

**ITU Contribution to the
Implementation of the WSIS
Outcomes: 2019**

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I. Introduction

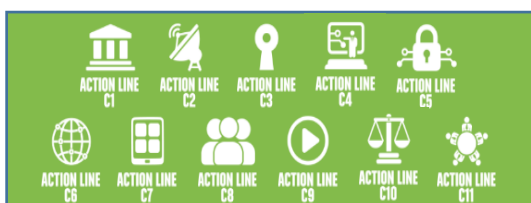
1. The coordination and implementation of the outcomes of the World Summit on the Information Society (WSIS) continues to be one of the priorities of the Secretary-General of the International Telecommunication Union (ITU). The Vision of the Union, as defined in the ITU Strategic Plan 2020-2023 is “an information society, empowered by the interconnected world, where telecommunication/information and communication technologies enable and accelerate social, economic and environmentally sustainable growth and development for everyone”, in line with the WSIS Outcome Documents. The Strategic Goals of the Union (Growth, Inclusiveness, Sustainability, Innovation and Partnership) support ITU’s role in facilitating progress towards the implementation of the WSIS Action Lines and the 2030 Agenda for Sustainable Development. Through these goals, the Union seeks to contribute to the development of an environment that is conducive to innovation, where advances in new technologies become a key driver for the implementation of the WSIS Action Lines and the 2030 Agenda for Sustainable Development, while also recognizing the need to contribute to the global partnership to strengthen the role of telecommunication/ICTs as means of implementation of the WSIS Action Lines and the 2030 Agenda for Sustainable Development.
2. Two momentous events took place in the year 2015 that have had a direct impact on strategic and operational activities related to the implementation of the WSIS outcomes, namely the:
 - **UNGA Sustainable Development Summit**, 25 - 27 September 2015, which adopted [Resolution A/70/1 "Transforming our world: the 2030 Agenda for Sustainable Development"](#);
 - **UNGA High-level Meeting on the overall review of the implementation of the outcomes of the World Summit on the Information Society**, 14-16 December 2015, which adopted [Resolution A/70/125 on "Outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the outcomes of the WSIS"](#).
3. PP-18, which took place in Dubai from 29 October to 16 October 2018 agreed on a number of key resolutions, including revision of the Resolution 140 that highlights ITU’s role in implementing the outcomes of the World Summit on the Information Society and in the overall review by United Nations General Assembly of their implementation.
4. The United Nations General Assembly in its ten-year review of WSIS, clearly highlighted the cross-cutting contribution of Information and Communication Technologies (ICTs) to the SDGs and poverty eradication, and called for close alignment between the WSIS process and the 2030 Agenda for Sustainable Development, noting that ICTs can accelerate progress towards all 17 SDGs. The resolution A/70/125 provides guidance on the implementation of the WSIS Outcomes till 2025 and requests all stakeholders to integrate ICTs into their approaches to implementing the Goals, while requesting UN entities facilitating WSIS Action Lines to review their reporting and work plans to support implementation of the 2030 Agenda.
5. Within the ITU, the WSIS Implementation and follow up activities of all three Sectors and the General Secretariat are reflected in this annual report titled [ITU’s Contribution to the](#)



Implementation of the WSIS Outcomes. ITU's Contribution to the Implementation of the WSIS Outcomes is a comprehensive report on the ITU activities in context of WSIS carried out by the Union. The Report provides detailed information on the key WSIS related initiatives and activities carried out by the three sectors of the Union (Standardization, Radiocommunication and the Development Sector) and the General Secretariat. The Report provides updates on the tasks carried out by the ITU at the operational and policy level, covering all assigned mandates with reference to the WSIS Process highlighting the linkages between the WSIS Action Lines and SDGs, in particular:

- (a) Lead facilitator (along with UNESCO and UNDP) in coordinating the multistakeholder implementation of the *Geneva Plan of Action*.
 - (b) Facilitator of Action Lines C2 (Information and communication infrastructure) and C5 (Building confidence and security in the use of ICTs); upon the UNDP's request the ITU accepted to play the role of the Facilitator of Action Line C6 (Enabling environment).
 - (c) Co-facilitator of Action Lines C1, C3, C4, C7 and C11; and partner for Action Lines C8 and C9.
 - (d) Rotating Chair of the United Nations Group on Information Society (UNGIS).
 - (e) Steering committee member of the Partnership on Measuring ICT for Measurement.
 - (f) Facilitator of the WSIS Stocktaking Process.
 - (g) Initiator and facilitator of the WSIS Project Prize.
 - (h) Implementor of other WSIS outcomes.
6. Within the ITU, the effective coordination of ITU's strategies and activities in relation to WSIS has been ensured by a WSIS Task Force that is chaired by the Deputy Secretary-General. Taking into account resolves of Resolution 1332, the terms of reference of the WSIS Task Force have been amended incorporating coordination on the activities of ITU related to SDGs.
 7. This document is divided into six sections. Following the introduction, the second section highlights the alignment between the WSIS Action Lines and the 2030 Agenda for Sustainable Development. The third section provides an overview of ITU activities and projects undertaken in 2019 in the context of the implementation of WSIS Outcomes, while the fourth section informs about ITU's Role in the Overall Review of the Implementation of the Outcomes of the World Summit on the Information Society. The fifth section highlights forums, innovative initiatives and informs about the planned future activities to ensure the full implementation of the WSIS outcomes. The final section provides conclusions of the report.

II. WSIS Action Lines and the 2030 Agenda for Sustainable Development



8. In line with resolution Resolution A/70/1 and Resolution A/70/125, the WSIS Process implementation activities have been aligned with the 2020 Agenda for Sustainable Development, thereby highlighting the direct linkages between WSIS Action Lines and SDGs.

(a) High Level Political Forum (HLPF) 2019

9. The **2019 High Level Political Forum (HLPF)**, convened under the auspices of the Economic and Social Council, was held from 9-18 July, 2019, at the United Nations Headquarters in New York. The HLPF is the central UN platform for the follow-up and review of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) adopted in 2015. The event held over 8 days was attended by over 125 heads and deputy heads of state and government, ministers, vice- ministers and other ministerial level officials, 130 panel speakers, and over 2000 registrants. This year, the event included over 25 official programme meetings, the presentation of [47 Voluntary National Reviews](#) (VNRs), 156 side events, 8 special events, 36 exhibitions, and 17 VNR labs.
10. The 2019 edition of the HLPF, held under the theme of " Empowering people and ensuring inclusiveness and equality ", reviewed in depth:
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
 - Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
 - Goal 10. Reduce inequality within and among countries
 - Goal 13. Take urgent action to combat climate change and its impacts
 - Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
 - Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
11. The HLPF adopted a procedural report introduced by ECOSOC President Inga Rhonda King.
12. This year, the HLPF convened under the auspices of ECOSOC did not adopt a Ministerial Declaration, given that an HLPF, under the auspices of the UN General Assembly, has been convened to take place on 24-25 September 2019 at UN Headquarters in New York.
13. The "SDG Summit" will continue to assess progress achieved so far since the adoption of the 2030 Agenda in September 2015 and will provide leadership and guidance on the way forward that would help accelerate implementation of SDGs, by means of a political declaration, which has been negotiated and already been agreed (available here).
14. **Statements:**
- ITU [SG's statement](#) delivered during the General Debate of the Ministerial segment and the High-level segment of the UN Economic and Social Council (ECOSOC)
 - [Statement](#) delivered by Chief of SPM to the Thematic review/ Report of the STI Forum
 - ITU commented on discussion on SDG 8 - Decent work and economic growth

15. Side events:

ITU organized special and side events:

- Special event organized by ITU/UNITAR in collaboration with ILO, UNESCO and the Permanent Mission of Mexico: [Attaining the SDGs in a future that is digital: the role of capacity building, education and skills development for digital inclusion](#)
- Side event organized by ITU in collaboration with GeSI and the participation of Costa Rica, UNIDO, Microsoft and the Earth Institute: [Harnessing Frontier Technologies for Accelerating Climate Actions and the SDGs](#)
- Side event organized by ITU-UNDP/UNGIS and Saudi Arabia: [Fostering digital transformation and global partnerships for SDG achievement” - \[Aligning WSIS process with the 2030 Agenda for Sustainable Development\]](#)
- Technical Meeting UNGIS organized by ITU and reception sponsored by UNDP
- Side event organized by ITU in collaboration with Montenegro, DIAL, GeSI, and the participation of representatives of Burkina Faso, Bangladesh and Chile: [Scaling Digital Transformation to Achieve the SDGs Using a Whole-of-Government Approach \(ITU, Montenegro, DIAL, GeSI\)](#)

Events organized by other entities with ITU participation:

- Special event organized by UNITAR with ITU Deputy Secretary General as panellist: [Launch of UN SDG: Learn: One Platform, One Partnership and One Programme for an effective, coherent and inclusive approach to the Sustainable Development Goals \(SDGs\) learning”](#)
- Luncheon event organized by the UN Secretary General’s Task Force on Digital Financing of the SDGs, Canada and Malawi, with participation of ITU’s Deputy Secretary-General: [Investing in the future – UNSG’s Task Force on Digital Financing of the SDGs - Canada/Malawi](#)
- Side event organized by UN Technology Bank, moderated by ITU Chief of SPM: [SDG17/UN Technology Bank for LDCs: ICTs and inclusiveness \(ORHLLS, Turkey\)](#)
- Side event organized by the Inter-Agency Coordination Group against Trafficking in Persons (ICAT), in collaboration with ITU’s Chief of SPM as a panellist: [World Day against Trafficking in Persons: Use of ICTs to Combat Trafficking in Persons and Leaving No One Behind](#)
- Side event organized by WEF, IEEE and DQ with ITU BDT Director as panellist: [A Framework for Digital Literacy, Skills and Readiness](#)
- Official Programme session [High-level Segment of ECOSOC Thematic discussion “Empowering people and ensuring inclusiveness and equality - Long term trends and scenarios](#), with ITU BDT Director as Lead Discussant

16. Key ITU inputs to HLPF 2019:

- [ITU Council Input](#)
- [Partnership on Measuring ICT for Development input](#)
- [United Nations Group on the Information Society \(UNGIS\) input](#)
- [World Summit on the Information Society Forum Outcomes](#)

ITU also contributed to the following key input reports:

- [UN Secretary Generals Progress Report](#)
- [The Sustainable Development Goals Report 2019](#)
- [STI Forum and its Report](#)
- [2019 Financing for Sustainable Development Report](#)

17. HLPF – SDG Summit

The “Compilation Report of ITU Council contributions to the High-Level Political Forums (HLPF) 2016-2019” was transmitted to the President of the General Assembly by letter dated 19 July 2019. This report was requested to serve as ITU’s input to the SDG Summit to take place on 24-25 September 2019 (available [here](#)).

(b) WSIS Action Lines and SDG Matrix

18. At the WSIS Forum 2015, ITU coordinated the [WSIS Action Lines and SDG matrix](#), a new tool developed by a number of United Nations agencies to map how ICTs may contribute to the implementation of the new SDGs. The Matrix will serve as an easy reference for stakeholders engaged in shaping the future of both, the SDGs and the WSIS processes beyond 2015 and the 2030 Agenda for Sustainable Development.

	C1	C2	C3	C4	C5	C6	e-gov	e-bus	e-lea	e-hea	e-emp	e-env	e-agr	e-sci	C8	C9	C10	C11
SDG 1																		
SDG 2																		
SDG 3																		
SDG 4																		
SDG 5																		
SDG 6																		
SDG 7																		
SDG 8																		
SDG 9																		
SDG 10																		
SDG 11																		
SDG 12																		
SDG 13																		
SDG 14																		
SDG 15																		
SDG 16																		
SDG 17																		

WSIS Action Line	SDG	ICT Application	SDG
Building confidence and security in the use of ICTs	16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 16.10, 16.11, 16.12, 16.13, 16.14, 16.15, 16.16, 16.17, 16.18, 16.19	ICT Application: +business	16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 16.10, 16.11, 16.12, 16.13, 16.14, 16.15, 16.16, 16.17, 16.18, 16.19
Building confidence	16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 16.10, 16.11, 16.12, 16.13, 16.14, 16.15, 16.16, 16.17, 16.18, 16.19	ICT Application: +education	16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 16.10, 16.11, 16.12, 16.13, 16.14, 16.15, 16.16, 16.17, 16.18, 16.19
ICT Application: +employment	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.17, 8.18, 8.19, 8.20	ICT Application: +health	3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20
The role of governments and all stakeholders in the promotion of ICTs for development	17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7, 17.8, 17.9, 17.10, 17.11, 17.12, 17.13, 17.14, 17.15, 17.16, 17.17, 17.18, 17.19, 17.20	ICT Application: +employment	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.17, 8.18, 8.19, 8.20
Information and communication technologies as enablers of innovation and sustainable development	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 9.11, 9.12, 9.13, 9.14, 9.15, 9.16, 9.17, 9.18, 9.19, 9.20	ICT Application: +employment	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.17, 8.18, 8.19, 8.20
Access to Information Knowledge	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20	ICT Application: +education	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20
Capacity building	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20	ICT Application: +education	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20

19. The mapping exercise draws direct linkages of the WSIS Action Lines with the proposed SDGs to continue strengthening the impact of Information and Communication Technologies (ICTs) for sustainable development. Each UN Action Line Facilitator has analyzed the connections and relations of their respective Action Line with the proposed SDGs and their targets. This is a living document and changes can be introduced by Action Line Facilitators, if needed.



Sustainable Development Goal	Relevant WSIS Action Line	ICT Application	SDG
SDG 1: End poverty in all its forms everywhere	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20	ICT Application: +business	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20
SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20	ICT Application: +agriculture	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20
SDG 3: Ensure healthy lives and promote well-being for all at all ages	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20	ICT Application: +health	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20

Please read the complete document at www.wsis.org/sdg

20. The goal is to create a clear and direct link and an explicit connection between the key aim of the WSIS, that of harnessing the potential of ICTs to promote and realize the development goals, and the post 2015 development agenda, so as to contribute to the realization of the latter.

21. The WSIS Forum continues to evolve and adapt, by strengthening the synergies between the WSIS Action Lines and SDGs, and taking into account the outcomes of the UNGA Overall Review. In this regard, the WSIS Forum 2016 was entitled WSIS Action lines: Supporting the Implementation of the SDGs, please read more at www.wsis.org/sdgs

22. **WSIS Forum 2019 Matrix:** The WSIS-SDG Matrix developed by UN WSIS Action Line Facilitators serves as the mechanism to map, analyze and coordinate the implementation of WSIS Action Lines, and more specifically, ICTs as enablers and accelerators of the SDGs. This Matrix builds upon the WSIS-SDG Matrix and provides guidance on the outcomes of the workshops and other sessions held during the forum, emphasizing linkages between the WSIS Action Lines and SDGs as well as highlighting rational for each linkage that has been established. WSIS Stakeholders identified a clear relation and connection between the WSIS Action Lines and SDGs in their respective workshops. Please read the complete document [here](#).

ICI and Smart Cities in the Middle East and North Africa - The Role of ICT	WFP	
Artificial Intelligence and data privacy - The importance of a diverse regulatory and technical expertise	International Telecommunications Union and Science	
Climate and Energy Transition	ITU and United Kingdom	This session addresses the important role of artificial intelligence in the development of smart and resilient cities that help bring SDGs based on large sets of data. The session will discuss the importance of the quality of the data for the use of the data in urban context for the solution in sustainability. The specific SDGs presented are 4, 6, 7, 8, 9, 11, 13, 16, and 17.
Commonwealth Cooperation on ICTs for SDGs	ITU and Commonwealth of Nations	Commonwealth countries will strengthen their collaboration and coordination on ICTs for SDGs. Topics to be discussed include: digital divide, gender and inclusion, the impact of AI and data, smart cities, online protection, cybersecurity and connecting the unconnected.
Innovation & Digital Literacy Americas	ITU and Inter-American Development Bank	

23. In response to the call by the UN General Assembly within the framework of the ten year review of the WSIS (Res. A/70/125) calling for a close alignment between the WSIS process and the 2030 Agenda for Sustainable Development, the **WSIS Stocktaking process** highlighted the contribution of 11 WSIS Action Lines to the achievement of 17 Sustainable Development Goals (SDGs).

