including business process outsourcing - BPO) and to agree on data sources and resources to ensure better coverage of BPO in the ICT sector. The presenter concluded by saying that there are plans to expand the data compilation on investments, and that new sources of information are being explored.

71. The last presentation of the session was delivered by **Henri Numbi Ilunga**, from ARPTC of Democratic Republic of Congo. The presentation highlighted that the country's size and diverse geographic characteristics requires huge investments to expand ICTs. The regulator uses the ITU questionnaire to collect data from operators and from value-added service providers. The data collection is done quarterly and annually (depending on the indicator), with a 45-day deadline given to operators. The data collected are analyzed and then submitted to ITU. Data show that mobile telephony accounts for the large majority of the telecommunication service market and that its value continues to grow, indicating the importance of mobile telephony, as well as the limited availability of fixed telecommunication infrastructure and services. The speaker highlighted some of the challenges faced in collecting the data, such as delays in data submission, non-reply from service providers, and the absence of household surveys to collect ICT demand-side data. As of 2010, ARPTC also started collecting data on investment, using the ITU definitions.

72. In the discussions that followed, the delegate from Benin requested the exact indicators that can be used to calculate the contribution of ICT to GDP. The DR Congo explained that they use value added to calculate the share of ICT. Tunisia emphasized that value added and revenue are two different concepts and are calculated differently. Mexico explained that data on value added in the country come from national accounting systems ("raw value added") and are collected and disseminated by the NSO. The regulator cooperates with the NSO since they understand that revenue and value added are two different concepts. ITU clarified that ICT value added is already defined in the core ICT indicators of the Partnership and collected by UNCTAD at the international level. Egypt asked DR Congo whether the payment of license fees is included in the value of non-tangible assets. DR Congo explained that it is not included.

73. Portugal and Mauritius requested information on how countries can report the data on revenue for bundled services. They emphasized that in many countries it is very difficult to report the revenue according to the ITU definition. ITU explained that in this case they should report the total value and explain in a note that it refers to bundled services.

74. The moderator closed the session by highlighting that there is a need to improve the data on investment and revenue, and encouraged the EGTI to continue the discussions on the subject.

He further emphasized the importance of the using international classifications when measuring the sector.

## Session 8: Measuring e-waste

75. The session was moderated by **Cosmas Zavazava**, of ITU/BDT. Mr Zavazava highlighted that as the world is moving towards becoming an information society, and as ICT products and devices are becoming increasingly ubiquitous, it is crucial to know what to do with these devices and products once they reach the end of their life cycle. Mr Zavazava made reference to the three 'R's: Reduce, Reuse, Recycle, and noted that ICTs contribute 2.6% of greenhouse gas emissions, and will contribute more in the future. It is therefore essential not only to ensure that ICTs are leveraged to help reduce emissions elsewhere, but also to make sure that ICTs themselves become 'greener'. The time for discussing e-waste seems particularly appropriate, with COP-17 in Durban taking place at the same time as WTIM, and in the run-up to Rio+20 next year in Brazil.

76. The first speaker was **Matthias Kern**, of UNEP/SBC, who spoke about "Measuring E-waste - Support for the Implementation of Multilateral Environmental Agreements". Mr Kern's presentation focused on electrical and particularly electronic waste, which is becoming a rapidly growing problem, with 40-50 million metric tonnes of e-waste generated every year. The presentation looked at multilateral environmental agreements, which notably include the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal. The problem is no longer just one of industrialized countries, but of developing countries, too, with the volume of obsolete PCs in the developing world soon to surpass that in the developed world. Mr Kern stressed that it was important to look at old PCs not just as waste, but as a source of valuable materials, which can be recycled and re-used. In this regard, e-waste can be an opportunity for job creation. He closed by announcing that UNEP/SBC is pleased to join the Partnership on Measuring ICT for Development and that plans are under way to create a new Partnership Task Group on e-Waste to develop indicators for the measurement and management of e-waste.

