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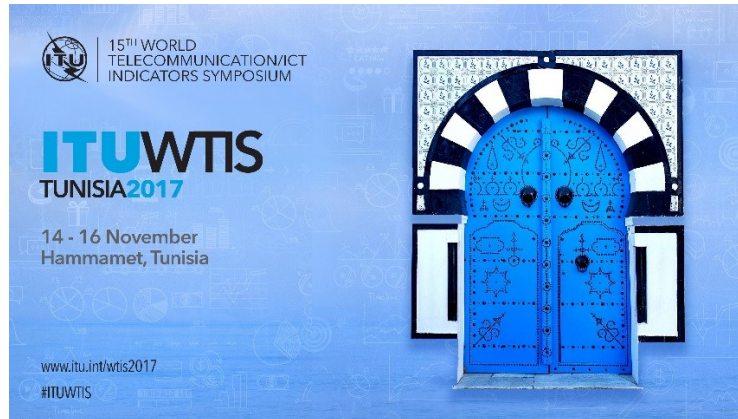
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15th World Telecommunication/ICT Indicators Symposium

“Transforming emerging technologies into economic opportunities with better data”

14 to 16 November 2017

Hammamet, Tunisia

FINAL REPORT



Introduction

1. The 15th World Telecommunication/ICT Indicators Symposium (WTIS-17) took place in Hammamet, Tunisia, from 14 to 16 November 2017. It was organized by the International Telecommunication Union (ITU) and hosted by the Government of Tunisia.
2. The Symposium attracted 418 participants from 74 countries, representing public and private organizations including ministries, regulators, national statistical agencies, universities and research institutions, telecommunication operators, ICT firms, and regional and international organizations.
3. The work of WTIS-17 was conducted under the chairmanship of H.E. Mr. Habib Dababi, the Secretary of State for the Digital Economy of Tunisia.
4. The outcomes of the Symposium will provide strategic guidance to the national and international community, including ITU, in the field of ICT statistics, and strengthen the collaboration among the global ICT statistics community.
5. Further information, including the agenda, the presentations delivered, media information, videos and photos are available at: <http://www.itu.int/en/ITU-D/Statistics/Pages/events/wtis2017/default.aspx>.

Tuesday, 14 November 2017

Opening ceremony

6. After opening the exhibition, the 15th World Telecommunication/ICT Indicators Symposium (WTIS-17) was opened by His Excellency Mr. Mohamed Anouar Maarouf, Minister of Communication Technologies and Digital Economy of Tunisia, Mr. Brahim Sanou, Director of the ITU Telecommunication Development Bureau (BDT), His Excellency Mr. Habib Dababi, the Secretary of State for the Digital Economy of Tunisia and His Excellency Mr. Adel Cheloui, Governor of Sousse.
7. Mr. Sanou thanked the Government of Tunisia for hosting WTIS-17 and recalled the theme of the Symposium, "Transforming emerging technologies into economic opportunities with better data". Mr. Sanou emphasized the importance of ICT data for fostering the evidence-based policy-making required for emerging ICT trends to deliver on their promises.
8. His Excellency Mr. Mohamed Anouar Maarouf expressed his belief that ICTs are an engine for economic growth and that building an information and knowledge society is a priority for developing and emerging countries. He further said that indicators allow a measure of progress and provide incentives for the development of infrastructure, use of ICT and development of human resources. In this context, Tunisia proposed that the international community undertakes the identification and development of indicators associated with the WSIS-SDG Matrix and prepares a report to be presented in 2025 to the United Nations General Assembly.
9. On behalf of H.E. Mr Youssef Chahed, Prime Minister of Tunisia, under whose patronage WTIS took place, Mr. Mohamed Anouar Maarouf then proposed to appoint H.E. Mr. Habib Dababi, the Secretary of State for the Digital Economy of Tunisia as WTIS chair, wished the participants a fruitful meeting, and declared the Symposium open.