University of Geneva	ITU and University of Geneva	Digital literacy initiatives foster access to quality education for all (Goal 4), promote gender parity, and facilitate access to secure energy (Goal 7), which in turn can reduce inequalities (Goal 10) and uplift people from extreme poverty (Goal 1), enabling governments to distribute more resources to ensuring justice, peace and strong institutions (Goal 16). Strengthening benefits of digital literacy initiatives and enabling a knowledge based society require multi-stakeholder cooperation as aligned with (Goals 10 and 17) in several dimensions.
Blockchain and Data Protection	ITU and Blockchain Association	Privacy is a human right and important for achieving many SDGs. It is not just about data protection. <ul style="list-style-type: none"> SDG 8: Decent work and economic growth: Privacy at the workplace is important for providing a decent work environment. SDG 9: Industry, innovation and infrastructure: Many use blockchain as one of the main future innovation technologies. Companies and governments need to make sure that the information is not abused for trading. SDG 11: Sustainable cities and communities: Blockchain is often debated in the context of smart cities and IoT. Smart cities need to protect citizens' personal data in blockchain. SDG 12: Responsible consumption and production: Responsible industries do not invade people's privacy and do not abuse their personal data.
Inclusiveness Leading the SDGs	World Summit Award and ITU	WSIS 11 categories cover SDGs: Goal 1: No poverty Goal 2: Zero hunger Goal 3: Good health and well-being for people Goal 4: Quality education Goal 5: Gender equality Goal 7: Affordable and clean energy 10%

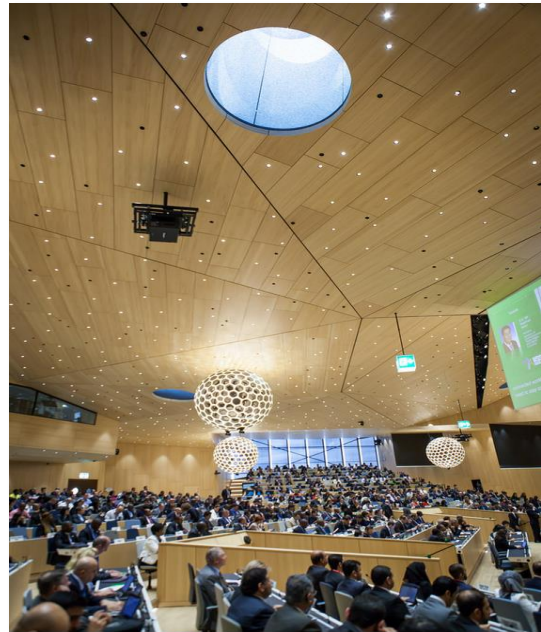
Role of ICT in Academia - Meeting the unconnected	ASDF International	Goal 8: Decent work and economic growth Goal 11: Sustainable cities and communities Goal 12: Climate action Goal 17: Partnerships for the goals.
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24. In this regard, the **WSIS Prizes 2019** contest aligned its rules to highlight the linkage between the WSIS Action lines and SDGs, this approach will be strengthened in 2020.

III. Overview of ITU activities and projects undertaken since 2018 in the context of the implementation of WSIS Outcomes, also related to the 2030 agenda for Sustainable Development

(a) Lead facilitator (along with UNESCO and UNDP) in organizing the multistakeholder implementation of the *Geneva Plan of Action*.

25. Since 2006, ITU (along with UNESCO and UNDP) has played a leading facilitating role in the implementation of the Geneva Plan of Action (para 109 of the Tunis Agenda). At the international level the cluster of the WSIS related Meetings held every May from 2006 to 2008, and the WSIS Forum has been held every year since 2009. In 2015, the UNGA resolution A/70/125 recognized the WSIS Forum as a platform for discussion and sharing of best practices in the implementation of the World Summit outcomes by all stakeholders, and stated that it should continue to be held annually.
26. At the regional level the Regional Commissions have played a key role in the implementation of the Geneva Plan of Action and reported at the WSIS Forum globally.
27. The ITU has planned, organized and hosted the WSIS Forum since 2009 in collaboration with the co-organizers, UNESCO, UNCTAD and UNDP. The annual WSIS Forum is a global multistakeholder platform facilitating the implementation of the WSIS Action Lines. The Forum, co-organized by ITU, UNESCO, UNDP and UNCTAD, in close collaboration with all WSIS Action Line co-/facilitators and other UN organizations (UNDESA, FAO, UNEP, WHO, UN Women, WIPO, WFP, ILO, WMO, ITC, UPU, UNODC, UNICEF and UN Regional Commissions), is also an opportunity for information exchange, knowledge creation and sharing of best practices, taking into account the evolving Information and Knowledge Societies. The WSIS Forum provides opportunities for developing multistakeholder and public-private partnerships to advance development goals.
28. The WSIS Forum is a natural evolution of the Cluster of the WSIS related Meetings held every May from 2006 to 2008 organized by the WSIS Action Line facilitations and coordinated by ITU. Since 2009, the WSIS Forum itself has evolved into a unique platform for multistakeholder consensus and discussions on crucial issues concerning the information society. The WSIS Forum results in several documents in particular the WSIS Forum Outcome Document is released on the last day of the Event each year. The agenda, programme and format of the Forum is built in an open multistakeholder consultation process that consists of physical meetings and online consultations. The Forum comprises of a high-level and forum track that include high-level panels, WSIS Action Lines meetings, WSIS Action Line Facilitator's meeting, thematic workshops, and various platforms for networking and initiation of partnerships.



29. Please refer to the following for the yearly editions of the WSIS Forum, you can also find the Outcome Documents and the Emerging Trends Document:

– **Cluster of WSIS Related Events 2006:**

<http://www.itu.int/net/wsis/implementation/cluster.asp?year=2006&month=0&type='alf'&subtype=0>

– **Cluster of WSIS Related Events 2007:**

<http://www.itu.int/net/wsis/implementation/cluster.asp?year=2007&month=0&type='alf'&subtype=0>

– **Cluster of WSIS Related Events 2008 :**

<http://www.itu.int/net/wsis/implementation/cluster.asp?year=2008&month=0&type='alf'&subtype=0>

In 2009 the cluster of WSIS related events were rebranded as the WSIS Forum.

8. **WSIS Forum 2009:** <http://www.itu.int/wsis/implementation/2009/forum/geneva/>

9. **WSIS Forum 2010:** <http://www.itu.int/wsis/implementation/2010/forum/geneva/>

10. **WSIS Forum 2011:** <http://www.itu.int/wsis/implementation/2011/forum/>

11. **WSIS Forum 2012:** <http://www.itu.int/wsis/implementation/2012/forum/>

12. **WSIS Forum 2013:** <http://www.itu.int/wsis/implementation/2013/forum/>

13. **WSIS Forum 2014:** <http://www.itu.int/wsis/implementation/2014/forum/>

14. **WSIS Forum 2015:** <http://www.itu.int/wsis/implementation/2015/forum/>

15. **WSIS Forum 2016:** <http://www.itu.int/wsis/implementation/2016/forum/>

16. **WSIS Forum 2017:** <http://www.itu.int/net4/wsis/forum/2017/>

17. **WSIS Forum 2018:** <https://www.itu.int/net4/wsis/forum/2018/>

18. **WSIS Forum 2019:** <https://www.itu.int/net4/wsis/forum/2019/>

30. At the regional level, each year the regional commissions report on their actions at the annual WSIS-Regional Commissions meeting held at the WSIS Forum. In follow up to the UNGA resolution A/70/125 that invites the regional commissions to continue their work in implementation of the World Summit on the Information Society action lines and their contribution to the reviews thereof, including through regional reviews, the regional commissions in collaboration with ITU, UNESCO and UNDP, organizes regional WSIS Implementation Workshops. The objectives of these workshops are:

- Building regional capacity on the WSIS Implementation process and its alignment with 2030 Agenda
- Building awareness on the enabling role of ICTs in sustainable development towards programming of future UNDAFs

- Contributing as regional formal submission to the WSIS Forum Open Consultation Process bringing the regional emerging trends, challenges and opportunities to the global dialogue on WSIS implementation
 - Regional reporting on projects to the WSIS Stocktaking
 - Identification of possible projects for submission to the WSIS Prize competition
 - Regional inputs to the WSIS Action Line facilitation process
31. WSIS Forum 2019 was hosted by ITU from the 8 to 12 April at the ITU Headquarters, Geneva, Switzerland. This year more than 3,000 information and communication technology (ICT) experts and implementation actors contributed to and participated in recent World Summit on Information Society (WSIS) Forum 2019 to foster partnerships, showcase the innovation, exchange best practices and announce new tools and initiatives to use ICTs to advance the United Nations' Sustainable Development Goals (SDGs). Thousands followed remotely while more than 500 were engaged by intervening remotely. More than 500 high-level representatives of the wider WSIS Stakeholder community graced the Forum with more than 85 ministers and deputies, several ambassadors, high-level government officials, CEOs and Civil Society leaders contributing passionately towards the program of the Forum. More than 300 content rich workshops and open space talks clearly aligned with the WSIS Action Lines and SDGs. In addition, more than 40 Exhibition Spaces highlighting innovation and projects from the ground. [18 WSIS Prizes winners and 72 WSIS Prizes champions](#) were acknowledged for their excellent work in implementation of the WSIS Action Lines on the ground.
32. The Chairman of the WSIS Forum 2019 was H.E Mr. Mustafa Jabbar, Minister, Ministry of Posts, Telecommunications and Information Technology, Bangladesh. The high-level policy sessions were moderated [14 by High-Level Track Facilitators](#) nominated and identified by the different WSIS Stakeholders types.
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33. With the constant objective of strengthening the alignment of WSIS and SDG processes, the overall theme for WSIS Forum 2019 was Information and Communication Technologies for achieving the Sustainable Development Goals. This year's program focused on highlighting the linkage between both Action Lines and the SDGs, including SGD priority areas such as health, hunger, education, youth inclusion, employment, gender empowerment, the environment and innovation. The concrete outcomes of WSIS Forum 2019 will enable stakeholders to strengthen implementation of WSIS Action Lines and the alignment of the WSIS and SDG processes. For example, Ministerial Round Table participants emphasized the importance of the WSIS Action Lines framework as a key UN framework for work on the information and knowledge societies, and reiterated that many national digital agendas were built upon it. They also highlighted the need for sharing of scarce resources, as well as strengthening collaboration to build confidence and security in the use of technology for good and digital skills so more people can benefit. The press release resuming the outcomes can be found [here](#).
34. WSIS Forum 2019 also resulted in a very detailed Outcome Document, which is a compilation of all the outcomes of the different sessions (Action Lines Facilitation Meetings, Thematic and Country Workshops, Policy Sessions, Information Sessions, Interactive Sessions). The PDF version of this document can be read [here](#).

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35. The WSIS Forum 2019 Outcomes linked to WSIS Action Lines SDGs Sustainable Development Goals - Matrix Flyer can be consulted [here](#).
 36. The WSIS Forum 2019 High Level Track Outcomes and Executive Brief can be found [here](#). This document is a compilation of the statements/speeches/briefings delivered at the High-Level Policy sessions of the High-Level Track by high-ranking officials of the WSIS Stakeholders community, representing the Government, Private Sector, Civil Society, Academia and International Organizations.
 37. The WSIS Stocktaking Report 2019 can be found [here](#). This document reflects around 1,062 activities relating to ICTs for development, submitted to the WSIS Stocktaking Platform from the 2nd July to 12th December, each one highlighting the efforts deployed by stakeholders involved in the implementation of the SDGs. The Report is based on the multistakeholder approach, including input from stakeholders from all over the world responding to ITU's official call in 2019 for Stocktaking updates and new entries. The inputs from WSIS action line facilitators and co-facilitators also contributed to the present Report.
 38. The WSIS Stocktaking Success Stories 2019 can be read [here](#). This document contains of ICT success stories to best showcase the possible achievement of SDGs, through the implementation of projects related to the WSIS Action Lines.
 39. The WSIS Forum 2019: Report – WSIS Action Lines Contributing towards Empowering People and Ensuring Inclusiveness and Equality, can be found [here](#). This document outlines the key priorities, opportunities and challenges for the respective WSIS Action Lines towards the achievement of the SDGs, in particular in line with the theme of the High level Political Forum 2019, empowering people and ensuring inclusiveness and equality.
 40. The WSIS Forum 2019 organised Special Tracks during the Forum, including:
 - ICT and Sport: to encourage the international community to promote Sport as an Enabler of Sustainable Development, highlighting the aspects of youth empowerment and innovative Technologies in the form of vibrant multi-stakeholder discussions, workshops, and showcasing sport technology products.
 - WSIS Accessibility Day: The Accessibility Day aims to inform and observe how ICTs can help people living with disabilities whilst focusing on progressing towards the United Nations Sustainable Development Goals. The day focused on 5 key issues: Security, Communication, Mobility, Education and Emergency.
 - Youth in ICTs: WSIS aims to include youth perspectives and engage young people in discussions about how technology can provide opportunities to address some of the world's most pressing issues and provides a platform where youth can offer their insights and understanding of the information society, its challenges and opportunities, and where they can raise questions but also propose solutions to harvesting the power of ICTs towards equally distributed social impact.
 - WSIS Innovation track: The vital role of ICTs as a catalyst for development is acknowledged in the 2030 Agenda for Sustainable Development, stating “the spread of information and

communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and develop knowledge societies.

41. Two special sessions were held on Experience a live demonstration on Virtual reality for Development. Pursuing a first partnership in 2016, WSIS and World VR Forum join forces to be at the forefront of Virtual Reality for advancing development. A shiny new Virtual Reality Track was held at the WSIS Forum 2019 bringing together high-level personalities, world-class VR experience and a very special focus on education (details available soon on WSIS website).

- **Photographs:** click [here](#).
- **Videos, Interviews and Highlights:** click [here](#).

All WSIS Forum 2019 Outcomes, photos and videos documentation and highlights are available at www.wsis.org/forum.

42. The **WSIS Forum 2020** is scheduled to be held from 6 to 9 April 2020 at the ITU Headquarters, Geneva. The agenda and program will build on the basis of submissions received during the Open Consultation Process. Additional information about the WSIS Forum 2020 will be made available soon.

The Open Consultation Process for the WSIS Forum 2019 was structured in five phases as follows:

- **Phase I: Opening of the Open Consultation**

The virtual launch of the open consultations took place on Monday, 2 July 2018, 14:30–15:30. Open calls for the WSIS Forum 2019 were announced. More information available here: <https://www.itu.int/net4/wsis/forum/2019/Home/Consultations>

- **Phase II: First Physical Meeting**

The first physical meeting of the Open Consultation Process was held on Monday, 12 November 2018, 12:20-13:20 at UNESCO Headquarters, Paris, France.

- **Phase III: Second Physical Meeting**

The second physical meeting of the Open Consultation Process was held on Thursday, 31 January 2019, 16:00-18:00 at the International Telecommunication Union Headquarters, Geneva, Switzerland.

- **Phase IV: Deadline for Submissions of Official Contributions and Binding Requests for Workshops** by 10 February 2019.

- **Phase V: Final Brief Meeting**

The final brief meeting of the Open Consultation Process was held on Friday, 8 March 2019, 14:00–16:00 at ITU Headquarters, Geneva, Switzerland.

(b) Facilitator of the WSIS Action Lines C2, C5, C6

Action Line C2: Information and Communication Infrastructure, (also related to the 2030 Agenda for Sustainable Development)



Related to the SDGs: SDG 1 (1.4), SDG 8 (8.2), SDG 9 (9.1, 9.a, 9.c), SDG 11 (11.5, 11.b)



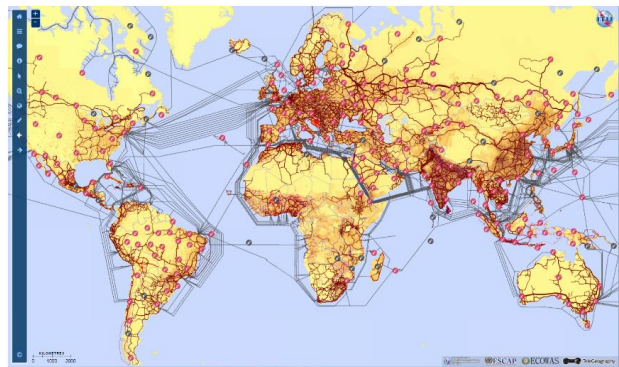
43. Within the framework of the existing resources and given mandate, as well as in line with the Geneva Action Plan, the ITU carries out several activities with regard to the WSIS Action Line C2. ITU plans and activities are taking into consideration the approved [Resolution 70/1](#) (Transforming our world: the 2030 Agenda for Sustainable Development) where it was recognized that high-speed broadband is an essential enabler of sustainable development. Another relevant tool is the [WSIS-SDG Matrix](#) developed by UN WSIS Action line Facilitators, serving as a mechanism to map, analyze and coordinate the use of ICTs as catalysts for the implementation of the SDGs.
44. The 14th Action line C2 Facilitation Meeting was held in Geneva on Monday, 8 April 2019 as an integral part of the WSIS Forum 2019. Based on proposals received during the WSIS Forum 2019 multistakeholder open consultation process, the theme for the Action Line Facilitation meeting was: **“Information and Communication Infrastructure: Hybrid Infrastructure and technologies for affordable broadband access”**. The session’s debate was mostly focused on different approaches broadband infrastructure implementation and on increasing accessibility and affordability of broadband services to connect the 4 billion unconnected. The session discussed different aspects of affordable accessibility and connectivity using hybrid technologies while sharing the best practices and innovations. More details on this session [here](#).
45. The Action line Facilitation meeting had a direct connection to SDGs 1,8,9 and 11. It was concluded that the following are needed (i) good policies; (ii) affordable and accessible sustainable connectivity; (iii) to go beyond connectivity: enabling environment; (iv) human resources; (v) technology layers, and (vi) sustainability.
46. During the five days of the WSIS Forum, at least 16 sessions were making the link between the Action Line C2 and the SDG Goals 1,8 9, and 11.
47. The WSIS Prizes 2019 Winner for the Action Line C2 is the Ministry of Digital Economy and Society of Thailand. The name of the project was **“The Village Broadband Internet Project”**. The main objective of the Net Pracharat project is to strengthen National Broadband Network by expanding high-speed Internet network to reach every village in the country, so that local Thai people who live in the remote areas will be able to access broadband or high-speed Internet as those who live in the cities. In December 2017, MDES and Telephone of Thailand Public Company Limited (TOT) completed the installation of fiber cable network to 24,700 target rural villages throughout the



country. In addition to provide network, the government equipped Thai people with Wi-Fi for community to provide free public Wi-Fi hotspots at the speed of 30/10 Mbps (Download/Upload). As of November 2018, there are about 4.5 million users registered to access Wi-Fi Net Pracharat. Newly registered increase around 200,000-300,000 users in every month. This program is linked to SDGoal 9: Industry, innovation and infrastructure. More details [here](#).