77. The second presentation was made by **Innocent Chidi Nnorom**, from the Basel Convention Coordinating Centre for Training & Technology Transfer for the African Region in Nigeria, who talked about "Measuring e-waste – results from country studies". Nigeria is a typical example of a developing country where e-waste is generated through the demand for new products, and old products becoming obsolete. Nigeria is also a hub for e-waste within the region and discussions are under way on the need for, and benefits of, an e-waste inventory and assessment. Such a discussion obviously requires the availability of reliable data and indicators; defining the scope of the project; models for estimating e-waste generation; and the necessary steps in the e-waste assessment process. Specific details (available in the presentation) were presented on the Nigerian e-waste inventory project, which showed that in one year some

22,000 tonnes of e-waste arrived in Nigeria via Lagos. Challenges included difficulties in assessing data; data inconsistencies; and time constraints.

78. The third speaker was **Hossam Alam**, of CEDARE and STeP, who gave a presentation on the 'STeP Initiative on measuring e-waste'. Mr Alam highlighted that e-waste was another side of ICT development, which has resulted in the Solving The e-waste Problem (STeP) initiative. STeP was created to initiate and facilitate environmentally, economically and socially sound approaches to reduce e-waste flows and to handle them in a sustainable way around the globe. Emphasis is given to the importance of measurement of e-waste as part of managing e-waste and STeP has started to work on this through a dedicated Task Force. The speaker stressed that the e-waste problem is still poorly understood, and that the situation is made more difficult by the ever-shortening technology lifecycle of devices. Mr Alam pointed to the need to develop clear policies on re-use and recycling, particularly concerning metals. Delegates were invited to participate in an e-waste survey STeP is currently carrying out jointly with other partners (including ITU) (see www.surveymonkey.com/s/ewastesurvey2011).

79. The moderator briefly summarized the main points made in the presentations, and then opened the floor for discussion. The delegate from the EU commented that the problem with measuring e-waste was comparable to that of measuring online content, which includes a lot of 'pirated' (and not documented) content that cannot be estimated. UNEP/SBC agreed that the illegal trade in, and handling of, e-waste was a problem and that they were working with Interpol and the World Customs Organization to track it. South Africa raised the problem of e-waste dumping, especially in Africa. The speakers highlighted that there is a need to ensure that industries such as recycling are financially sustainable and for this it is necessary to measure e-waste. Data are also necessary to be able to determine new procedures and to ensure the correct labelling (e.g. new, used, re-used). ICTs can also be used to monitor, detect and predict the cross-border movement of hazardous materials. While there is a need for a legal and regulatory framework, there is therefore an equal need for a monitoring framework. One delegate stated that ITU should take steps to help stop obsolete devices being dumped in developing countries, including in Africa. In this regard, ITU invited the concerned delegate to participate in the upcoming ITU/BDT Study Group 1 question on e-waste in September and to contribute to ITU's new e-waste guidelines, which are now being developed.

80. In his closing remarks, the speaker from STeP reminded participants that today's computer is tomorrow's e-waste and that e-waste should not be dealt with as a problem, but as an opportunity for the developing world. UNEP/SBC stressed that illegal dumping has to be stopped, and that the law of the importing country matters (rather than that of the exporting country). Countries that have ratified the Basel convention – and that includes most African countries – have a responsibility to notify illegal dumping cases. It is also important to note that the e-waste problem is growing even faster in the developing world than in the developed world. Some countries have already banned the export of old PCs, for example China. The speaker from Nigeria stressed that developing countries should look inwards for solutions; most e-waste is

produced by individuals. Finally, the need for different government agencies to work together was highlighted.

## Session 9: Household ICT surveys

81. The session was moderated by **Alexandre Barbosa**, from CGI/NIC in Brazil who highlighted the important role that the Partnership on Measuring ICT for Development has played in guiding countries in their ICT data collection efforts, and in increasing not only the quantity but also the quality and international comparability of ICT statistics. He also noted the crucial role of good statistics for policy making.

82. The first set of presentations were made by **Martin Mana** from the Czech Republic (who also represented the OECD WPIIS) on revisions to the OECD model survey, and by **Esperanza Magpantay**, from ITU/BDT, on revisions to the core ICT household indicators developed by the Partnership on Measuring ICT for Development. According to Mr Mana, the OECD model survey was first released in 2002 but has gone through several revisions, with the latest revisions discussed in 2011. Revisions are necessary to reflect the changes taking place in ICT technologies, services and devices, and to respond to new priority areas identified by policy makers, so as to guarantee the survey relevance. In terms of broadband, for example, changes in technologies, services and devices have led to a number of new products and online applications. Mr Mana highlighted some of the key policy priorities, which include measuring the social and economic impact of Internet use, trust and security, ICTs and the environment, the digital divide, and ICT skills. Mr Mana presented some of the proposed revisions to the OECD model survey, including a number of new questions, for example, on the incident rate of cyber crime. The revised survey might also include new questions to address the use of social networking services and user-generated content. Some revision were also proposed on the methodological issues, including the proposal to expand the population coverage and scope for individuals, which is currently limited to the 16-74 year olds.