Plenary Session 1: Fostering a healthy investment climate with better data

10. The high-level session recognized that both public and private investment are needed to meet national and international targets for expanding ICT access and use, often in public-private partnerships. Public investment in shared broadband network infrastructure complements private sector investment in broadband infrastructure and services. ICTs need to be fully integrated in the educational system, providing pupils with the knowledge and skills required to change their lives and turn around communities. Public investment in basic research, eventually leading to advances in networking technology, is also crucial for the development of the whole ICT sector. However, public investment strategies must carefully avoid crowding out private investment if overall investment in the ICT sector is to grow dynamically and sustainably.
11. A congenial policy and market environment will help encourage private investment in broadband infrastructure and allow a healthy ICT startup ecosystem to flourish. ICTs can also help governments increase their effectiveness, efficiency and transparency.
12. The session highlighted the benefits of data-driven decision-making for public investment. Clear metrics on investment returns and other measurable outcomes will help governments, especially in developing countries, to prioritize public funding for high impact ICT development projects. At the same time, the wide availability of timely and good quality ICT data will lower search and information cost for potential investors by providing accurate market signals. Together, ICT ministries, telecommunication regulators and national statistics institutes play important and complementary roles in making ICT data regularly and broadly available to all stakeholders in the public and private sector.

Plenary Session 2: Big data for measuring the information society

13. The Symposium recognized the importance of exploring the use of big data for official statistics and appreciated the results of the ITU project on 'Big Data for Measuring the Information Society'. The project includes pilot studies in six countries (Colombia, Georgia, Kenya, Philippines, Sweden and the United Arab Emirates) that aims to explore how big data from the ICT industry, particularly from telecommunication operators, can produce new or complement existing indicators to measure the information society.
14. The session welcomed the document developed by ITU describing the big data ICT indicators and methodologies and how these can be produced by operators and service providers, and compiled at the country level. The document was developed and enhanced based on experiences by pilot countries. The use of the methodology document will ensure international comparability of the ICT indicators that are produced from big data sources.
15. The experiences of Colombia, Philippines and the United Arab Emirates highlighted the lessons learned and the challenges faced in implementing the project in their respective countries. The challenges include accessing the data, confidentiality and data protection issues, lack of infrastructure resources and lack of skills to analyze big data. The experiences of the pilot countries showed that there are different models and modalities for data access and processing depending on the level of aggregation and anonymization of the data and national data protection, privacy and statistical legislations. The experiences further showed examples of legal documents that stakeholders need to comply with to ensure privacy of data.

16. National collaboration among public and private stakeholders is crucial to utilize big data, particularly among the following entities: ministries, regulators, national statistics offices, data protection commissions, telecommunication operators and service providers. The Symposium encouraged the different stakeholders to engage actively in the discussions and to work together to take advantage of the potential of big data for official statistics and policy-making.
17. The Symposium highlighted that the lack of skills required to exploit new data sources is a challenge to all stakeholders and countries. Participants emphasized the need to build statistical capacity in the use of big data sources and encouraged broader support from governments and international agencies.
18. The Symposium invited countries to implement big data analysis using the ITU methodology and to engage actively in the discussion and experience sharing of this new area of ICT measurement.

Tutorial: Data visualization and big data analysis tools

19. The Symposium recognized the opportunities that new data visualization tools bring to official ICT statistics. Both proprietary and open-source data visualization packages exist that can improve ICT data dissemination and thus have a positive impact on consumer information, overall sector transparency and accountability. Advanced data visualization tools can also support the analysis and decision-making process of ICT policy-makers and regulators.
20. The Symposium took note that platforms to perform big data analytics have progressed enormously in the last years and that the current state of the art makes it possible to use big data analytics to inform and drive development policies, such as those related to the Sustainable Development Goals (SDGs). Big data from the ICT sector can be used for this purpose while preserving privacy and confidentiality, if robust statistical methods are used. Integration of ICT data with other sources is key to maximizing impact. Because of the complexity and rapid evolution of big data methods, skill development in the area of data science is required to successfully incorporate big data analytics into the production of official ICT statistics.
21. The Symposium acknowledged that big data analytics can contribute to improving the insights derived from ICT data, but noted that the statistical issues that apply to regular ICT data collections, such as sampling errors and various types of biases, need to be taken into consideration when drawing conclusions from big data analytics. In order to ensure the statistical robustness of big data analytics and predictions, data from official statistical agencies, such as censuses and representative household surveys, are very important for calibration and validation of the results obtained. As a result, big data cannot replace traditional data in most cases, but can be used to complement or supplement them.

Demos: Crowdsourcing ICT data

22. Demonstrations were given on innovative initiatives to crowdsource the collection of ICT-related data, including a global network of probes that measure Internet connectivity and reachability, a mobile application to crowdsource location-based bandwidth and signal strength measurements, and web scraping techniques to collect enterprise ICT statistics. These crowdsourcing initiatives were demonstrated to be feasible and in some cases to have a measurably positive impact on the quality of ICT services. Speakers highlighted the need for transparency, such as publishing open-source codes and datasets, to ensure trust and maintain collaboration from volunteers.