48. ITU-D worked closely with ITU-R and ITU-T in all regions to develop infrastructure and services. Several countries were assisted in preparing wireless broadband master plans, spectrum management master plans and national broadband policies for their transition from public switched telecommunication networks to next-generation networks.
49. ITU Global Development Initiatives are supporting the implementation of SDGs, such as: the [m-Powering Development for a Better Tomorrow](#) that is an innovative and unique ITU initiative. The goal is to extend the benefits of mobile telephony to all strata of society, in order to build a truly inclusive information society, with special focus on remote rural and underserved areas; The [Smart Sustainable Development Model initiative](#) aims at linking rural telecommunications development for general communications, business, education health and banking to disaster risk reduction and disaster management initiatives, to ensure an optimal use of technology and avoid duplication of efforts and investments.

50. To identify the global perspective of broadband connectivity that allows the ICT community to identify broadband placement, gaps and evidence-based investment opportunities, the ITU Interactive Transmission Map is continuously adding network links from all regions. The maps are a cutting-edge [ICT-data mapping platform](#) to take stock of national backbone connectivity (Optical fiber, Microwave links and Satellite Earth Stations) as well as of other key metrics of the ICT sector, which currently covers all regions of the globe.

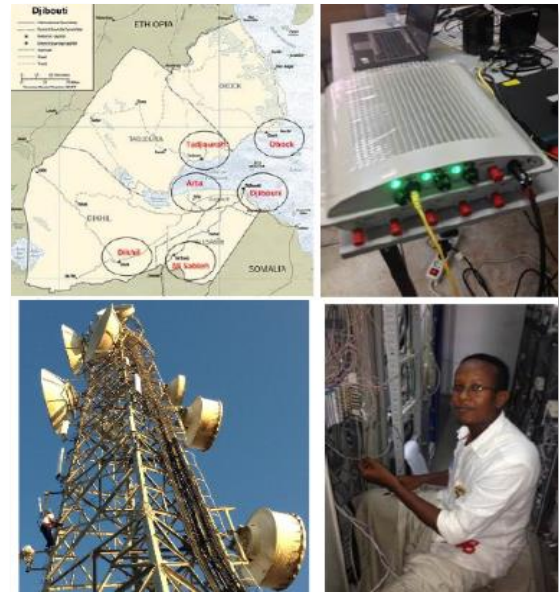


51. Implementation and updates of the ITU Interactive Terrestrial Transmission Maps (<http://itu.int/go/Maps>) is ongoing. The ITU Maps present critical ICT infrastructure on broadband backbone optical fiber, microwave links, satellite earth stations, and submarine cables. The Map interface was renewed to allow new data visualizations and data analytics. The Maps allow for graphical improvements proposals, wireframes for smartphone and tablet applications, and dashboard and statistics. Video and demonstrations for events have been developed ready to be deployed.

52. At the time of this reporting, the Map presented information from 482 operator networks and 22,953 nodes worldwide. The research on the transmission links has reached 13,808,320 km of routes, of which 3,588,484 km have been imported to the Map. Submarine cables, information on IXPs and satellite earth stations have been updated.

53. In order to enhance the Interactive Terrestrial Transmission Map worldwide, ITU coordinated the data collection and validation process covering infrastructure of more than 170 countries.

54. ITU-D has made available a computer program known as [SMS4DC](#) (Spectrum Management System for Developing Countries) to assist administrations of developing countries in performing their spectrum management responsibilities more effectively. ITU has kept updating this program and more than 40 countries have subscribed to the [tool](#). Further developments to the SMS4DC are underway covering administrative and radio communication functions. Technical assistance and training programs were provided in this area to several countries and regions.



55. The capacity of ITU members was enhanced on a range of network issues through numerous activities. Direct assistance was provided to multiple countries from all regions in frequency planning, spectrum management master plans, the transition from analogue to DTTV broadcasting and other technical issues. Some of the examples of such assistance programs are provided below.

56. Assistance on conformity and interoperability has been provided to developing countries. A C&I Assessment Study follow-up for the Caribbean Region targeting young IoT entrepreneurs and the challenges to reach compliance and market. Regional training events have been organized together with testing laboratory partners for AMS, ASP and AFR.



57. Enhanced knowledge in Conformance & Interoperability for Africa with a training held in Tunis in May 2018. 16 participants from 14 countries participated in the training in Regulatory framework and practical EMC tests. A Training for the Asia-Pacific region focusing on IoT testing has been organized in July 2018 (http://itu/int/go/CI_events).

58. The ITU/Craig and Susan McCaw Broadband Wireless Network project is under implementation in Africa covering several countries (Burkina Faso, Burundi, Rwanda, Swaziland, etc.). The wireless broadband connectivity and developing ICT applications will provide free or low cost digital access for schools and hospitals, and for underserved populations in rural and remote areas in those countries.

59. The procurement of ICT equipment is under way in Burkina Faso as part of the Broadband Wireless Network project.

60. Broadband Wireless Network for Djibouti was completed for Phase 2 and the maintenance contract was finalized and signed by Djibouti Telecom.

61. Procurement for the Broadband Wireless Network in Mali is in progress. The international call for Proposals has been done. The technical evaluation is following.

62. Basic National Spectrum Management System is to assist developing countries to establish basic structure of spectrum management system. Currently, projects for Comoros, Bolivia and Kyrgyzstan are ongoing. The results of the assistance will be the workplan for countries for implementing/updating their spectrum management structures and activities.
63. 100 participants from 13 Arab countries participated and discussed the different themes presented during the workshop on Emerging Technologies held in Algeria on 14-15 February 2018. An excellent exchange of opinions and feedback between delegates, speakers and the representatives of the local, regional and international companies and organizations took place during the workshop.
64. PIRRC (Pacific ICT Regulatory Resource Centre) organized SMS4DC training in Pacific area for more than 10 countries. The content and experiences have been exchanged and discussed. A new training is under organization for the new features of the tool and installing higher resolution map.
65. Caribbean Spectrum Management Task Force: around 30 participants from Caribbean countries provided contributions between 31 January and 2 February 2018 for the relevant reports of the Task Force (digital broadcasting transition, cross-border frequency coordination, emergency communication, spectrum pricing).
66. Spectrum management and digital transition: The ITU is in the process of providing assistance to Guyana in relation to the Spectrum Management Technical Assistance Services as well as Spectrum Management Spectrum Management Training Workshop.
67. IPv6 and IoT (Internet of Things) Expertise Center: The Project document has been signed with MUST (Malaysia University of Science and Technology) to assist developing countries. Following the cooperation agreement between the ITU and Malaysia University of Science (MUST), procurement is under process for the equipment, software and training material as required for the Implementation of an IPv6 and IoT (Internet of Things) in Penang Malaysia.
68. Forum on the Conformance and Interoperability (C&I) in Innovation for Youths (25-27 June 2018) and a workshop on Establishing a Mutual Recognition Agreement (MRA) for the Caribbean Countries (28 -29 June 2018) were held in Port-of- Spain, Trinidad & Tobago. These events highlighted the importance of C&I for young IoT developers and served as forums for the discussion of the implementation of a MRA for the CARICOM region.
69. An excellent exchange of opinions and feedback between more than 100 delegates coming from 13 countries, the speakers and the representatives of the local, regional and international companies took place during the Regional Workshop on Emerging Technologies, Algiers, Algeria, on 14-15 February 2018. Fruitful discussions addressed the opportunities, benefits and challenges of the Emerging Technologies in the development of the ICT applications and services and related regulation issues.
70. Regional Workshop for Europe and CIS on Digital Future powered by 4G/5G was held in Kiev, Ukraine from 14 to 16 May 2018, resulting in raised capacity of stakeholders and improved regional and interregional cooperation on 4G/5G, spectrum management and broadcasting. The workshop attracted 100 participants from 12 countries.

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71. ITU and Global Forum Workshop on spectrum management and broadcasting was organized 12-14 March 2019 in Kuala Lumpur with more than 250 participants.
72. Assistance continues to be provided in the areas of broadband connectivity and developing ICT applications to provide free or low cost digital access for schools, hospitals, and underserved populations in rural and remote areas in selected countries. For instance, the broadband wireless network is fully operational in Burundi with 437 institutions and users connected to the network. The broadband wireless network in Burkina Faso is fully installed and operational. In Djibouti, all 5 provinces are connected, and the broadband network is fully operational. Broadband wireless networks have also been installed in Rwanda, Antigua & Barbuda and St. Kitts & Nevis, among others.
73. In accordance with WTDC Resolution 47 (Rev. Buenos Aires, 2017), regional forums, assessment studies and on-the-job training courses on C&I are planned for 2019 with the participation of several countries in the regions.
74. Capacity of ITU members was built and training programs were organized in such areas as telecommunication/ICT network issues, including conformance & interoperability, digital terrestrial television, IPv6, SMS4DC, spectrum management and allocation, frequency planning and coordination, etc.
75. Direct assistance was provided regarding frequency planning, spectrum management structures and activities, the transition from analogue to digital terrestrial television broadcasting, conformance and interoperability, and future Internet exchange
76. Digital Broadcasting Transition database (DSO) was updated using information received from around 20 countries. During ITU-D Study Group 1, workshop was organised on 18 March 2019 Question 2/1 related thematic event on "Trends in new broadcasting technologies, services and applications", 4 presentations (ITU, EBU, University of Vienna), around 50 participants.
77. More details about the technical assistance programs implemented by the Telecommunications Development Bureau (BDT) of ITU in all ITU regions can be found in BDT's quarterly and annual performance reports:

<<https://www.itu.int/en/ITU-D/Pages/OperationalPlansPerformanceReports.aspx>>.
78. Furthermore, ITU develops a number of the large scale regional projects focusing on regional initiatives facilitating development of the information and communication infrastructure. More information on these projects as well as the other projects can be found [ITU-D Projects webpage](#).
79. In the framework of ITU-D Study Groups, the following questions related to AL-C2 were approved by WTDC-18 with working mandate until 2021:
- 1) [Question 1/1](#): *Strategies and policies for the deployment of broadband in developing countries*
 - 2) [Question 2/1](#): *Strategies, policies, regulations and methods of migration and adoption of digital broadcasting and implementation of new services*
 - 3) [Question 5/1](#): *Telecommunications/ICTs for rural and remote areas*

- 4) [Question 4/2](#): Assistance to developing countries for implementing conformance and interoperability (C&I) programmes and combating counterfeit ICT equipment and theft of mobile devices
- 5) [Question 7/2](#): Strategies and policies concerning human exposure to electromagnetic fields

The Final Reports and Guidelines from the ITU-D Study Groups for the 2014-2017 study period are available for download and viewing in different accessible formats in the six official languages ([link](#) to ITU-D SG1 Reports and [link](#) to ITU-D SG2 Reports).

As an input document to Question 1/1 and Question 2/1 in the 2014-2017 cycle, ITU has contributed with a Report on Implementation of Evolving Telecommunication/ICT Infrastructure for Developing Countries: Technical, Economic and Policy Aspects. The report introduces essential telecommunication/ICT infrastructures and their technologies, economic and policy aspects supporting effective adoption of Next-generation Networks, and it is [available online](#).

80. ITU is contributing to bridging the standardization gap between developing and developed countries. Instructed by [PP-14 Resolution 123](#), [WTSA-16 Resolution 44](#), and the new [WTDC-14 Recommendation 22](#) on Bridging the Standardization Gap (BSG), regional workshops and other regional activities are receiving support from ITU Regional Offices to improve awareness, understanding and participation on the development of ICT standards developed by global and regional Standardization Development Organizations (SDOs).
81. In the implementation of Action Line C2, ITU continues to be at the forefront of providing global standards for telecommunication in areas such as broadband access and home networks and infrastructures for ultra-high-speed transport; as well as future networks including 5G and networking innovations in fields such as network slicing, fixed mobile convergence, information centric networking, software-defined networking, machine learning as applied to 5G, cloud computing, data management, and trusted network infrastructure. Since 1 November 2018, ITU-T approved [more than 270 texts](#) (as of 31 August 2019), including ITU-T Recommendations, Supplements and Technical Reports.
82. ITU-T Study Group 3 continues to study and develop Recommendations and guidelines regarding the policy, tariff, charging and economic aspects of trans-multi-country terrestrial telecommunication cables.
 - ❖ **Recommendation ITU-T D.198 "Principles for unified format of price/tariffs/rates-lists used for exchanging telephone traffic"** recognizes the right of any operator to present price/tariffs/rates charged for telecommunications services in any form deemed convenient for the operator, and recommends that telecommunications companies offering international connections/exchange of traffic make use as far as possible of the same templates/forms/format of data to represent traffic destinations and offered price/tariffs/rates including if required optional clarifying information or quality of service criteria.
 - ❖ **Recommendation ITU-T D.262 "Collaborative Framework for OTTs"** provides a collaborative framework in order to promote competition, consumer protection, consumer benefits, dynamic innovation, sustainable investment and infrastructure

development, accessibility and affordability in relation to the global growth of the Over the Top (OTT) applications.

- ❖ **Recommendation ITU-T D.263 "Costs, Charges and Competition for Mobile Financial Services (MFS)"** proposes a possible approach to reduce high retail and wholesale telecommunication charges related to mobile financial service (MFS).
- ❖ **Recommendation ITU-T D.264 "Shared use of spectrum and telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications"** (under approval) proposes a set of possible methods to help telecommunication providers save costs and enhance efficiency through the shared use of spectrum and telecommunication infrastructure, including passive infrastructure sharing, active infrastructure sharing and spectrum sharing in the active infrastructure sharing.
- ❖ **Technical Report DSTR-DFSECO "Digital Financial Services – The Digital Financial Services Ecosystem"** defines the Digital Financial Services ecosystem and describes the players and their roles within the Ecosystem. These players include users (consumers, businesses, government agencies and non-profit groups) who have needs for digital and interoperable financial products and services; providers (banks, other licensed financial institutions, and non-banks) who supply those products and services through digital means; the financial, technical, and other infrastructures that make them possible; and the governmental policies, laws and regulations which enable them to be delivered in an accessible, affordable, and safe manner. The Technical Report recognizes a goal of reaching "digital liquidity" – a state wherein consumers and businesses are content to leave their funds in digital form, therefore reducing the burden of the "cash-in", "cash-out" process. Various high-level challenges and issues in the ecosystem are acknowledged in this Technical Report: many of these are the subject of more detailed reports produced by the Focus Group. Finally, this Technical Report looks at the many products and services that comprise the DFS ecosystem.
- ❖ **Technical Report DSTR-DFSREG "Digital Financial Services – Regulation in the Digital Financial Services Ecosystem"** outlines the categories of regulation, defines the corresponding sub-issues or topics and highlights the financial inclusion of each topic. This Technical Report also addresses key issues related to managing the regulatory environment. It outlines a survey of how regulators currently work together, provide a draft memorandum of understanding template for Authorities in a given country to formally outline joint goals and methods of working together, and outline considerations if regulators are interested in formalizing cross-border collaborations.
- ❖ **Technical Report DSTR-DFSSNDL "Impact of social networks on digital liquidity"**: Social networks enable users to chat, share photos, and perform similar social activities. As social networks mature, they continually add commercial services such as person-to-person (P2P) payments, shopping at physical stores, and 'conversational commerce' via chat applications.
- ❖ **Technical Report DSTR-DFSCA "Competition Aspects of Digital Financial Services"** enumerates a sampling of competition issues stemming primarily from access to, and the use of technology in, the digital financial services (DFS) ecosystem from the perspective of its stakeholders. The Technical Report outlines competition issues that

have been identified by the author based on publicly available and ventilated examples and studies of DFS ecosystems worldwide, as of January 2017. Insights from market participants, analysts, and regulators participating in the ITU Focus Group on DFS and externally are also included. Country examples are from: Bangladesh, China, Colombia, Georgia, Ghana, India, Jordan, Kenya, Malawi, Mexico, Nepal, Nigeria, Pakistan, Peru, Philippines, South Africa, Sri Lanka, Tanzania, Uganda, Zambia, and Zimbabwe. In some instances, multiple competition-related issues in the DFS ecosystem in a country may manifest. As a pure information resource for the DFS Focus Group, this study does not make any conclusions or recommendations as to how the issues described may be approached or resolved.