83. Following this presentation, Ms Magpantay presented the proposed revisions to the Icore ICT household indicators collected by ITU. She confirmed the need for revisions due to changes in technologies, devices and service, and resulting new policy needs. Changes proposed by ITU also reflect feedback from NSOs and efforts to harmonize indicators with those collected by the OECD and Eurostat. Ms Magpantay provided an overview of the 12 ICT household indicators, which were initially defined by the Partnership in 2005, and which all countries are encouraged to collect. She highlighted a number of challenges, including the difficulty of reflecting the issue of convergence. The revisions also need to reflect the changes made in the definition of infrastructure and access indicators, for example in terms of broadband, which are included in the ITU Handbook. The revision process will start in 2012 and will be done in consultation with member states, as well as OECD and Eurostat. Preliminary results of this process are to be presented at the next WTIM in 2012.

84. The next presentation was made by **Martin Mana** from the Czech Statistical Office, on "Measuring household ICT expenditure". Mr Mana highlighted the need to measure ICT expenditure because of the increasing role and spread of ICTs, and their impact on economic performance and social well-being. Data on ICT expenditure can also reveal important information about the (national) digital divide and the link between income levels and ICT uptake. The data can be collected by using existing data collection tools, such as household budget surveys, and based on international classifications in particular the Classification of Individual Consumption by Purpose (COICOP), which provides a sufficient breakdown to analyze ICT expenditure. Mr Mana also presented some results from existing surveys in the EU countries, such as the increasing share of expenditure on ICTs. Furthermore, Czech data show that people spend more on services than on equipment and that low-income households spend a higher share of their income on ICTs than high-income households. Although prices for services have dropped, and despite the economic crisis, the share of ICT expenditure in total expenditure over the last years has remained stable. For OECD countries, expenditure on ICTs averages just under 5% but varies from below 3% to over 6%. Data also reveal that there are a number of households that would like to buy a computer but cannot afford to.

85. The final presentation was made by **Enrico Calandro**, from Research ICT Africa (RIA), on "Measuring the use of social media through household surveys". Mr Calandro briefly presented RIA, which is a network of researchers in Africa. RIA has carried out several household surveys and Mr Calandro highlighted the need for demand-side data by comparing Namibian data on the number of mobile cellular subscriptions – collected from administrative data– with data on the number of mobile cellular users and owners, collected through a household survey. Data show major differences between SIM cards (subscriptions), mobile ownership and the number of mobile users. The Namibian survey, which was carried out in 2007 and 2011, also showed the uptake of Internet use, and the growing number of mobile phone users who browse the Internet, with major differences between users in rural and urban areas. By 2011, almost 50% of Internet users in Namibia first used the Internet over the mobile phone and over 80% of Internet users are signed up for a social network. A key result of the latest survey is that the mobile phone is not only helping to close the voice gap, but also the data gap. Mr Calandro also briefly described the research methodology of the RIA surveys, including the sample frame (which in the Namibian case is based on the national census), and issues of non-response and confidence level.

86. The discussions following the presentations included a number of comments on the proposed revisions to the ITU household indicators, including the need to continue collecting data on TVs, which remain an important ICT in many developing countries, and to clearly define all ICT activities. Singapore highlighted the importance of taking into account seasonal changes for all definitions where the reference period is changed to 3 months.

87. Rwanda asked for clarification on how often countries should carry out ICT household surveys and Egypt requested that for transparency purposes, countries should provide the sampling methodology of their surveys and ITU should review the expansion factor used by countries to extrapolate data. Egypt further highlighted that it has expanded the model household survey to

adapt it to national policy purposes and that its household expenditure survey includes questions on the expenditure on ICT training.

88. Intel encouraged all administrations to collect data on households with fibre subscriptions and on the increasing use of wireless technologies. Intel also asked the group to reconsider the definition of broadband and to increase the minimum speed of 256 kbit/s.