23. The Symposium acknowledged the opportunities provided by crowdsourcing to collect timely metrics on a continuous basis at lower cost, while reducing response burden. Concerns relating to the scalability and sustainability of these efforts, as well as the quality and statistical representativeness of the collected data will need to be addressed when using crowdsourcing approaches for official statistics

Wednesday, 15 November 2017

Plenary Session 3: Measuring the Information Society Report 2017

24. The Symposium witnessed the launch of the 9th edition of the Measuring the Information Society Report (MISR), an annual report published by ITU since 2009. The MISR 2017 features two volumes, volume 1 includes key global ICT data, the ICT Development Index (IDI) and key emerging trends. For the first time, the report includes volume 2 containing individual economy profiles providing a snapshot of the latest ICT landscape and efforts made to increase ICT access and use of their citizens.
25. The ICT Development Index (IDI) is an important and impartial global benchmarking tool recognized widely by countries, which helps to evaluate progress, identify challenges, and set targets. The IDI helps identify best practices, and provides critical evidence for policy makers and the private sector.
26. During the session, the top ranking country in IDI 2017 (Iceland) was announced, and awards were given to the countries that made most progress in its IDI performance between 2016 and 2017 in terms of value (Namibia) and rank (Uzbekistan).
27. The IDI award ceremony was followed by the presentation of the MISR main findings. Relying on data collected by ITU from its Member States, current ICT trends were presented, followed by an overview of the IDI results at global and regional level. A final chapter highlighted four emerging and interconnected ICT trends, artificial intelligence, big data, the Internet of Things (IoT), and cloud computing, and their implications for statistical measurement.
28. Some countries expressed concern about the methodology of the IDI, in particular its application to countries with large population size and land area. The Secretariat informed the participants about the independent audit of the IDI, which concluded that the methodology is robust, and reminded participants that next year's IDI will feature 14 indicators instead of the current 11, as agreed during the Extraordinary meeting of the Expert Group on ICT Household Indicators (EGH) and Expert Group on Telecommunication/ICT Indicators (EGTI), allaying the expressed concerns. It was further highlighted that the IDI should not be used only to compare countries to each other, but for countries to self-assess and track their own progress over time, and to put in place a system at the national level to collect timely data. Countries were also invited to participate actively in the work of EGTI and EGH.
29. The Symposium welcomed the presentation of the Report, which was described as a key publication in the field of ICT for development. The Symposium also noted with satisfaction the inclusion for the first time of economy profiles of ICT developments.

Plenary Session 4: New data needs for the digital economy

30. The Symposium acknowledged the work carried out by the Expert Group on Household Statistics (EGH) in 2017, and endorsed the outcomes of the 5th EGH meeting held on 14-15 September 2017, which agreed on new indicators and proposals for future work. These include new indicators on measuring e-commerce, a technical definition of smartphones and to add smartphone as a new sub-category for the three ICT household indicators on mobile telephones. The proposals for future work include improving the measurement of ICT skills, reviewing the indicator on location of Internet use, collecting data on indicators such as cybersecurity, e-waste, child online protection, Internet of Things (IoT), and digital content.
31. The Symposium further agreed to continue experience sharing on methodological issues, on how to improve data availability in support of the SDGs, the use of new data sources such as big data, and sharing experiences in implementing household surveys and disseminating results using data visualizations.
32. The Symposium welcomed the creation of the sub-groups on measuring ICT skills, and on reviewing the indicator on location of Internet use. The sub-groups will produce a document defining the conceptual framework and dimensions of digital skills and a proposal for a revised indicator on location of Internet use in the current context of widespread smartphone use.
33. The Symposium recommended countries to strengthen national coordination and to include all stakeholders in order to improve the data quality and availability to inform policy-makers.