- ❖ **Technical Report DSTR-DFS RP “The Regulator’s Perspective on the Right Timing for Inducing Interoperability - Findings of a survey among Focus Group Members”:** Interoperability has been understood as a relevant aspect in fostering the financial inclusion efforts made through the availability of digital financial services (DFS). Despite the fact that some consensus has been achieved and the regulator can now have an important role in inducing interoperability, the right timing for and scope of the regulator’s actions is still an open discussion. This Technical Report provides insights shared by five regulators who participated in the DFS Focus Group WG on Interoperability. Although it is impossible to generalize conclusions from the survey, some similarities across the surveyed countries can be observed.
- ❖ **Technical Report DSTR-DFS PI “Digital Financial Services – Access to Payment Infrastructures”:** Non-banks are having an increasing role in payments, including the provision of payments services directly to end-users. Despite this increasing role, many of them are still not accepted as direct participants of key payment infrastructures, which often leads to limited or null interoperability in the services/products they offer. Moreover, being able to use key payment infrastructures at a reasonable cost and with appropriate service levels is an important element underlying a competitive payments market.
- ❖ **Technical Report DSTR-DFS UA AFR “Digital financial services – Review of DFS User Agreements in Africa: A Consumer Protection Perspective”** explains the findings from an analysis of DFS user agreements in nine African countries and attempts to understand the overall consumer experience and whether or not there is a disconnect between contract provisions and the legal and regulatory provisions governing DFS. It highlights key findings, and makes a number of recommendations for action by the appropriate regulator in the various markets examined. Countries need to take these considerations into account as they continue to nurture their DFS markets so as to safeguard customers from harmful practices and ensure trust in the market.
- ❖ **Technical Report DSTR-DFS CP “Digital Financial Services – Commonly identified Consumer Protection themes for Digital Financial Services”** is a synthesis of existing research, legal provisions, guidelines, and other related resources related to consumer protection for digital financial services. This Technical Report identifies four common themes that policy makers or regulators may want to consider when developing laws, regulations, or guidelines related to DFS.

- ❖ **Technical Report DSTR-DFSMR “Digital Financial Services – Main recommendations”** outlines the main recommendations of the ITU Focus Group on Digital Financial Service (FG-DFS) and identifies key areas where intervention by regulators, DFS operators and policymakers are needed to create a conducive environment for digital financial services.

83. Results of ITU-T study groups on Action Line C2:

- ❖ **Recommendation ITU-T E.217 (revised) “Maritime communications - Ship station identity”**: For the purposes of International Public Correspondence Telecommunication, the ship station identity is now only relevant for those existing systems that have the ship station identity embedded in the numbering scheme as illustrated in Annexes A and B. For future systems that will not embed the ship station identity in their numbering scheme the ship station identity ceases to have any relevance for public correspondence telecommunication purposes. This revision of E.217 includes relevant text from E.210 as it combines both of those Recommendations into E.217. In addition it reflects changes that have occurred within the existing family of services provided by Inmarsat that impact the provision of Global Maritime Distress and Safety System (GMDSS). For historical accuracy this revised version also reflects details of the provision of Inmarsat services prior to the expansion of the E.164 numbering plan (ITU-T Recommendation E.164 'The international public telecommunication numbering plan') from a maximum of 12 to 15 digits.
- ❖ **Recommendation ITU-T E.805 “Strategies to establish quality regulatory frameworks”** (under approval) provides guidance to regulators aiming to establish national or regional regulatory frameworks to monitor and measure quality of service (QoS) and quality of experience (QoE).
- ❖ **Recommendation ITU-T E.806 “Measurement campaigns, monitoring systems and sampling methodologies to monitor the QoS in mobile networks”** describes a baseline framework of best practices for measuring QoS in mobile networks. It provides a high-level overview of measurement campaigns, monitoring systems characteristics and requirements, post-processing general recommendations and sampling methodologies to monitor mobile electronic services. This Recommendation is technology-neutral but may state different requirements depending on the services being measured.
- ❖ **Recommendation ITU-T F.743.7 “Requirements for big data enhanced visual surveillance services”** defines requirements for big data enhanced visual surveillance service. It promotes the value of visual surveillance service by using big data analytics method and tools. Massive data of video, event and sensing are analysed to support enhanced visual surveillance service including video retrieval, event detection and status prediction. This Recommendation provides application scenarios, service requirements, functional requirements, performance and security requirements for big data enhanced visual surveillance service.
- ❖ **Recommendation ITU-T F.743.9 “Use-cases and requirements for multimedia CDN”** illustrates content delivery network, and defines the use cases for multimedia CDN in two categories: content delivery and capability use cases, as well as the requirements for CDN. This Recommendation is intended to give the references for CDN providers

and the customers of CDN when they build the infrastructures of a CDN or choose to use a CDN.

- ❖ **Recommendation ITU-T F.746.9 “Requirements and architecture for indoor conversational robot system”** defines requirements and architecture for in-door conversational robot system. In-door conversational robot system is one of the Artificial Intelligence applications equipped with speech interface that enables users to have a dialog with the robot. This recommendation defines requirements, architecture and functions for in-door conversational robot system. The scope of this Recommendation is focused on architecture, terminals, servers, and interfaces among modules. This Recommendation will allow users of the in-door conversational robot system to be able to experience convenient information services in various areas with user-friendly speech-dialog interfaces.
- ❖ **Recommendation ITU-T F.749.10 “Requirements for communication service of civilian unmanned aerial vehicle”** specifies requirements for communication services of civilian unmanned aerial vehicle (CUAV), including general communication service framework, communication system requirements, requirements for flight control communication and flight data transport, and requirements for mission payload communication service (such as audio / video / images transport, sensor data transport and communication signal relay). Use cases are presented in industry and consumer application areas such as agriculture and plant protection, power line and petroleum pipeline inspection, police & traffic security surveillance, natural disaster monitoring, aerial photography & video, logistics express delivery, meteorological, resource and science research, etc. This Recommendation provides communication service requirements behind all kinds of CUAV applications.
- ❖ **Recommendation ITU-T G.1028 (revised) “End-to-end quality of service for voice over 4G mobile networks”** provides guidelines concerning the key aspects impacting end-to-end performance of managed voice applications over LTE networks and how they can be properly assessed using current elements of knowledge. Some typical end-to-end scenarios are described, involving cases with LTE access at both sides of the communication, or with a different access technology at one side (wireless or wireline access). These scenarios are based on typical reference connections defined in this Recommendation, composed of various segments, including: terminal, wireless access, backhaul network, core network. Considerations regarding the sharing of the budget of some key parameters and the location where they can be assessed across these segments are provided.
- ❖ **Recommendation ITU-T G.1028.1 “End-to-end QoS for Video Telephony over 4G mobile networks”** provides guidelines concerning the key aspects impacting end-to-end performance of carrier-grade (in opposition to over-the-top approaches, which are outside of the scope here) conversational video services over LTE networks, also known as ViLTE, as defined by the GSMA. It more so identifies the preconditions for an optimally operating ViLTE network and in conclusion provides remedial measures that operators can leverage to address the associated impact of QoS degradations in the LTE network.
- ❖ **Recommendation ITU-T G.1028.2 “Assessment of the LTE circuit switched fall back -**

impact on voice QoS”: While the LTE circuit switched fall back (CSFB) can be considered as a procedure separated from voice service delivery over LTE, it has an impact on the QoS for the voice services and is therefore worth of attention and consideration. Indeed, operators have to make sure that clients purchasing LTE-capable devices must keep the level of QoS they used to have with their former 2G and 3G devices, even when VoLTE is not available (for any reason: network, device). Therefore, specific and complementary KPIs are proposed in this Recommendation, together with procedures for their assessment. It should be noted that this Recommendation focuses only on the specific impact of CSFB, the information it contains must be considered as a complement to provision already provided in the Recommendation ITU-T G.1028: “End-to-end quality of service for voice over 4G mobile networks”.

- ❖ **Recommendation ITU-T G.107.1 (revised) “Wideband E-model”** gives the algorithm for the wideband (WB) version of the E-model as the common ITU-T transmission rating model for planning speech services that provide WB speech transmission (50-7000 Hz). This computational model can be useful to transmission planners, to help ensure that users will be satisfied with end-to-end transmission performance. The primary output of the model is a scalar rating of transmission quality. A major feature of this model is the use of transmission impairment factors that reflect the effects of different types of degradations occurring on the entire transmission path, mouth-to-ear. This WB-E-model is an adapted version of the narrowband (NB) (300-3400 Hz) E-model, typically referred to as “the E-model”, which is described in Recommendation ITU-T G.107. It does not replace the NB E-model. Instead, it describes a separate WB version of the model that uses, within limits, similar concepts and input parameters as the NB E-model.
- ❖ **Recommendation ITU-T G.107.2 (revised) “Fullband E-model”** gives the algorithm for the fullband (FB) version of the E-model as the common ITU-T transmission rating model for planning speech services that provide FB speech transmission (20-20000 Hz). This computational model can be useful to transmission planners, to help ensure that users will be satisfied with end-to-end transmission performance. The primary output of the model is a scalar rating of transmission quality. A major feature of this model is the use of transmission impairment factors that reflect the effects of different types of degradations occurring on the entire transmission path, mouth-to-ear.
- ❖ **Recommendation ITU-T G.671 (revised) “Transmission characteristics of optical components and subsystems”** (under approval) covers the transmission-related aspects of all types of optical components used in long-haul networks and access networks. A broad range of types of optical components is included in this Recommendation. This Recommendation also includes transmission characteristics of optical components under the full range of operating conditions, but does not specify the operating service conditions, installation aspects or other aspects of components not affecting the optical transmission path. This Recommendation also draws upon the relevant IEC definitions and test methods where applicable.
- ❖ **Recommendation ITU-T G.709.1/Y.1331.1 (2018) Amd.1 “Flexible OTN short-reach interfaces: Amendment 1”** (under approval) contains editorial changes to the second edition (06/2018) of ITU-T Recommendation G.709.1/Y.1331.1.

- ❖ **Recommendation ITU-T G.709.1/Y.1331.1 Amd.1 “Flexible OTN short-reach interfaces: Amendment 1”** contains editorial changes to the second edition (06/2018) of ITU-T Recommendation G.709.1/Y.1331.1.
- ❖ **Recommendation ITU-T G.709.3/Y.1331.3 Amd.1 “Flexible OTN long-reach interfaces: Amendment 1”** contains extensions to the first edition (06/2018) of ITU-T Recommendation G.709.3/Y.1331.3.
- ❖ **Recommendation ITU-T G.709/Y.1331 (2016) Amd.3 “Interfaces for the optical transport network (OTN): Amendment 3”** contains extensions to the fifth edition (06/2016) of ITU-T Recommendation G.709/Y.1331.
- ❖ **Recommendation ITU-T G.709/Y.1331 (2016) Amd.3 “Interfaces for the optical transport network (OTN): Amendment 3”** (under approval) contains extensions to the fifth edition (06/2016) of ITU-T Recommendation G.709/Y.1331.
- ❖ **Recommendation ITU-T G.709/Y.1331 (2016) Amd.3 “Interfaces for the optical transport network (OTN): Amendment 3”** (under approval) contains extensions to the fifth edition (06/2016) of ITU-T Recommendation G.709/Y.1331.
- ❖ **Recommendation ITU-T G.798 (2017) Amd.2 “Characteristics of optical transport network hierarchy equipment functional blocks - Amendment 2”** (under approval) specifies both the components and the methodology that should be used in order to specify the optical transport network (OTN) functionality of network elements; it does not specify individual optical transport network equipment. Amendment 2 contains text modifications and additions for:
 - OTSi to OTU4 adaptation function with SC-FEC.
 - OTSi to FlexO-1-SC adaptation function.
 - alignment with ITU-T G.709.1.
- ❖ **Recommendation ITU-T G.807 “Generic functional architecture of the optical media network”** (under approval) describes the generic functional architecture of the optical media network that supports the propagation of signals in the context of a transport network. This description is independent of the client digital information that is being carried by a signal in the media network.
- ❖ **Recommendation ITU-T G.808.2 “Generic protection switching – Ring protection”** (under approval) defines the generic functional models, characteristics and processes associated with various ring protection schemes for connection oriented networks; e.g., optical transport networks (OTNs), synchronous digital hierarchy (SDH) networks, and MPLS transport profile (MPLS-TP) networks. It also defines the objectives and applications for these schemes. The protection scheme described in this Recommendation is shared ring protection. Generic functional models, characteristics and processes for linear protection and interconnected subnetwork protection schemes are defined in other Recommendations.
- ❖ **Recommendation ITU-T G.872 (revised) “Architecture of optical transport networks (OTN)”** (under approval) describes the functional architecture of the optical transport network (OTN) using the modelling methodology described in Recommendations ITU-T G.800, ITU-T G.805 and ITU-T G.807. The OTN functionality is described from a

network level viewpoint, taking into account, client characteristic information, client/server layer associations, networking topology, layer network functionality and optical media network structure, that provide multiplexing, routing and supervision of digital clients. The media portion of the network is described in terms of media constructs, media elements and optical signal maintenance entities.

- ❖ **Recommendation ITU-T G.7041/Y.1303 (2016) Amd.1 “Generic framing procedure – Amendment 1”** (under approval) contains edits to enhance the clarity of the client bit numbering for the GFP-F mappings, especially the SSM bit numbering in clause 7.11. It also includes editorial corrections to labelling in four additional figures.
- ❖ **Recommendation ITU-T G.7710/Y.1701 (revised) “Common equipment management function requirements”** (under approval) addresses the equipment management functions (EMFs) inside a transport network element that are common to multiple technologies. For example, common applications are described for date and time, fault management, configuration management, account management, performance management and security management. These applications result in the specification of common EMF functions and their requirements.

The 2012 revision of this Recommendation has incorporated the following below.

- Recommendation ITU-T G.7710/Y.1701 Corrigendum 1 (11/2009):
this mainly contains an updated equipment management function process block diagram.
- Recommendation ITU-T G.7710/Y.1701 Amendment 1 (07/2010):
updates the packet layer related specification of severely errored second (SES) to align it with the SES definition in Recommendation ITU-T Y.1563.
- Recommendation ITU-T G.7710/Y.1701 Corrigendum 2 (04/2011):
this adds the missing 6 LBC terms to the process description, and gives additional specifications on gauge measurement.

The 2019 revision of this Recommendation has incorporated the following below.

- Recommendation ITU-T G.7710/Y.1701 Amendment 1 (9/2016):
- Create new clause 12 for control plane function management, including fault event reporting for controller-based restoration.
- ❖ **Recommendation ITU-T G.7712/Y.1703 (revised) “Architecture and specification of data communication network”** (under approval) defines the architecture requirements for a data communication network (DCN) which may support distributed management communications related to the telecommunication management network (TMN), distributed control plane communications (e.g., signalling and routing) related to the automatically switched optical network (ASON), distributed control plane communications (e.g., signalling and routing) related to multiprotocol label switching – transport profile (MPLS-TP), control plane communications related to Software Defined Networking (SDN), and other distributed communications (e.g., orderwire or voice communications, software download). The DCN architecture considers networks that are IP only, OSI-only, and mixed (i.e., support both IP and OSI). The interworking

between parts of the DCN supporting IP-only, parts supporting OSI only, and parts supporting both IP and OSI are also specified – other protocols (other than IP or OSI) are outside the current scope of this Recommendation.

Various applications (e.g., TMN, ASON, etc.) require a packet-based communications network to transport information between various components. For example, the TMN requires a communications network, which is referred to as the management communication network (MCN) to transport management messages between TMN components (e.g., network element function (NEF) component and operations system function (OSF) component). ASON and MPLS-TP require communication networks, which are referred to as the signalling communication networks (SCNs) to transport signalling and routing messages between functional control plane components (e.g., connection controller (CC) components and routing controller (RC) components). This Recommendation specifies data communication functions that can be used to support one or more application's communication network.

The data communication functions provided in the 11/2001 version of this Recommendation support connectionless network services. The 03/2003 revision of this Recommendation adds the support of connection-oriented network SCN services by including a specific MPLS-based mechanism.