89. ITU will take all of these comments and questions into consideration when revising the ICT household indicators and encouraged countries to also share these and other comments on the EGTI forum.

90. Thailand requested a clarification on the inclusion of software expenditure in the COICOP and Mr Mana explained that it was included, but not as a separate indicator.

91. Several questions were addressed to the speaker from RIA, including on why the ownership of computers in Namibia is decreasing and how it is possible that there are more SIM cards than phones. Mr Calandro replied that some people are replacing their computer with a mobile phone, and that some people in Africa can afford several SIM cards but just one mobile phone. DR Congo asked for RIA's selection criteria in terms of choosing the countries in which it carries out surveys. Mr Calandro replied that the choice of countries depended in part on the availability of researchers within countries but also on the available budget.

92. The moderator closed the session by summarizing the main points and encouraging countries to apply international standards and definitions in their production of ICT household statistics.

**Concluding session**

93. During the concluding session, the Chair of WTIM, Mr Krishna Oolun, Executive Director of the ICT Authority, Mauritius, presented the draft conclusions and recommendations of the meeting. During the debate, delegates provided constructive comments on various parts of the text. Annex 1 presents the final version of the conclusions and recommendations as agreed by the meeting.

94. Before the closing of the meeting, the delegate of Thailand delivered a statement on behalf of Ms Jirawan Boonperm, Permanent Secretary, Ministry of ICT, Thailand. She announced that the Royal Government of Thailand was pleased to offer hosting the next ($10^{th}$) WTIM in Bangkok, Thailand, in the last week of September 2012. The announcement was applauded by the participants.

95. In his closing remarks, Mr Cosmas Zavazava, ITU/BDT, congratulated the participants to a successful event and thanked them for their active contribution to the meeting. He thanked the ICT Authority for having hosted the meeting so successfully and the Chair for the excellent conduct of the meeting. He also thanked other agencies for their cooperation, especially the

members of the Partnership on Measuring ICT for Development. Finally, he confirmed ITU's commitment to continue to work closely with Member States to assist them in their efforts to collect data and measure the information society.

96. Before closing the meeting, the Chair, Mr Krishna Oolun, thanked the ITU for inviting him to Chair this important meeting, which had been an invaluable experience for him. He also thanked the participants, speakers and moderators for their active contributions to make the WTIM a useful and interesting event.

**9th World Telecommunication/ICT Indicators Meeting**
**7-9 December 2011**
**Swami Vivekananda International Convention Centre, Pailles, Mauritius**

# Conclusions and recommendations

**Presented by the Chair**

1. The 9th World Telecommunication/ICT Indicators Meeting (WTIM) focused on the measurement aspects of five topics: measuring global development targets; ICT infrastructure and access indicators – in particular the review of definitions and discussions on broadband capacity, mobile broadband subscriptions and tariffs, and speed and quality of service; investment and revenue in the telecommunication/ICT economy; e-waste; and household ICT surveys.

2. Based on the WTIM presentations and discussions, the following conclusions and recommendations are made.

## 1. Measuring global development targets

3. The meeting acknowledges the *Partnership on Measuring ICT for Development's* continued efforts to track global information society developments. It welcomes the expansion of the *Partnership* core list of ICT indicators to include seven core indicators on measuring e-government developed under the leadership of the UN Economic Commission for Africa (UNECA), which will help countries monitor progress on e-government.

4. The *Partnership* plays a key role in promoting the WSIS targets and in the assessment of the WSIS outcomes (WSIS+10 review). The meeting calls upon countries to use the *Partnership's* Statistical Framework document on Measuring the WSIS Targets to collect data on the indicators that will be used to monitor progress towards 2015. Delegates are encouraged to follow the good example of countries, such as Ecuador, in measuring the WSIS targets.

5. The meeting acknowledges the leading role of ITU in providing ICT data and statistics towards the monitoring of global development targets, including the MDGs (Goal 8); the WSIS targets; and the targets set out by the Broadband Commission for Digital Development.

6. The meeting further acknowledges and welcomes the expansion of the *Partnership* to include UN Environment Programme (UNEP)/the Secretariat of the Basel Convention (SBC) on e-waste as a new partner. This new partner will contribute with key expertise in the area of e-waste.