Plenary Session 5: New metrics for broadband and cybersecurity

34. The Symposium welcomed the continued participation and engagement of experts in ICT statistics in the work carried out by the Expert Group on Telecommunication/ICT Indicators (EGTI). Furthermore, the Symposium took note of the recognition of the relevance of EGTI's work in Resolution 8 of the World Telecommunication Development Conference (WTDC), following its revision at the WTDC convened in Buenos Aires, Argentina, from 9 to 20 October 2017.
35. The Symposium acknowledged the work carried out by EGTI in 2017. The outcomes of the Extraordinary Meeting of EGTI and EGH, held in March 2017, and the 8th EGTI meeting, held in September 2017 were presented. The agreements include, inter alia: the collection of fixed network coverage indicators starting from 2018; the implementation of the revision of the ICT price baskets in 2018; the extension of the data collection on fixed-broadband subscriptions by speed to new tiers to monitor high-speed broadband uptake; and the revision of the IDI indicators, agreed with the EGH at the Extraordinary Meeting. The Symposium took note that the new IDI indicators will be implemented from 2018 and acknowledged the need to collect and report the agreed new IDI indicators.
36. Taking into consideration the proposals for future work of EGTI, the creation of a sub-group within EGTI to develop a proposal for indicators on spectrum allocation/assignment was announced. All experts interested in contributing to the drafting of this proposal were encouraged to register to the sub-group. In addition, the Symposium encouraged EGTI to work on indicators to monitor some of the ongoing and emerging ICT trends, such as IoT, M2M, 5G and convergence.
37. The Symposium welcomed the emergence of innovative ways of measuring broadband quality of service and, in particular, broadband speeds, based on online applications and big data analytics. The Symposium recognized that broadband quality of service is an important topic for policy-

makers and regulators and welcomed EGTI's work towards developing new methodologies and indicators to monitor progress in this area.

38. The Symposium acknowledged the growing importance of cybersecurity for building confidence and security in the use of ICTs. Quantitative cybersecurity metrics could contribute to the monitoring of the progress made in this area at the national and international level, but measuring from the supply side such a multifaceted topic remains challenging. The Symposium encouraged countries to use EGTI as a platform for experience sharing on the topic of supply-side quantitative cybersecurity indicators.
39. Dr. Alexandre Barbosa, Head of the Regional Center for Studies on the Development of the Information Society (CETIC.br), Brazil, was thanked for chairing the EGH from 2012 to 2017, and his successor Mr. Candido Astrologo, Assistant National Statistician of Philippine Statistics Authority, was announced. Ms. Linah Ngumba, Senior Statistician, Kenya National Bureau of Statistics, Kenya will continue as EGH Vice-Chair, and Mr Seung Keon Kim, Vice President of Korea Association for ICT Promotion (KAIT), will serve as additional Vice-Chair.
40. Mr. Iñigo Herguera, Associate Professor of Economics, Complutense University of Madrid, Spain, was thanked for chairing the EGTI from 2012 to 2017, and Mr. Joao Noronha, Head of Statistics and Market Research, Autoridade Nacional de Comunicações, Portugal was announced as his successor. Mr. Mansour Ali F Alshehry, Market Study Analyst, Communications and Information Technology Commission (CITC), Saudi Arabia and Mr. Bernard Banda, Manager, Policy and Research, Zambia Information and Communications Technology Authority will serve as Vice-Chairs.

Lightning Talks: Country Experiences

41. The session featured several country experiences in the area of measuring ICT skills, national coordination in the production of official ICT statistics and big data for tourism statistics and mobility planning.
42. The Symposium stressed the importance of monitoring ICT skills to inform policies in this area and thus contribute to national and international development targets, such as SDG 4 (Quality Education). In this context, the Symposium welcomed the successful work undertaken by several countries and the methodological work of the Expert Group on ICT Household Indicators (EGH) concerning the measurement of ICT skills.
43. The Symposium noted that the issue of national coordination in collecting ICT statistics was cross-cutting to all presentations. Furthermore, the Symposium encouraged regulators, ministries, national statistical agencies, telecommunication operators, service providers and other national stakeholders to collaborate in the challenge of keeping abreast of developments in the ICT sector and taking advantage of ICT data to inform national policies in a wide range of sectors, including tourism, transport planning and the wider ICT sector. Formal coordination mechanisms established within each country can help to achieve national coordination. Other important factors include, inter alia, sustainable budget to support statistical actions and policy support at the highest level to implement them. Participants highlighted that countries with a large population and/or large land area face particular challenges in the implementation of official data collections.

Lightning Talks: Partnership on Measuring ICT for Development

44. In a session on tracking the digital economy co-organized with the Partnership on Measuring ICT for Development, the Symposium heard that digitization has transformed the world today, and that the digital economy has highly influenced trade, commerce, labour requirements and government policies, in particular policies pinpointing connectivity, effective use, skills, security and privacy, and strategic coordination. The Symposium heard from Bangladesh how the digital economy can help a country achieve the SDGs.
45. Finally, the work of the Partnership Task Group on ICT for the SDGs on developing a thematic list of ICT indicators to measure ICT availability and use in sectors relevant to the SDGs that are not covered in the global SDG indicators framework, such as indicators on skills, e-commerce, financial inclusion, e-government and e-waste, was presented and welcomed by participants.