This 2010 revision of this Recommendation provides the requirements for the MPLS transport profile (MPLS-TP) signalling communication channel (SCC) and management communication channel (MCC) data communication functions. The part of this Recommendation that addresses MPLS for transport networks complies with the transport profile of MPLS architecture as defined by IETF. In the event of a difference between this ITU-T Recommendation and any of the normatively referenced RFCs for MPLS-TP, the RFCs will take precedence.

This Recommendation forms part of a family of Recommendations covering transport networks.

- ❖ **Recommendation ITU-T G.8052/Y.1346 (revised) “Protocol-neutral management information model for the Ethernet transport capable network element”** contains the protocol neutral UML information model for Ethernet transport network (NE) management. The model is based on the Ethernet equipment functions specified in Recommendation ITU-T G.8021/Y.1341, generic management requirements in Recommendation ITU-T G.7710/Y.1701, and Ethernet specific management requirements in Recommendation ITU T G.8051/Y.1345. The 2016 revision of this Recommendation changes the UML modelling tool from RSA to open source Papyrus tool, updates the Recommendation ITU-T G.8052/Y.1346 information model to align it with the Recommendation ITU-T G.7711/Y.1702 v2.0 Core information model, drops subclassing of the TP classes from Recommendation ITU-T M.3160, and supports the additional management requirements in Recommendation ITU-T G.8051/Y.1345. The 2018 revision of this Recommendation up-versions the UML model tool to Papyrus v3.2.0 and the profile to v0.2.13, deletes ODUkP-X-L (from the CsfRdiFdiEnableSink_Pac, CsfRdiFdiEnableSource_Pac, and CsfReportSink_Pac), replace ETY termination points with ETHnull termination points, removes ODUkp/ETH_A and ODU2P/ETHPP-OS_A, adds Annex A for the Ethernet Spec model.

- ❖ **Recommendation ITU-T G.8133 “Dual-Homing Protection for MPLS-TP Pseudowires”** (under approval) provides architecture and mechanisms for Pseudowire (PW) dual-homing protection in MPLS transport profile (MPLS-TP) networks. It also describes the Dual-Homing Coordination (DHC) protocol defined in [IETF RFC 8184] and [IETF RFC 8185]. The mechanisms defined herein protect point-to-point MPLS-TP PWs against failures within or at the edges of the MPLS-TP network.
- ❖ **Recommendation ITU-T G.8152/Y.1375 (revised) “Protocol-neutral management information model for the MPLS-TP network element”** contains the protocol neutral unified modelling language (UML) model for multi-protocol label switching – transport profile (MPLS-TP) network element (NE) management. This Recommendation provides a representation of the MPLS-TP technology using the methodologies that have been used for other transport technologies (e.g., SDH, OTN and Ethernet). The 2018 revision of this Recommendation up-versions the UML model tool to Papyrus v3.2.0 and the profile to 0.2.13. Updates the model to add the MEP proactive measurement MI, MEP configuration MI, and MIP configuration MI, add the Spec model for MPLS-TP model, replace the G.8152NE and MT_NE by the MMPLS-TP Constraint Domain, and MT_SubnetworkProtectionGroup specifies the FcSwitch, and MT_CrossConnection specifies the ForwardingConstruct.
- ❖ **Recommendation ITU-T G.8261/Y.1361 (revised) “Timing and synchronization aspects in packet networks”** (under approval) defines frequency synchronization aspects in packet networks. It specifies the maximum network limits of jitter and wander that shall not be exceeded. It specifies the minimum equipment tolerance to jitter and wander that shall be provided at the boundary of these packet networks at TDM and synchronization interfaces. It also outlines the minimum requirements for the synchronization function of network elements.

The requirements for the jitter and wander characteristics that are specified in this Recommendation must be adhered to in order to ensure interoperability of equipment produced by different manufacturers and a satisfactory network performance.

This revision to Recommendation ITU-T G.8261 (2013) provides the following updates:

 - Addition of Clause 9.2.1.4 (Enhanced Synchronous Equipment Clock network limits)
 - Addition of frequency requirements for LTE and NR to Appendix IV
 - Addition of Appendix XIV.
- ❖ **Recommendation ITU-T G.8262.1/Y.1362.1 “Timing characteristics of enhanced synchronous equipment slave clock”** outlines requirements for timing devices used in synchronizing network equipment that uses the physical layer to deliver frequency synchronization. This Recommendation defines the requirements for clocks, e.g., bandwidth, frequency accuracy, holdover and noise generation.
- ❖ **Recommendation ITU-T G.8262.1/Y.1362.1 (01/2019) Amd.1 “Timing characteristics of enhanced synchronous equipment slave clock: Amendment 1”** (under approval) outlines requirements for timing devices used in synchronizing network equipment that uses the physical layer to deliver frequency synchronization. This Recommendation defines the requirements for clocks, e.g., bandwidth, frequency accuracy, holdover and noise generation.

Amendment 1 to Recommendation ITU-T G.8262.1/Y.1362.1 (01/2019) provides the following updates:

- Adds requirements for clause 9.1
 - Replaces clause 9.3.1 with a reference to clause 9.2.1 of [ITU-T G.8262].
 - Adds “enhanced” to the “synchronous OTN interface” in clause 9.3.3
 - Changes in Clause 11.1: defines parameter S; defines parameter T (except for OTN interfaces)
 - Changes in Clause 11.2: define parameter a2; changes figure 8 to start at 15s.
 - Adds “Synchronous OTN interfaces” in Clause 12
 - Adds text to Appendix IV
 - Adds Appendix V.
- ❖ **Recommendation ITU-T G.8265.1/Y.1365.1 Amd.1 “Precision time protocol telecom profile for frequency synchronization – Amendment 1”** (under approval) makes the following changes:
- Add notes to the quality level to clockClass mappings table in clause 6.7.3.1.
- ❖ **Recommendation ITU-T G.8271.1 (10/2017) Amd.2 “Network limits for time synchronization in packet networks: Amendment 2”** (under approval) specifies the maximum network limits of phase and time error that shall not be exceeded. It specifies the minimum equipment tolerance to phase and time error that shall be provided at the boundary of packet networks at phase and time synchronization interfaces. It also outlines the minimum requirements for the synchronization function of network elements. This Recommendation addresses the case of time and phase distribution across a network by a packet-based method with full timing support to the protocol level from the network.

Amendment 2 to Recommendation ITU-T G.8271.1 (10/2017) provides the following updates:

- Updated references
 - Addition of information to Clause 7
 - Revision of Appendix II
 - Revision of Appendix VII
 - Revision of Appendix XI
 - New Appendix XII.
- ❖ **Recommendation ITU-T G.8271.2 Amd.2 “Network limits for time synchronization in packet networks with partial timing support from the network: Amendment 2”** provides updates.
- ❖ **Recommendation ITU-T G.8272.1/Y.1367.1 Amd.2 “Timing characteristics of enhanced primary reference time clocks - Amendment 2”** (under approval) provides the following updates:

- Added case where ePRTC includes an integrated T-GM clock.
- ❖ **Recommendation ITU-T G.8273.2/Y.1368.2 Amd.2 “Timing characteristics of telecom boundary clocks and telecom time slave clocks - Amendment 2”** replaces text in the Scope, in clauses 2, 4, 7.1, 7.1.1, 7.1.2, 7.4.1.2, C.2.4.1.2, and in Annex B. It adds Annex D. It replaces text in Appendices I, II, and V. It replaces text, table and figure in Appendix III and VI.
- ❖ **Recommendation ITU-T G.8273.2/Y.1368.2 (revised) “Timing characteristics of telecom boundary clocks and telecom time slave clocks”** (under approval) specifies minimum requirements for time and phase for telecom boundary clocks and telecom time slave clocks used in synchronization network equipment that operates in the network architecture as defined in Recommendations ITU-T G.8271, ITU-T G.8271.1, ITU-T G.8275 and ITU-T G.8275.1. It supports time and/or phase synchronization distribution for packet based networks.
 This version of the Recommendation only applies to full timing support from the network.
 These requirements apply under the normal environmental conditions specified for the equipment.
- ❖ **Recommendation ITU-T G.8273.3/Y.1368.3 Amd.1 “Timing characteristics of telecom transparent clocks - Amendment 1”** changes the notes in clauses 7.1.1, 7.1.2 and 7.13. It also adds Appendix III.
- ❖ **Recommendation ITU-T G.8275/Y.1369 Amd.2 “Architecture and requirements for packet-based time and phase distribution - Amendment 2”** (under approval) provides the following updates:
 - Add a profile translation to Appendix III
 - Add a functional model for cnPRTC to Appendix VI.
- ❖ **Recommendation ITU-T G.8275.1/Y.1369.1 Amd.3 “Precision time protocol telecom profile for phase/time synchronization with full timing support from the network - Amendment 3”** (under approval) provides the following updates:
 - G.8272.1 and G.8273.3 references added along with related supporting text
 - Native OTN transport added to this profile.
- ❖ **Recommendation ITU-T G.8275.2/Y.1369.2 Amd.3 “Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network - Amendment 3”** (under approval) provides the following updates:
 - G.8272.1 reference added
 - Convention T-BC-P/A added as a concise way to refer to T-BC-P or T-BC-A
 - Convention T-TSC-P/A added as a concise way to refer to T-TSC-P or T-TSC-A
 - Added Appendix VIII Operations over link aggregation.
- ❖ **Recommendation ITU-T G.875 (revised) “Optical transport network: Protocol-neutral management information model for the network element view”** provides a protocol-neutral management information model for managing network elements in the optical transport network (OTN). The model contains the managed entities and their properties that are useful to describe the information exchanged across interfaces defined in the ITU-T M.3010 telecommunications management network (TMN) architecture. The

protocol-neutral management information model shall be used as the base for defining protocol-specific management information models, for example, common management information service element (CMISE), common object request broker architecture (CORBA) and simple network management protocol (SNMP) information models. Mapping from the protocol-neutral entities into protocol-specific objects is a decision of the specific protocol modelling design and should be described in the protocol-specific information model Recommendations.

- ❖ **Recommendation ITU-T G.9700 (revised) “Fast access to subscriber terminals (G.fast) – Power spectral density specification”** specifies power spectral density (PSD) mask requirements for fast access to subscriber terminals (G.fast), a set of tools to support reduction of the transmit PSD mask, profile control parameters that determine spectral content, including the allowable maximum aggregate transmit power into a specified termination impedance, and a methodology for transmit PSD verification. It complements the physical layer (PHY) specification in Recommendation ITU T G.9701.

Amendment 1 provided support for a new 106 MHz profile with +8 dBm maximum aggregate transmit power.

Amendment 2 aligns the text of clause 6.5 on notching of specific frequency bands with ITU-T G.9701 (2014) and its latest amendments, completes the specification of 212 MHz profiles, adds Annex X "Adaptation to the coax medium" in support of Annex X "Operation without multi-line coordination intended for a crosstalk free environment" that has been specified in amendment 3 to ITU-T G.9701, and updates the table of International amateur radio frequencies in Appendix I.

The 2019 version of ITU-T G.9700 integrates the previous version and its amendments, and adds a new 106 MHz limit PSD mask intended to be used for transmission over networks with increased shielding, such as those with shielded cables or where cables are buried underground.

- ❖ **Recommendation ITU-T G.9701 (revised) “Fast access to subscriber terminals (G.fast) – Physical layer specification”** specifies a gigabit broadband access technology that exploits the existing infrastructure of wire-pairs that were originally deployed for plain old telephone service (POTS) services. Equipment implementing this Recommendation can be deployed from fibre-fed distribution points (fibre to the distribution point, FTTdp) located very near the customer premises, or within buildings (fibre to the building, FTTB). This Recommendation supports asymmetric and symmetric transmission at an aggregate net data rate up to 1 Gbit/s on twisted wire-pairs using spectrum up to 106 MHz and specifies all necessary functionality to support far-end crosstalk (FEXT) cancellation between multiple wire-pairs, and facilitates low power operation.
- ❖ **Recommendation ITU-T G.9701 (2019) Amd.1 “Fast access to subscriber terminals (G.fast) – Physical layer specification – Amendment 1”** (under approval) includes enhancements to DTA functionality.
- ❖ **Recommendation ITU-T G.9710 “Multi-gigabit fast access to subscriber terminals (MGfast) – Power spectral density specification”** (under approval) specifies power spectral density (PSD) mask requirements for Multi-gigabit fast access to subscriber

terminals (MGfast), a set of tools to support reduction of the transmit PSD mask, and a methodology for transmit PSD verification. It supports operation over both twisted pair and coaxial cable media.

- ❖ **Recommendation ITU-T G.9803 “Radio over fiber systems”** defines fundamental architecture and requirements for radio over fiber system and specifies radio over fiber transmission systems suitable for access network and radiolocation applications.
- ❖ **Recommendation ITU-T G.9804.1 “Higher Speed Passive Optical Networks: Requirements”** (under approval) serves as a guide to the development of higher speed PON systems, by identifying sets of applications that can be addressed by a particular system, and defining the requirements for each of those systems. It is anticipated that there may have several distinct systems, such as higher speed single channel (TDMA-PON), higher speed multi-channel (TWDM-PON), and higher speed point to point overlay PONs.
- ❖ **Recommendation ITU-T G.984.2 (revised) “Gigabit-capable Passive Optical Networks (G-PON): Physical Media Dependent (PMD) layer specification”** (under approval) describes a flexible optical fibre access network capable of supporting the bandwidth requirements of business and residential services, and covers systems with nominal line rates of 1244.160 Mbit/s and 2488.320 Mbit/s in the downstream direction and 155.520 Mbit/s, 622.080 Mbit/s, 1244.160 Mbit/s and 2488.320 Mbit/s in the upstream direction. Both symmetrical and asymmetrical (upstream/downstream) Gigabit-capable Passive Optical Network (GPON) systems are described. This Recommendation proposes the physical layer requirements and specifications for the Physical Media Dependent (PMD) layer. The Transmission Convergence (TC) layer and ranging protocol for GPON systems are described in a different ITU-T Recommendation. This Recommendation describes a system that represents an evolutionary development from the system described in ITU-T Rec. G.983.1. To the greatest extent possible, this Recommendation maintains the requirements of ITU-T Rec. G.983.1 to insure maximal continuity with existing systems and optical fibre infrastructure. In addition, it describes several enhanced optical budgets (B+, C+, and D) to extend that capability. The necessary parameters are defined to support optical layer supervision.
- ❖ **Recommendation G.988 (2017) Amd.2 “ONU management and control interface (OMCI) specification - Amendment 2”** (under approval) contains updates to ITU-T G.988 (2018 Amd 1). This amendment adds support for DC voltage based visual message indicators in G.988 VOIP application service profile ME. This amendment makes editorial changes on Extended VLAN.
- ❖ **Recommendation ITU-T G.989.2 (revised) “40-Gigabit-capable passive optical networks 2 (NG PON2): Physical media dependent (PMD) layer specification”** specifies the physical media dependent (PMD) layer requirements for a passive optical network (PON) system with a nominal aggregate capacity of 40 Gbit/s in the downstream direction and 10 Gbit/s in the upstream direction, hereinafter referred to as NG-PON2. NG-PON2 is a flexible optical fibre access network capable of supporting the bandwidth requirements of mobile backhaul, business and residential services. Furthermore, this Recommendation describes optional configurations, to extend beyond this nominal capacity, as the ITU-T G.989 series of Recommendations allows for multiple upstream

and downstream line rates. This Recommendation specifies the characteristics of hybrid time and wavelength division multiplexing (TWDM) channels, referred to as TWDM PON. The characteristics of optional, tunable point-to-point wavelength overlay channels are also described, referred to as point-to-point wavelength division multiplexing (PtP WDM) PON. The TWDM PON described in this Recommendation represents a further development from the systems described in the ITU-T G.984 and ITU-T G.987 series of Recommendations. To the greatest extent possible, this Recommendation retains the requirements of ITU-T G.984.1 and ITU-T G.987.1 to ensure maximal reuse of existing technology and compatibility with deployed optical access systems and optical fibre infrastructure. Edition 2.0 continues the maintenance and evolution of physical media dependent (PMD) layer specification.