## 2. ICT infrastructure and access

### *2.1. Indicators and definitions*

7. The meeting acknowledges the excellent work of the Expert Group on Telecommunication/ICT Indicators (EGTI), under the chairmanship of Malaysia, in revising the telecom/ICT indicators and

harmonizing definitions in accordance with other international organizations. The meeting endorses the outcome of the EGTI meeting held on 5-6 December 2011 at the same venue and recommends that the mandate of the EGTI should continue in order to carry on discussions on outstanding issues and new indicators proposed by the EGTI meeting. The EGTI might consider establishing an action plan outlining the implementation of its work.

8. The meeting agreed to encourage all producers of infrastructure and access indicators, including operators and service providers, to participate actively in the work of the EGTI by sharing their experiences and technical expertise. The EGTI online discussion forum is the ideal place to do this, as it is easy to use and an excellent working tool.

9. Countries provide telecommunication/ICT statistics to a number of international agencies. It is important that the definitions of indicators are harmonized at the international level to avoid additional and unnecessary work. The meeting therefore recognizes the importance of maintaining the participation of international and regional organizations in the EGTI, such as the Organisation for Economic Co-operation and Development (OECD) and the European Union (EU). In this context, ITU should continue to work with these organizations to harmonize the definitions, in cooperation with Member States.

10. The ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT 2011 will be a valuable tool for the national and international collection of data on telecommunication infrastructure and access. The meeting encourages administrations to use the Handbook, and ITU to continue working towards its improvement, and to include new indicators as they become available, and relevant. Countries are invited to share their experiences with ITU in order to contribute to future revisions of the Handbook, taking into account the special circumstances of developing countries.

11. To improve the availability, quality and international comparability of administrative data on telecommunication/ICT statistics, the meeting encourages countries to use the Handbook as a basic reference document in national data collections.

### *2.2 Measuring broadband capacity*

12. The presentations highlighted the need to expand existing broadband indicators collected by ITU, and to consider indicators to measure broadband capacity. Particular attention should be paid to measuring: national core backbone infrastructure; fibre reach/population and household coverage; different levels of international backbone capacities; and data traffic flows.

13. The meeting encourages data producers to distinguish between installed capacity and effectively used capacity, and to recognize these indicators as meaningful measures of broadband capacity along with the number of subscriptions. When looking at fibre optic networks, route kilometres, reach (the number of people living in proximity to a fibre node), and equipped capacity can help in measuring the adequacy of a network.

14. The meeting took note of the rapid uptake of IP traffic globally, both for fixed (wired) and wireless technologies, with the highest growth rates being witnessed in emerging economies. Policy and regulatory instruments and national broadband plans can assist in this transition.

15. Delegates were reminded that high-capacity international and national backbone networks play a crucial role in meeting the future broadband needs of consumers worldwide.

16. In order to develop internationally harmonized indicators related to broadband capacity, the meeting recommends that EGTI propose, discuss and develop a group of indicators, and to present the results at the next WTIM.

### *2.3 Measuring mobile broadband*

17. Mobile-broadband services are becoming increasingly important in both the developed and the developing world and there is a need to measure active mobile-broadband subscriptions. In order to enhance reliability and international comparability, countries are encouraged to use the ITU Handbook definitions and methodology for the collection of mobile-broadband subscriptions. These have been agreed in the EGTI, and are in line with OECD definitions.

18. The meeting welcomes the recommendation by the EGTI to include mobile-broadband prices in the next ITU ICT Price Basket questionnaire, and encourages countries to provide the data. Based on this first complete data collection, ITU should work in close collaboration with the EGTI to refine the methodology for future collections of mobile-broadband prices, as well as the methods for monitoring and benchmarking the affordability of mobile-broadband services.

### *2.4 Measuring speed and quality of service*

19. The meeting recognizes the importance of measuring and evaluating ICT developments by identifying indicators to measure Quality-of-Service (QoS). The WTIM suggests expanding the QoS indicators currently included in the Handbook, which are limited to fixed-telephone services. A number of QoS indicators to measure mobile-cellular and fixed- broadband Internet services should be included in the ITU data collection, as proposed by the EGTI. The meeting further agrees with the EGTI's proposal to discuss QoS indicators to measure fixed-broadband as well as mobile-broadband services, taking into consideration users' experiences.

20. The meeting highlights the importance of distinguishing between different speed tiers for the fixed-broadband subscription indicators. To increase the availability of internationally comparable data for different broadband speed tiers, countries are encouraged to adapt their broadband subscription data collection according to the ITU definitions.