Thursday, 16 November 2017

Plenary Session 6: Measuring emerging ICT trends

46. The session highlighted four emerging ICT trends that form a new ICT ecosystem: artificial intelligence (AI), big data, cloud computing and the Internet of Things (IoT), which are developing exponentially and will bring about massive socio-economic changes. These new technologies imply risks in terms of new digital divides and job displacement, but they also present new opportunities and tools for achieving the SDGs.
47. The Symposium recognized that to maximize the benefits, countries will need to promulgate public policies that ensure affordable, widely available and high-quality connectivity infrastructure and services. Furthermore, the Symposium recognized the need to upgrade complementary user skills and education. At the same time, adaptive approaches to policy-making that facilitate digital entrepreneurship and innovation are required for countries to better avail of opportunities to achieve SDG targets and mitigate current and emerging digital divides with the help of new technologies.
48. The Symposium acknowledged the importance of starting the work to develop internationally harmonized indicators to track the uptake and application of these four emerging ICT trends worldwide and to aid the formulation of enabling public policies. Many examples of indicators were already suggested, which can be discussed further in the EGH and EGTI fora, by the Partnership on Measuring ICT for Development and elsewhere. The Symposium also acknowledged that these new technologies make possible new national and international data collection paradigms, such as facilitating and curating machine-generated data harvested directly from the digital infrastructure through open algorithms and open data repositories.

Plenary Session 7: Smart data for smart sustainable cities

49. ICTs are helping to meet the challenge of providing public services efficiently and sustainably by unlocking the potential of digital data to make cities smart and sustainable. The Symposium highlighted that we are only at the beginning of the smart city movement, and that smart cities are not only a matter of technology, but also of strategy, policy, and outcomes, and city leadership which is at the heart of a successful initiative. The Symposium emphasized that the ideal way to

measure smart city success is to first distinguish between process and outcome, then measure the outcomes.

50. Examples of smart homes and buildings, transportation, micro grids and wearables were given, showing how with data analytics and artificial intelligence data can be transformed into information that make cities more sustainable from an economic, environmental and societal point of view. The Symposium emphasized that public policies are needed to promote smart and sustainable cities and the importance of indicators to measure their development and operation. The Symposium highlighted that a standardized set of indicators is required to benchmark cities within and between countries.
51. The Symposium noted that while in developed countries the challenge often is to transform existing, non-smart systems into smart systems, in developing countries there is an opportunity to leapfrog directly into smart systems.

Plenary Session 8: Transforming emerging technologies into economic opportunities with better data

52. The final plenary session brought five moderators of previous sessions together, who provided a synthesis of the key messages of WTIS-17.
53. The Symposium heard that better data leads to better policies. The panelists underlined the need for reliable and internationally comparable data for evidence-based policy making, collected continually, and in a transparent way. The Symposium highlighted that better data are essential for socio-economic development at the national level, providing opportunities especially for developing countries to make faster progress, and aid in achieving the SDGs.
54. The Symposium emphasized that governments should aim to use new technologies in the collection of data, in particular using big data tools and the Internet of Things, exploring partnerships for data sharing, while keeping in mind the Fundamental Principles of Official Statistics. The Symposium called countries to innovate to collect quality data while ensuring security, privacy and confidentiality. Further, the Symposium highlighted that government bodies and regulators need to develop inclusive regulation policies.
55. The roles of EGH and EGTI were emphasized in developing methodology for new indicators. OTT services and countries' dependence on ICT were raised as potential new topics, in addition to the emerging trends that were the focus of the Symposium and the topics that came out of the EGH and EGTI meetings.

Presentation of Chair's summary and conclusions

56. The Chairman of the Symposium, H.E. Mr. Habib Dababi, presented a short summary report of the Symposium. A longer summary is available at <https://www.itu.int/en/ITU-D/Statistics/Pages/events/wtis2017/default.aspx>.

Closing ceremony

57. During this session, the Government of Tunisia offered a gift to the ITU symbolizing the door which was the main logo of WTIS-17. In return, the Government of Tunisia was presented with an ITU award for hosting WTIS-17.
58. The Symposium closed with a video of the event highlights, and closing remarks by ITU and the host.