- ❖ **Recommendation ITU-T G.989.3 Amd2 “40-Gigabit-capable passive optical networks (NG PON2): Transmission Convergence (TC) layer specification”** continues the evolution of NG-PON2 Transmission Convergence (TC) layer, introducing TWDM channel bonding, making additions and changes to the PLOAM channel, providing DBA enhancements, and performing regular specification maintenance.
- ❖ **Recommendation ITU-T G.993.2 (revised) “Very high speed digital subscriber line transceivers 2 (VDSL2)”** specifies an access technology that exploits the existing infrastructure of copper wires that were originally deployed for POTS services. It can be deployed from central offices, from fibre-fed cabinets located near customer premises, or within buildings. This Recommendation is an enhancement to ITU T G.993.1 that supports asymmetric and symmetric transmission at a bidirectional net data rate up to 200 Mbit/s on twisted pairs using a bandwidth up to 30 MHz. This version of this Recommendation integrates all the previous amendments and corrigenda with the 2011 version of Recommendation ITU-T G.993.2.
- ❖ **Recommendation ITU-T G.993.5 (revised) “Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers”** is specifically limited to the self-far-end crosstalk (self-FEXT) cancellation in the downstream and upstream directions. It defines a single method of self-FEXT cancellation, in which FEXT generated by a group of near-end transceivers and interfering with the far-end transceivers of that same group is cancelled. This cancellation takes place between very high-bit-rate digital subscriber line 2 (VDSL2) transceivers, not necessarily of the same profile. This Recommendation is intended to be implemented in conjunction with Recommendation ITU T G.993.2. This version of this Recommendation integrates all of the previous amendments and corrigenda with the 2015 version 2.0 of Recommendation ITU-T G.993.5.
- ❖ **Recommendation ITU-T G.997.1 (revised) “Physical layer management for digital subscriber line transceivers”** specifies the physical layer management for asymmetric digital subscriber line (ADSL) and very high speed digital subscriber line 2 (VDSL2) transmission systems. It specifies means of communication on a transport transmission channel defined in the physical layer Recommendations ITU-T G.992.1, ITU-T G.992.2, ITU-T G.992.3, ITU-T G.992.4, ITU T G.992.5 and ITU-T G.993.2. It specifies network elements (NE) content and syntax for configuration, fault and performance management. The revision of this Recommendation includes the management information base (MIB) elements for the physical layer management of Recommendation ITU T G.993.2 and additional MIB elements for the physical layer

management of Recommendations ITU T G.992.3 and ITU-T G.992.5. The 2018 edition of this Recommendation integrates ITU-T G.997.1 (2016) and all its amendments and corrigenda.

- ❖ **Recommendation ITU-T G.997.2 (revised) “Physical layer management for G.fast transceivers”** specifies the physical layer management for fast access to subscriber terminals (G.fast) transmission systems. It specifies managed objects for configuration, fault, status, inventory and performance management. The 2018 edition of this Recommendation integrates ITU-T G.997.2 (2015) and all its amendments and corrigenda.
- ❖ **Recommendation ITU-T G.999.1 (revised) “Interface between the link layer and the physical layer for digital subscriber line (DSL) transceivers”** defines a point-to-point interface between the LINK layer device such as a network processor and a PHY device supporting multiple DSL lines, such as VDSL2, ADSL2, and SHDSL.
- ❖ **Recommendation ITU-T G.9803 Amd.1 “Radio over fibre systems – Amendment 1”** (under approval) develops a new type of optical access network based on radio-over-fibre (RoF) technologies. This Recommendation describes a fundamental architecture and requirements for RoF systems. This Recommendation specifies the system overview, physical layer requirements, system requirements and co-existence with passive optical network (PON) for analogue RoF systems supporting the international mobile telecommunication (IMT) system over optical distribution network (ODN). This Recommendation also describes the system overview and physical layer requirements for analogue RoF systems supporting the foreign object debris (FOD) detection system.
- ❖ **Recommendation ITU-T G.9960 Amd.1 “Unified high-speed wire-line based home networking transceivers - System architecture and physical layer specification: Amendment 1”** (under approval) belongs to the family of ITU-T G.996x Recommendations. Recommendation ITU-T G.9960 specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers which are capable of operating over premises' wiring, including inside telephone wiring, coaxial cable, and power-line wiring. It complements the data link layer (DLL) specification in Recommendation ITU-T G.9961, and the power spectral density (PSD) specification in Recommendation ITU-T G.9964. Amendment 1 includes the extension of the Recommendation to operate on an extended bandwidth over coaxial and phoneline mediums.
- ❖ **Recommendation ITU-T G.9961 Amd.1 “Unified high-speed wireline-based home networking transceivers – Data link layer specification: Amendment 1”** (under approval) belongs to the family of ITU-T G.996x Recommendations. Recommendation ITU-T G.9961 specifies the data link layer (DLL) for wireline-based home networking transceivers capable of operating over premises wiring including inside telephone wiring, coaxial cable, and power-line wiring. It complements the system architecture and physical (PHY) layer specification in Recommendation ITU-T G.9960, and the power spectral density (PSD) specification in Recommendation ITU-T G.9964. Amendment 1 includes a new physical layer specification. This new physical layer provides new modulation mechanisms (e.g. Multi Level Coding) and Robust Communication Mode

(RCM) and allows the system to be operated over an extended bandwidth for coaxial and phonline mediums.

- ❖ **Recommendation ITU-T G.9964 (2011) Amd.3 “Unified high-speed wireline-based home networking transceivers – Power spectral density specification - Amendment 3”** (under approval) specifies the control parameters that determine spectral content, power spectral density (PSD) mask requirements, a set of tools to support reduction of the transmit PSD, means to measure this PSD for transmission over telephone wiring, power line wiring and coaxial cable, as well as the allowable total transmit power into a specified termination impedance. It complements the system architecture and physical layer (PHY) specification in Recommendation ITU-T G.9960, and the data link layer (DLL) specification in Recommendation ITU-T G.9961, as well as the modifications and additions to these Recommendations specifying the multiple input/multiple output (MIMO) home networking transceiver in Recommendation ITU-T G.9963.

Amendment 1 adds support for a new profile for 200 MHz baseband coaxial.

Amendment 2 contains the specification of spectral content for 200 MHz bandplan for telephone lines.

Amendment 3 includes the extension of the Recommendation to operate on an extended bandwidth over coaxial and phonline mediums.

- ❖ **Recommendation ITU-T G.9992 “Indoor optical camera communication transceiver – System architecture, physical layer and data link layer specification”** specifies the system architecture, physical (PHY) layer and data link layer (DLL) for indoor optical camera communication transceiver.
- ❖ **G-series Supplement “5G Wireless Fronthaul Requirements in a PON Context”** enumerates the various requirements arising from 5G wireless systems, concentrating on the fronthaul portion of the network, and considers how they compare with current and future optical access transport systems. Practical passive optical network solutions to serve the 5G fronthaul application are hypothesized.
- ❖ **G-Series Supplement G.Sup.5gotn “Application of OTN to 5G Transport”** describes the use of existing optical transport network (OTN) Recommendations [ITU T G.709] and the [ITU T G.709.x] series in order to address the requirements for supporting 5G transport in the 5G transport networks as described in [ITU T GSTR TN5G].
- ❖ **Recommendation ITU-T H.643.1 “Architecture for deployment of information centric network”** describes the functional architecture for deployment of information centric network (DICN) including functional entities, reference points and service control flows. It also describes the required DICN capabilities. This architecture can be used to flexibly support the deployment of any particular information centric network (ICN) instances and the co-existence of multiple ICN instances in one physical network. It also facilitates the interoperation between different ICN instances. It will benefit the deployment of existing ICN protocols and enable the research and development of new ICN technology.
- ❖ **Recommendation ITU-T H.644.1 “Functional architecture for virtual content delivery networks”** describes a functional architecture for virtual content delivery network (VCDN). ITU-T Recommendation F.743.4 gives an overview and the requirements for

virtual content delivery network (VCDN). This Recommendation focuses on functional architecture for VCDN. It specifies overall functional architecture, domains and functional role relationship, functional blocks, reference points, relations among physical resources, virtual resources, and LINPs (logically isolated network partition), functions and their mutual relations, and security considerations. VCDN can realize accurate infrastructure distribution and elastic resource scheduling. VCDN can integrate the resources of CDN, reduce construction cost and improve the scalability.

- ❖ **Recommendation ITU-T J.1 “Terms, definitions and acronyms for television and sound transmission and integrated broadband cable networks”** compiles all the definitions related to television and sound transmission, and integrated broadband cable networks, and which are in force in J-series and N-series Recommendations developed under the responsibility of SG9. The Recommendation is regularly updated to reflect newly-approved terms and definitions.
- ❖ **Recommendation ITU-T J.1108 “Transmission specification for Radio over IP transmission system”** provides a cost-effective adaptable solution for HFC-based cable TV network devices in optic-based cable TV network. The purpose of RoIP system is to transmit Data Over Cable Service Interface Specifications (DOCSIS) based Up Stream (US) RF signal of Cable Modem (CM) to Cable Modem Termination System (CMTS) through IP transmission in optic-based cable TV network.
- ❖ **Recommendation ITU-T J.1109 “Requirement for in-band full-duplex in HFC based network”** describes the high level general and system requirements for in-band full duplex in HFC based network. The purpose of in-band full duplex in HFC based network is to develop simultaneous transmission and reception in the same band using HFC based cable TV network.
- ❖ **Recommendation ITU-T J.1201 “The functional requirements of smart TV operating system”** specifies the functional requirements of a smart TV operating system. The smart TV operating system is intended to be installed in IBB capable cable STB and TV and to enable broadcasting and IP-based interactive services provided by cable television operators and third-party providers. By running the smart TV operating system, the IBB capable cable STB and TV will be able to intelligently provide subscribers with advanced and personalized services by downloading and installing advanced and personalized Apps from cable operators’ platforms and third-party platforms, which are interconnected with the related cable operators’ platforms. This Recommendation is the first Recommendation of a smart TV operating system series. The Recommendations for this smart TV operating system will cover functional requirements, architecture, security and APIs.
- ❖ **Recommendation ITU-T J.1202 “The Architecture of Smart TV Operating System”** defines the architecture of smart TV operating system to enable IBB capable cable STB and TV to apply to broadcasting services and IP-based interactive services provided by cable television operators and third-party providers. By running the smart TV operating system, the IBB capable STB and TV will be able to provide subscribers with advanced and personalized services by downloading and installing advanced and personalized Apps from cable operators' platforms and third-party platforms, which are interconnected with the related cable operators' platforms.

- ❖ **Recommendation ITU-T J.1210 “Requirements of IP Video Broadcast (IPVB) for CATV Networks”** specifies an IPVB technology, which simply adds a one-way IP-based video broadcast system to the existing low-cost bidirectional CATV networks (including both HFC and optical networks). The IPVB can greatly increase the bandwidth of downlink programs when using optical network, and at the same time, have the characteristics of low cost and low complexity. The IPVB in downlink transmits IP-based video streams through broadcast channels which are identified by multicast IP addresses and UDP port numbers, and broadcasts all the IP-based video streams through the CATV networks to all subscribers. By cooperating with the uplink channel provided by the existing bidirectional access networks, it is capable of providing varieties of IP-based high bitrate video services in CATV networks.’
- ❖ **Recommendation ITU-T J.1600 “Premium Cable Network Platform (PCNP) – Framework”** (under approval) specifies the framework of the Premium Cable Network Platform (PCNP) for the cable TV and broadband network that exploit the cloud based artificial intelligence and network data to optimize the network and TV services, thus enable the high satisfaction of user’s experience of perceptual aspects of services.
- ❖ **Recommendation ITU-T J.207 (revised) “Specification for integrated broadcast and broadband digital television application control framework”** was revised to update the information about the Hybridcast, HbbTV and Ginga according to the revision of Recommendation ITU-R BT.2075. As WP6B October 2018 meeting, proposed to revise the Recommendation ITU-R BT.2075 to update the information on device integration in the Hybridcast system, update of HbbTV and update of Ginga.
- ❖ **Recommendation ITU-T J.216 “Second-generation Modular Headend Architecture in systems for interactive cable television services - IP cable modems”** defines the second generation of headend architectures for high-speed data-over-cable systems. The second-generation of headend architecture introduces a number of new features that build upon what was present in previous Cabinet DOCSIS Recommendations [J.223.1] and [J.223.2]. This Recommendation includes key new features for the CMC III Device (also known as the Remote-PHY Device).

- ❖ **Recommendation ITU-T J.224 “Fifth-generation transmission systems for interactive cable television services - IP cable modems”** defines the fifth generation of high-speed data-over-cable systems. The fifth-generation transmission systems introduce a number of new features that build upon what was present in previous Recommendations [ITU-T J.112], [ITU-T J.122], [ITU-T J.222], and [ITU-T J.223]. This Recommendation includes key new features for the physical (PHY) layer and defines Full Duplex DOCSIS® Mode of operation, including enhancements to the media access control (MAC) layer protocols as well as requirements for upper layer protocols (e.g., IP, DHCP, etc.). The fifth-generation cable modem specifications fully incorporate the fourth generation specifications.
- ❖ **Recommendation ITU-T J.288 (revised) “Encapsulation of type length value (TLV) packet for cable transmission systems”** proposes an encapsulation scheme for type length value (TLV), a data structure specified in Recommendation ITU-R BT.1869, for cable transmission systems designed on the basis of Recommendation ITU-T J.83. Many of the existing digital broadcasting systems use the Motion Picture Experts Group version 2 (MPEG-2) transport stream (TS) as their input format. In contrast, variable-length packets formats such as TLV are specified for transmitting Internet protocol (IP) packets efficiently over broadcasting channels as aggregates of variable-length packets. In order to transmit TLV with the existing Recommendation ITU-T J.83 transmission system, it is necessary that variable-length TLV packets be fragmented and encapsulated into fixed-length 188-byte packets.
- ❖ **Recommendation ITU-T J.298 “Requirements and technical specifications of cable TV hybrid set-top box that has the compatibility with terrestrial and satellite TV transport”** describes the requirements and technical specifications of cable TV hybrid set-top-box that has the compatibility with terrestrial and satellite TV transport. The major purpose of the Recommendation is to specify a minimum and basic requirement for a hybrid STB, which meets the requirements for developing countries and regions. The hybrid set-top-box has full functionalities for traditional cable broadcasting services based on ITU-T Recommendation J.83, at the same time, a satellite or a terrestrial broadcast receiving functions will also be implemented in the box so as the STB be able to receive satellite or terrestrial broadcast service. The basic functionalities for IP-based interactive video services is also required so as the STB be able to support the latest IP interactive services together with legacy cable and satellite/terrestrial services.
- ❖ **Recommendation ITU-T L.163 “Criteria for optical fibre cable installation with minimal existing infrastructure”** describes criteria for the installation of optical fibre cables defined in [ITU-T L.110] in remote areas with lack of usual infrastructure for installation including the procedures of cable-route planning, cable selection, cable-installation scheme selection, cable tension and temperature consideration, and the handling, bend protection and river/lake closing of the cable together with pilot tests and training for installation. This Recommendation also describes how to mitigate the considerable risks and/or issues to which the optical fibre cable may be exposed when infrastructures are minimal during installation, maintenance and operation procedures.
- ❖ **Recommendation ITU-T M.3040 “Principles for on-site telecommunication smart maintenance”** introduces principles for on-site telecommunication smart maintenance

(TSM). In this Recommendation, the background and basic concepts of on-site telecommunication smart maintenance are provided. This Recommendation also provides details of TSM architectures, including TSM functional architecture, TSM physical architecture, TSM information architecture, and maintenance processes.

- ❖ **Recommendation ITU-T P.10/G.100 (2017) Amd. 1 “Vocabulary for performance, quality of service and quality of experience - Amendment 1: New definitions for inclusion in Recommendation ITU-T P.10/G.100”** is coordinated with a related revision to Recommendation ITU-T P.64 Determination of sensitivity/frequency characteristics of local telephone systems. Definitions for the terms ear cap and earpiece are included in Recommendation ITU T P.10/G.100.
- ❖ **Recommendation ITU-T P.1100 (revised) “Narrowband hands-free communication in motor vehicles”** describes performance requirements and test methods for narrowband hands-free communication in vehicles. This Recommendation addresses the test of complete systems, as well as the subsystems of hands-free microphones and telephones with short-range wireless transmission links used to interconnect the hands-free system to the mobile network. For testing, the test set-up and the recommended environmental conditions are described. The methods, analysis and performance parameters described in this Recommendation are based on test signals and test procedures defined in Recommendations ITU-T P.501, ITU-T P.502, ITU-T P.340 and ITU-T P.380.
- ❖ **Recommendation ITU-T P.1203.1 (revised) “Parametric bitstream-based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport - Video quality estimation module”** specifies the short-term video representation quality estimation modules for ITU-T P.1203 (Pv module). The ITU-T P.1203-series of Recommendations specifies modules for a set of model algorithms for monitoring the integral media session quality for transport control protocol (TCP) type video streaming. The models comprise modules for short-term video-quality (described in this part of the Recommendation family) and audio-quality estimation. The per-one-second outputs of these short-term modules are integrated into estimates of audio-visual quality and together with information about initial loading delay and media playout stalling events, they are further integrated into the final model output, to provide an estimate of integral quality. The respective ITU-T work item has formerly been referred to as "Parametric non-intrusive assessment of TCP-based multimedia streaming quality", or "P.NATS". The ITU-T P.1203.1 part of ITU-T P.1203 provides details for the modules for bitstream-based, short-term video quality estimation. This revision to Recommendation ITU-T P.1203.1 (10/2007) replaces the scale factor defined in clause 8.
- ❖ **Recommendation ITU-T P.1203.3 (revised) “Parametric bitstream-based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport - Quality integration module”** specifies the quality integration module for Recommendation ITU-T P.1203. The ITU-T P.1203 series of ITU-T Recommendations specify modules for monitoring the audio, video and audiovisual quality of video services such as adaptive bit-rate video streaming. The respective ITU-T work item has formerly been referred to as P.NATS (parametric non-intrusive assessment of TCP-based multimedia streaming quality). The ITU-T P.1203.3 part of

Recommendation ITU-T P.1203 can be applied to the monitoring of performance and quality of experience (QoE) of video services such as adaptive bit-rate video streaming. Besides stream-based input information, the ITU-T P.1203.3 quality integration module takes the per-one-second video- and audio-quality scores calculated according to ITU-T P.1203.1 and ITU-T P.1203.2, respectively, as input. Only one quality integration module is recommended for all four modes 0 to 3 of the Recommendation ITU-T P.1203 model series, unique across all modes. This Recommendation includes an electronic attachment containing the 20 trees described in clause 8.4. This revision to Recommendation ITU-T P.1203.3 (10/2007) replaces equation (20) in clause 8.3.