21. The difference between advertised and actual speeds is one of the most frequently highlighted areas for measurement, particularly for consumers, who often express dissatisfaction with their service. Although speed tests are one recognized way of revealing trends, they often show mixed results, and are not entirely reliable. Another way of measuring network performance is to install software on Internet users' computers. Regulatory authorities play an important role in

enforcing fair advertising rules, including the obligation of operators to provide consumers with correct information on actual speeds.

22. The WTIM further discussed other possible indicators to monitor the quality of broadband services – including latency, jitter, packet loss and availability – and emphasized that testing in this area should be coordinated by regulators. Testing methodologies should be comparative; tests should be made randomly from undisclosed locations; and results should be made publicly available.

**3. Measuring investment and revenue in the telecommunication/ICT economy**

23. Investment and revenue data are important to appropriately monitor trends of the telecommunication/ICT economy and to evaluate its role in and impact on the overall economy. However, data are often not reported by countries and comparable data are limited. In addition, countries face difficulties in collecting financial data due to confidentiality issues. There is therefore a need to improve and increase the availability of comparable indicators on investment and revenue in the sector. In particular, comparable data on foreign direct investment are limited and require further improvements.

24. ITU and other international organizations (e.g. OECD and UNCTAD) play an important role in producing internationally comparable ICT data in this area and – in close cooperation with experts – in identifying the appropriate methodology, classification of services, and investment and revenue sources.

25. The meeting acknowledges the need to improve existing data and recommends that the EGTI consider this topic for further discussion, in particular with respect to developing comparable definitions, classifications and improved data collection methods.

26. The improvement of measuring revenue and investment should not be limited to telecommunication services only, but should also consider the entire ICT sector (including ICT manufacturing, ICT services and other ICT activities). This could be done in close cooperation with members of the Partnership on Measuring ICT for Development.

**4. Measuring e-waste**

27. ICTs have been recognized as an important development enabler. At the same time, the increasing number of ICT users and a growing number of ICT devices in a rapidly changing technological environment are responsible for a large and rising quantity of electronic waste (e-waste). The meeting recognizes the necessity to track the production and flow of e-waste as a basis for political decision-making and acknowledges that there are broader issues related to e-waste that should be brought to the attention of relevant ITU forums, with specific regard to tightening control mechanisms for importing e-waste.

28. The meeting emphasizes the importance of existing measurement projects and initiatives in this area – such as those carried out by the Secretariat of the Basel Convention (SBC) and the Solving the E-Waste Problem (StEP) Initiative.

29. Comprehensive data related to e-waste on the global level are currently not available. Targets and indicators are needed, particularly in the areas of production, trade, collection and recycling. Furthermore, there is a need to measure the inputs and outputs in terms of e-waste and to report on these measurements, providing comprehensive data on the lifecycle of ICT equipment. The meeting recommends an internationally harmonized measurement process on e-waste, which could be led by the *Partnership on Measuring ICT for Development*. In this context, the meeting welcomes the proposal by the *Partnership* to create a new Task Group on e-waste, under the leadership of UNEP/SBC, with the objective of developing internationally comparable indicators for measuring e-waste. Countries are encouraged to participate actively in this work.

**5. Household ICT surveys**

30. The WTIM recognizes the considerable progress that has been made in terms of collecting ICT demand-side indicators through official household surveys over recent years. It recognizes the important role that ITU and the *Partnership on Measuring ICT for Development* have played, as well as the efforts made by national governments in improving the comparability and availability of data. It further welcomes the revisions that ITU, in close cooperation with the OECD, proposes to the core list of indicators on measuring household access to and individual use of ICTs. The revision of the core indicators and the ITU Manual for Measuring ICT Access and Use by Households and Individuals should be carried out in consultation with Member States and other experts, for example through an expert group on ICT household indicators. Countries are encouraged to participate actively in this process.

31. The meeting further welcomes the expansion of the existing core household indicators to consider other aspects, such as household expenditure on ICTs, which can be collected either through existing household budget surveys or via stand-alone ICT household survey, and which provide important information for analysing the role and impact of ICTs and identifying national and international digital divides. Furthermore, to reflect recent trends and the strong growth in new applications such as social media, relevant new indicators should be developed and collected through household surveys.