- ❖ **Recommendation ITU-T P.340 Amd.2 “Transmission characteristics and speech quality parameters of hands-free terminals - Amendment 2”** replaces Annex B: Objective test methods for multi-talker scenarios, which was introduced in Rec. ITU-T P.340 (2000)/Amd.1 (10/2014).
- ❖ **Recommendation ITU-T P.64 (revised) “Determination of sensitivity/frequency characteristics of local telephone systems”** is mainly concerned with electro-acoustical measurements required for supplying sensitivity/frequency characteristics suitable for use in calculating loudness ratings, or estimating other subjectivity-determined quantities. For this purpose, measurements under real conditions must form the basis. Artificial mouths and artificial ears must be used with due regard to obtaining good agreement between these measurements and those from real mouth and ear determinations. Measurements under real conditions are complicated, time-consuming and not reproducible with great precision. This Recommendation describes measurement methods using recommended forms of artificial mouths and artificial ears (see Recommendations ITU-T P.51 and P.57). This Recommendation applies mainly to local telephone systems (LTSS) with handset telephones; however, the principles also apply to other types of telephones. Annexes D and E define handset positions to be used with HATS according to P.58 and P.57 type 3.2, 3.3 and 3.4 artificial ears. Allowance is given to placing the handset in a way which best represents its intended use. Annex F describes correspondence between measurements using the loudness rating guard-ring position (LRGP) and the head and torso simulator (HATS) position.
- ❖ **Recommendation ITU-T P.700 “Calculation of loudness for speech communication”** describes a unified method required for calculating loudness, allowing comparison of narrow-band (300-3.4k Hz), wideband (100-8k Hz), super-wideband (50-14k Hz) and Fullband (10-20k Hz) telephony, for all types of terminals including handset, hands-free and conference terminals. The model described in this Recommendation is consistent when switching from one bandwidth to another and independent of the listening situation (handset, headset, hands-free ...) with regards to producing a constant perceived loudness. Compared to loudness rating models, like the one presented in Recommendation ITU-T P.79, the present method predicts the absolute loudness, considers auditory masking and is applicable to a wide range of acoustic levels. This Recommendation incorporates a number of annexes that hold test vectors for validation of loudness model implementations as well as of the descriptions and results of the loudness experiments that form the basis for this Recommendation.
- ❖ **Recommendation ITU-T P.811 “Subjective test methodology for evaluating Speech oriented stereo communication systems over headphones”** describes a methodology

for evaluating the subjective quality of signal and spatial localization in stereo telecommunication systems. The methodology assesses the quality of the stereo transmission chain using separate subjective rating scales to independently estimate the subjective quality of a Signal, the Spatial Localization, and the Overall Quality.

- ❖ **Recommendation ITU-T P.863.1 (revised) “Application guide for Recommendation ITU-T P.863”** provides important remarks that should be taken into account in the objective quality evaluation of speech conforming to Recommendation ITU-T P.863. Users of ITU-T P.863 should understand and follow the guidance given in this Recommendation. This Recommendation is a supplementary guide for users of Recommendation ITU-T P.863, which describes a means of estimating listening speech quality by using reference and degraded speech samples. The scope of Recommendation ITU-T P.863 is clearly defined in itself. This Recommendation does not extend or narrow that scope; rather, it provides necessary and important information for obtaining stable, reliable and meaningful objective measurement results in practice.
- ❖ **Recommendation ITU-T P.917 “Subjective test methodology for assessing impact of initial loading delay on user experience”** defines a procedure for conducting behavioral studies targeted at investigating video streaming performance and its relation to users’ Quality of Experience. The studies are to be conducted in controlled environments. Subjects are exposed to different initial loading delay conditions and other quality degradations typical for video streaming, and may be asked to rate audiovisual quality or their experience. Additionally, their behavior as a response to long loading times (i.e., aborting the video playback during its loading phase) may be investigated.
- ❖ **Recommendation ITU-T Q.3054 “Signalling architecture for virtualization of control network entities”** provides functional architecture for virtualization of control network entities. Based on the functional architecture of virtualization of control network entities, it specifies the signalling requirements for interfaces supporting the reference points in architecture for virtualization of control network entities. It defines the protocols used for interfaces and provides security considerations as well.
- ❖ **Recommendation ITU-T Q.3642 “IMS references to Release 12 for communication between IMS and NGN networks to support end-to-end service interoperability”**: In general, the IMS implementation is based on the set of standards developed by different SDOs. In this regards, there is an intention to develop a recommendation which lists the references to specifications defining requirements for IMS to be used for the Non-roaming architecture for 3GPP accesses as base for the communication between IMS and NGN Networks in order to support the end-to-end service interoperability.
- ❖ **Recommendation ITU-T Q.3717 “Signalling requirements for automatic management of IP address pool by SDN technologies on BNG”** describes the signalling requirements for the implementation of automatic management and efficient utilization of IP address resources using software defined networking technologies on broadband network gateways. The signalling is used to automatically implement allocation, monitor and reclaim of IP address resources.

- ❖ **Recommendation ITU-T Q.3718 “Signalling requirements of the Sew interface for Virtual Data Center”** focuses on the inter-domain Sew interface which is standardized to allow for multiple control entities within Virtual Data Center (VDC). In VDC, the SDN control entities exchanges the control plane related information with each other through the Sew interface.
- ❖ **Recommendation ITU-T Q.3741 “Signalling Requirements for SD-WAN service”** specifies signalling requirements for SD-WAN service launched by service providers. The signalling is to support the automated provision and management of the enterprise SD-WAN service.
- ❖ **Recommendation ITU-T Q.5050 “Framework for solution to combat counterfeit ICT devices”**: There has been growing usage of ICT equipment in people’s daily lives, in recent years, but there have also been unwelcome side effects related to the increased in the sale, circulation and use of counterfeit ICT devices in the market. This Recommendation aims to describe a reference framework, with high level challenges and requirements, that should be considered when deploying solutions to combat the circulation and use of counterfeit ICT devices.
- ❖ **Recommendation ITU-T Q.731.3 (revised) “Stage 3 Description for number identification supplementary services using Signalling System no.7 - Calling Line Identification Presentation”** provides signalling procedure for calling line identification presentation (CLIP). It specifies service description, operation requirements and coding requirements of CLIP. It also presents the signalling requirements for originating local exchange, transit exchange, international gateway exchange and destination local exchange. Interaction with other supplement services, interaction with other network and dynamic description are included as well.
- ❖ **Recommendation ITU-T Q.731.4 (revised) “Stage 3 Description for number identification supplementary services using Signalling System no.7 - Calling Line Identification Restriction”** provides signalling procedure for calling line identification restriction (CLIR). It specifies service description, coding requirements and operation requirements of CLIR. It also presents the signalling requirements for originating local exchange, transit exchange, international gateway exchange and destination local exchange. Interaction with other supplement services, interaction with other network and dynamic description are included as well.
- ❖ **Recommendation ITU-T Q.731.5 (revised) “Stage 3 Description for number identification supplementary services using Signalling System no.7 - Connected Line Identification Presentation”** provides signalling procedure for connected line identification presentation (COLP). It specifies service description, coding requirements and operation requirements of COLP. It also presents the signalling requirements for originating local exchange, transit exchange, international gateway exchange and destination local exchange. Interaction with other supplement services, interaction with other network and dynamic description are included as well.
- ❖ **Recommendation ITU-T Q.731.6 (revised) “Stage 3 Description for number identification supplementary services using Signalling System no.7 - Connected Line Identification Restriction”** provides signalling procedure for connected line identification restriction (COLR). It specifies service description, coding requirements

and operation requirements of COLR. It also presents the signalling requirements for originating local exchange, transit exchange, international gateway exchange and destination local exchange. Interaction with other supplement services, interaction with other network and dynamic description are included as well.

- ❖ **Recommendation ITU-T Q.850 (2018) Amd.1 (revised) “Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN user part”** incorporates all points highlighted in ITU-T Q.850 Amd.1 and ITU-T Q.850 Add.1.
- ❖ **Recommendation ITU-T X.609.6 “Managed P2P communications: Content distribution signalling requirements”** specifies signalling requirements for content distribution services over managed P2P overlay network that is specified in ITU-T X.609. Content distribution over a managed P2P network provides flexible content management over existing overlay networks and also it enables contents providers to control accessing the overlay network. That is, the content provider can update the content to be distributed over an overlay network anytime, and every update will be applied to all peers in the overlay network. This Recommendation lists requirements for the related reference points that are defined in Recommendation ITU-T X.609 for providing content distribution services, and it also describes high-level procedures for content distribution service over managed P2P architecture and roles of the managed P2P components for the service.
- ❖ **Recommendation ITU-T X.609.7 “Managed P2P communications: Content distribution peer protocol”** specifies a content distribution peer protocol (CDPP) that runs on the interface among entities of managed P2P communications. CDPP is used to distribute one or more contents to a number of peers. Content distribution over traditional P2P communications has incurred various issues such as distribution of illegal content, uncontrollable participation, and synchronized distribution of the updated contents. Different from the content distribution over the traditional P2P communications which is not capable of providing manageability, the content distribution over managed P2P communications can be managed by content provider or service provider. In the content distribution over managed P2P communications, as an example, participation in an overlay network can be controlled so that only predefined peers can join the overlay network and distribute contents each other. In addition, content to be distributed over an overlay network can be updated anytime, and every update will be applied to all peers in the overlay network. The protocol is capable of managing content distribution under control of content provider or service provider. This Recommendation provides protocol operations, and message formats for content distribution over managed P2P network.
- ❖ **Recommendation ITU-T Y.1540 (revised) “Internet protocol data communication service - IP packet transfer and availability performance parameters”** (under approval) defines parameters that may be used in specifying and assessing the performance of speed, accuracy, dependability and availability of IP packet transfer of regional and international Internet protocol (IP) data communication services. The defined parameters apply to end-to-end, point-to-point IP service and to the network portions that provide, or contribute to the provision of, such service in accordance with the normative references specified in clause 2. Connectionless transport is a distinguishing

aspect of the IP service that is considered in this Recommendation. Following over 20 years as an in-force Recommendation, the 2019 Edition recognizes many changes in the design of IP services and in the protocols employed by end-users. It introduces the new Annex A that defines IP Capacity parameters in ways that cater toward assessment, and provides requirements for methods of measurement of IP Capacity. This new Annex is the result of years of study, and application of ITU-T Study Group 12 principles of accurately evaluating performance parameters and methods of measurement against a “ground truth” reference in laboratory and field measurements.

- ❖ **Recommendation ITU-T Y.1550 “Considerations for Realizing Virtual Measurement Systems”** makes recommendations in key areas such as On-Demand Deployment and Accuracy Considerations. Development of virtualized measurement systems in areas highly relevant to SG12 work are in the early stages, so this Recommendation is timely.
- ❖ **Recommendation ITU-T Y.2242 “Service function chaining in mobile network”** specifies a way to coordinate existing and ongoing works on service function chaining in mobile network (specified in [IETF RFC7665][IETF RFC 8300] and [b-ONF TS-027]) by introducing a chain orchestrator as a new entity. The Recommendation also covers the case when relevant network functions are virtualized. The objective of this document is to describe the requirements, architecture, functional entities, reference points and information flows of service function chaining in mobile networks.
- ❖ **Recommendation ITU-T Y.2323 “Requirements and capabilities of orchestration in next generation network evolution”** provides the scenarios of the orchestration in NGNe, specifies the general requirements of the orchestration in NGNe, and also introduces its capabilities from the perspective of NGN evolution and the coordination of NGNs and the networks implemented by SDN and NFV technologies.
- ❖ **Recommendation ITU-T Y.2620 “T interface for Public packet Telecommunication Data Network (PTDN)”**: Public packet Telecommunication Data Network (PTDN) is one of hierarchical data networks to meet requirements of future packet-based networks which reference interfaces are defined in ITU-T Recommendation Y.2613. This Recommendation identifies the T interface and its functions between PTDN edge devices and Address Translators (ADT). The functions, procedures for the two types, i.e. T1 interface and T2 interface, are described. Appendix I gives an example of encapsulation for T interface messages. Appendix II gives one candidate message format for address resolution in T1 interface.
- ❖ **Recommendation ITU-T Y.2774 “Functional requirements of deep packet inspection for future networks”** specifies the functional requirements of deep packet inspection for future networks (e.g., software defined networks (SDNs), network function virtualization (NFV), etc.). The scope of this Recommendation includes the general requirements of deep packet inspection (DPI) for future networks, DPI functional requirements for SDN, DPI functional requirements for NFV, DPI functional requirements for service function chain (SFC) and DPI as a service, as well as DPI functional requirements for network virtualization and DPI functional requirements for evolving mobile networks.
- ❖ **Recommendation ITU-T Y.2775 “Functional architecture of deep packet inspection for future networks”** (under approval) specifies the functional architecture of deep packet

inspection for future networks (e.g., software defined networking, network function virtualization etc.). This Recommendation specifies general DPI functional architecture aspects related to future networks, DPI functional architecture for software defined networking, DPI functional architecture for network function virtualization, DPI functional architecture for service function chaining and DPI as a service, DPI functional architecture for network virtualization, and DPI functional architecture for evolving mobile network.

- ❖ **Recommendation ITU-T Y.2815 “Mobility supporting architecture for mobile Peer to Peer service in heterogeneous wireless networks”** specifies the mobility supporting architecture required for mobile P2P services in heterogeneous networks including cellular networks, WiMAX and WLAN. It covers the aspects related to functional requirements, and architecture, high-level information flows and security considerations for mobile P2P users.
- ❖ **Recommendation ITU-T Z.100 Annex F1 (revised) “Specification and Description Language - Overview of SDL-2010 - Annex F1: SDL-2010 formal definition: General overview”** provides the motivation for and the main objectives of a formal semantics definition for SDL-2010. It gives an overview of the structure of the formal semantics, and it also contains an introduction to the Abstract State Machine (ASM) formalism, which is used to define the SDL-2010 semantics.
- ❖ **Recommendation ITU-T Z.100 Annex F2 (revised) “Specification and Description Language – Overview of SDL 2010 - Annex F2: SDL 2010 formal definition: Static semantics”** describes the static semantic constraints of SDL-2010, the mapping to the abstract grammar and the transformations identified by the 'Model' clauses of Recommendations ITU-T Z.101, Z.102, Z.103, Z.104, Z.105 and Z.107, that are included by reference in Recommendation ITU-T Z.100.
- ❖ **Recommendation ITU-T Z.100 Annex F3 (revised) “Specification and Description Language – Overview of SDL 2010 - Annex F3: SDL 2010 formal definition: Dynamic semantics”** defines the SDL 2010 dynamic semantics.
- ❖ **Recommendation ITU-T Z.151 (revised) “User Requirements Notation (URN) - Language definition”** defines the User Requirements Notation (URN) intended for the elicitation, analysis, specification and validation of requirements. URN combines modelling concepts and notations for goals (mainly for non-functional requirements and quality attributes) and scenarios (mainly for operational requirements, functional requirements and performance and architectural reasoning). The goal sub-notation is called Goal-oriented Requirements Language (GRL) and the scenario sub-notation is called Use Case Map (UCM).
- ❖ **Recommendation ITU-T Z.161 (revised) “Testing and Test Control Notation version 3: TTCN-3 core language”** defines TTCN-3 (Testing and Test Control Notation 3) defines Testing and Test Control Notation 3 (TTCN-3) intended for specification of test suites that are independent of platforms, test methods, protocol layers and protocols. TTCN-3 can be used for specification of all types of reactive system tests over a variety of communication ports. Typical areas of application are protocol testing (including mobile and Internet protocols), service testing (including supplementary services), module testing, testing of Common Object Request Broker Architecture (CORBA) based

platforms and application programming interfaces (APIs). The specification of test suites for physical layer protocols is outside the scope of this Recommendation.

- ❖ **Recommendation ITU-T Z.161.2 (revised) “Testing and Test Control Notation version 3: TTCN-3 language extensions: Configuration and deployment support”** defines the configuration and deployment support package of TTCN-3.
- ❖ **Recommendation ITU-T Z.161.4 (revised) Testing and Test Control Notation version 3: TTCN-3 language extensions: Behaviour types”** defines the behaviour types package of TTCN-3.
- ❖ **Recommendation ITU-T Z.161.6 (revised) “Testing and Test Control Notation version 3: TTCN-3 language extensions: Advanced matching”** defines the support of advance matching of TTCN-3. TTCN-3 can be used for the specification of all types of reactive system tests over a variety of communication ports. Typical areas of application are protocol testing (including mobile and Internet protocols), service testing (including supplementary services), module testing, testing of OMG CORBA based platforms, APIs, etc. TTCN-3 is not restricted to conformance testing and can be used for many other kinds of testing including interoperability, robustness, regression, system and integration testing. The specification of test suites for physical layer protocols is outside the scope of the present document. TTCN-3 packages are intended to define additional TTCN-3 concepts, which are not mandatory as concepts in the TTCN-3 core language, but which are optional as part of a package which is suited for dedicated applications and/or usages of TTCN-3. While the design of TTCN-3 package has taken into account the consistency of a combined usage of the core language with a number of packages, the concrete usages of and guidelines for this package in combination with other packages is outside the scope of the present document.
- ❖ **Recommendation ITU-T Z.166 (revised) “Testing and Test Control Notation version 3: TTCN-3 control interface (TCI)”** specifies the control interfaces for TTCN-3 test system implementations, and provides a standardized adaptation for management, test component handling and encoding/decoding of a test system to a particular test platform.
- ❖ **Recommendation ITU-T Z.167 (revised) “Testing and Test Control Notation version 3: Using ASN.1 with TTCN-3”** defines a normative way of using ASN.1 as defined in Recommendations ITU-T X.680, ITU-T X.681, ITU-T X.682 and ITU-T X.683 with TTCN-3.
- ❖ **Recommendation ITU-T Z.169 (revised) “Testing and Test Control Notation version 3: Using XML schema with TTCN-3”** defines the mapping rules for W3C Schema to TTCN-3 to enable testing of XML-based systems, interfaces and protocols.
- ❖ **Recommendation ITU-T Z.171 (revised) “Testing and Test Control Notation version 3: Using JSON with TTCN-3”** specifies the rules to define schemas for JSON data structures in TTCN 3, to enable testing of JSON-based systems, interfaces and protocols, and the conversion rules between TTCN-3 and JSON to enable exchanging TTCN 3 data in JSON format between different systems.
- ❖ SG13’s Focus Group on Network 2030 issued a **White Paper** [“Network 2030 - A Blueprint of Technology, Applications and Market Drivers Towards the Year 2030 and Beyond”](#) in May 2019.

84. Several new Recommendations standardize the network aspects of IMT-2020:

- ❖ **Recommendation ITU-T Q.5020 “Protocol requirements and procedures for network slice lifecycle management”** describes the protocol requirements and procedures for network slice lifecycle management, including the reference signalling architecture, requirements, and protocol procedures.
- ❖ **Recommendation ITU-T Q.5021 “Protocol for managing capability exposure APIs in IMT-2020 network”** describes the protocol for managing capability exposure APIs in IMT2020 network. It includes signalling architecture, API management functions, signalling flows and their message format, and definition for management APIs. It also describes gap analysis and use cases for API management. This protocol can be used by network operators and third parties to manage capability exposure APIs.
- ❖ **Recommendation ITU-T Y.3072 “Requirements and Capabilities of Name Mapping and Resolution for Information Centric Networking in IMT-2020”** specifies the requirements and capabilities of name mapping and resolution to achieve high performance such as low latency and scalability for a massive number of named objects for information centric networking in IMT-2020. (1) It provides an introduction to name mapping and resolution in IMT-2020. (2) It describes service and functional requirements of name mapping and resolution. (3) Based on the requirements, it specifies the capabilities of name mapping and resolution for information centric networking in IMT-2020.
- ❖ **Recommendation ITU-T Y.3073 “Framework for service function chaining in information centric networking”** (under approval) specifies the framework in applying information centric networking (ICN) to edge computing and service function chaining. It describes the communication models, messages and their content, and functional components and their interactions in applying ICN to service function chaining.
- ❖ **Recommendation ITU-T Y.3074 “Framework for directory service for management of huge number of heterogeneously named objects in IMT-2020”** (under approval) introduces a directory service function in the IMT-2020 architecture. It describes the components of the directory service function that can store a huge volume of records associated with heterogeneous types of names of objects (i.e. devices and data), and that can provide a very low latency lookup service. It describes the general procedure of the directory service function to register, cache, lookup, update, and delete records.
- ❖ **Recommendation ITU-T Y.3104 “Architecture of the IMT-2020 network”** provides the architecture of the IMT-2020 network from a functional perspective. An architecture reference model of the IMT-2020 network and procedures of the IMT-2020 network basic services [ITU-T Y.3102] are specified.
- ❖ **Recommendation ITU-T Y.3105 “Requirements of capability exposure in the IMT-2020 network”** identifies requirements of capability exposure in the IMT-2020 network. In particular, it provides at first an overview and general aspects of capability exposure in the IMT-2020 network, and then identifies requirements for the following key network capabilities: network slicing management, edge computing, network data analytics, fixed and mobile convergence, and QoS capabilities. Related scenarios of capability exposure in the IMT-2020 network are provided in Appendix.

- ❖ **Recommendation ITU-T Y.3106 “QoS functional requirements for the IMT-2020 network”** specifies the QoS functional requirements for the International Mobile Telecommunications (IMT) 2020 network. This Recommendation first provides an overview of QoS requirements for IMT-2020. It then describes the high level QoS capabilities of the IMT-2020 network which include: QoS planning, QoS provisioning, QoS monitoring and QoS optimization. Based on these capabilities, this Recommendation specifies the QoS functional requirements for the IMT-2020 network.
- ❖ **Recommendation ITU-T Y.3107 “Functional architecture for QoS assurance management in the IMT-2020 network”** (under approval) specifies the functional architecture for QoS assurance management in the International Mobile Telecommunications (IMT) 2020 network. This Recommendation first describes the functional architecture for QoS assurance management under the IMT-2020 network management and orchestration framework. It then specifies reference points between QoS functional entities and IMT-2020 network management and orchestration plane.
- ❖ **Recommendation ITU-T Y.3112 (revised) “Framework for the support of Multiple Network Slicing in the IMT-2020 network”** describes the concept of network slicing and use cases of multiple network slicing. The multiple network slicing enables a single device to simultaneously connect to different network slices. The use case describes the slice service type for indicating a specific network slice and the slice user group for precisely representing the network slice in terms of performance requirements and business models. This Recommendation also specifies the high-level requirements and high-level architecture for multiple network slicing in IMT-2020 network.
- ❖ **Recommendation ITU-T Y.3131 “Functional architecture for supporting fixed mobile convergence in IMT-2020 networks”** (under approval) describes the functional architecture of fixed mobile convergence in IMT-2020 networks, which supports the requirements of network evolution and accommodates convergent services in fixed and mobile networks. This Recommendation presents the overview, framework and functional architecture for supporting fixed mobile convergence in IMT-2020 networks.
- ❖ **Recommendation ITU-T Y.3151 “High-level technical characteristics of network softwarization for IMT-2020 - part: SDN”**: With the advent of network slicing technology for IMT-2020, which is the most typical substantiation of the network softwarization approach, this Recommendation describes technical aspects of SDN part of network slice support, which assists in handling individual components of a network slice, and contains network infrastructure and its control/management [ITU-T Y.3150]. This Recommendation addresses the technical aspect of the SDN environment: architectural model, functionalities and interfaces. Especially, high-level specifications of SDN control interfaces are treated based on a standard of SDN control of transport networks [ITU-T G.7702].
- ❖ **Recommendation ITU-T Y.3152 “Advanced Data Plane Programmability for IMT-2020”**: Advanced data plane programmability (ADPP) as an underlying technology for network softwarization enhances SDN with more agility and flexibility to meet the requirements of IMT-2020 networks [ITU-T Y.3150]. Via the advanced data plane programmability technology, network operators benefit from a “top-down” design process by defining network processing behaviour in a high level language. In other

words, the advanced data plane programmability enables network operators to define specific data plane protocol (including packet formats) and to support extended network functionalities. The advanced data plane programmability leads to flexibility and automation, which lets network operators fully exploit data plane resources to enable their network applications. This Recommendation specifies the requirements and architecture about advanced data plane programmability for IMT-2020.

- ❖ **Recommendation ITU-T Y.3172 “Architectural framework for machine learning in future networks including IMT-2020”** specifies an architectural framework for machine learning (ML) in future networks including IMT-2020. A set of architectural requirements and specific architectural components needed to satisfy these requirements are presented. These components include, but are not limited to, ML pipeline and ML management and orchestration functionalities. The integration of such components into future networks including IMT-2020 and guidelines for applying this architectural framework in a variety of technology-specific underlying networks are also described.
- ❖ **Recommendation ITU-T Y.3324 “Requirements and Architectural Framework for Autonomic Management and Control of IMT-2020 Networks”** specifies high-level and functional requirements and architecture of Autonomic Management and Control (AMC) for IMT-2020 networks. It also specifies interworking reference points between AMC and IMT-2020 management and orchestration architecture, and legacy NMS/OSS. In Appendix I, it describes a use case to realize the AMC architecture through ETSI GANA reference model.

85. Cloud computing, big data and data management work in ITU-T is reported as follows:

- ❖ **Recommendation ITU-T F.743.8 “Requirements for cloud computing platform supporting a visual surveillance system”** defines the requirements for cloud computing platform supporting visual surveillance system. Cloud computing is an emerging technology aimed at providing various computing services over the Internet. With the virtualization technology, cloud computing platform realizes a ubiquitous and flexible shared resources pool which can be rapidly provisioned and released with minimal management effort or service-provider interaction based on the needs of users. By using the cloud computing technology, the visual surveillance system can conveniently manage various functional components and services, such as video distribution, video transcoding, and intelligent video processing. This Recommendation provides the application scenarios and the requirements for cloud computing platform supporting visual surveillance system.
- ❖ **ITU-T Y.3500-series Supplement 49 “Cloud computing standardization roadmap”** provides a summary of the cloud-computing-related deliverables of ITU-T study groups and other standards development organizations (SDOs). For this purpose, the Supplement collects all the information from ITU and other SDOs on their work and understanding related to cloud computing.
- ❖ **Recommendation ITU-T Y.3507 “Cloud computing – Functional requirements of physical machine”** provides the introduction of physical machine with physical machine components, physical machine types, virtualizations in physical machine as well as the scalability of components in physical machine. Also, the Recommendation provides

functional requirements for physical machine derived from various use cases are described in Appendix. The relationship with other related specifications developed in other SDOs has also been introduced as Appendix.

- ❖ **Recommendation ITU-T Y.3508 “Cloud computing - Overview and high-level requirements of distributed cloud”** (under approval) provides an overview and high-level requirements for distributed cloud. This Recommendation introduces the concept of the distributed cloud, and identifies the characteristics of distributed cloud. Based on concept and characteristics, configuration models are illustrated. Deployment considerations of distributed cloud are provided in perspective of infrastructure, network, service, management and security. From use cases, high-level requirements of the distributed cloud are derived.
- ❖ **Recommendation ITU-T Y.3518 “Cloud computing - Functional requirements of inter-cloud data management”** provides the overview of inter-cloud data management and its functional requirements. It describes the typical use cases and specifies the functional requirements on three aspects, ranging from inter-cloud data policy, inter-cloud data isolation and protection, inter-cloud data management which are derived from the corresponding use cases.
- ❖ **Recommendation ITU-T Y.3519 “Cloud computing - Functional architecture of big data as a service”** describes the functional architecture for big data as a service (BDaaS). The functional architecture is defined on the basis of the analysis of requirements and activities of cloud computing based big data described in ITU-T Y.3600. Following the methodology of ITU-T Y.3502, the BDaaS functional architecture is described from a set of functional components and cross-cutting aspects. The specified functional components consist of sets of functions that are required to perform the BDaaS activities for the roles and sub-roles described in ITU-T Y.3600.
- ❖ **Recommendation ITU-T Y.3523 “Metadata framework for NaaS service lifecycle management”** (under approval) specifies the metadata framework for NaaS service lifecycle management in the closed loop automation environment. This Recommendation is the extension the Recommendation ITU-T Y.3512 and Recommendation ITU-T Y.3515 as the NaaS series Recommendations. It provides the metadata framework for NaaS service lifecycle management with the highlight on the NaaS service operational policy framework.
- ❖ **Recommendation ITU-T Y.3602 “Big data – Functional requirements for data provenance”** describes a model and operations for big data provenance. Also, this Recommendation provides the functional requirements for big data service provider (BDSP) to manage big data provenance.
- ❖ **Recommendation ITU-T Y.3651 “Big-data-driven networking – mobile network traffic management and planning”**

Big-data-driven networking (bDDN) is a type of future network framework that collects big data from networks and applications, and generates big data intelligence based on the big data; it then provides big data intelligence to facilitate smarter and autonomous network management, operation, control, optimization and security, etc.

Recommendation Y.3651 specifies some technology aspects related to big-data-driven networking – mobile network traffic management and planning. The research of this Recommendation includes: requirements, framework, reference points, performance aspects and security considerations of big-data-driven networking – mobile network traffic management and planning.

- ❖ **ITU-T Y.3650-series Supplement 50 “Use case and application scenario for big-data driven networking”** presents a set of use cases and several scenarios supported by bDDN including: 1) network management; 2) network active maintenance; 3) network optimization; 4) network operation; 5) network attack prevention; 6) root cause tracking of quality of service (QoS); 7) quality of experience (QoE) improvement; 8) resource management; 9) network planning and design; 10) traffic engineering; 11) cross-layer design; 12) content delivery network (CDN); 13) network address translation (NAT) device detection; 14) bDDN in future networks; 15) bDDN in data centre networks; and 16) bDDN in industrial Internet.

86. Internet of Things (IoT) standardization progressed and numerous ITU-T Recommendations were published by ITU-T Study Group 20:

- ❖ **Recommendation ITU-T Y.4051 “Vocabulary for smart cities and communities”** contains vocabulary applied to smart cities and communities (SC&C) works. Basically, the terms and definitions in this vocabulary are defined in published Recommendations and Supplements of ITU and published standards of other international SDOs (such as ISO and IEC, etc.). Additionally, this vocabulary also includes some new terms and definitions to meet the needs of SC&C works of ITU.
- ❖ **Recommendation ITU-T Y.4202 “Framework of wireless power transmission application service”** defines a framework for Wireless Power Transmission (WPT) application service by describing concept, functional model, requirements, basic service flows and use cases.
- ❖ **Recommendation ITU-T Y.4203 “Requirements of things description in the Internet of things”** specifies requirements for an effective way of representing things as far as possible in a homogeneous way. This Recommendation may be relevant for the matters addressed by ITU-T Y.4114 “Specific requirements and capabilities of the Internet of things for big data”, e.g. semantic related data processing.
- ❖ **Recommendation ITU-T Y.4204 “Accessibility requirements for the Internet of things applications and services”** provides accessibility requirements specific to Internet of Things (IoT) applications and services. Benefits of accessible IoT applications and services are addressed, and accessibility requirements for IoT applications and services for persons with disabilities, persons with age related disabilities and those with specific needs to utilize the benefits of IoT applications and services, are specified. Some use cases are also provided in the Appendix to illustrate the need for IoT accessibility. This Recommendation complements existing Recommendations specifically defined for certain platforms in case such platforms are applied in the IoT context.
- ❖ **Recommendation ITU-T Y.4205 “Requirements and reference model of IoT-related crowdsourced systems”** introduces the concept of crowdsourced systems, as well as the reference model of IoT-related crowdsourced systems for the support of IoT

applications and services to be provided via systems employing crowdsourcing principles. It addresses IoT-related crowdsourced systems in terms of functional requirements, reference model as well as identifying relevant security, privacy and trust issues.

- ❖ **Recommendation ITU-T Y.4206 “Requirements and capabilities of user-centric work space service”**: User-centric work space (UCS) service is a service capable of providing a personalized work space to its service users by orchestrating local and/or remote ICT resources [ITU-T Y.Suppl.42]. Based on the use cases of UCS service addressed by [ITU-T Y.Suppl.42], this Recommendation provides the requirements and capabilities of UCS service. The provided requirements and capabilities are necessary to implement various types of UCS services.
- ❖ **Recommendation ITU-T Y.4207 “Requirements and capability framework of smart environmental monitoring”** provides the requirements and capability framework of smart environmental monitoring (SEM). As a smart application of Internet of Things (IoT) in the field of environmental monitoring and protection, SEM is an important means to enhance environmental management level and develop environmental protection. The provided requirements and capability framework are intended to be generally applicable in environmental monitoring.
- ❖ **Recommendation ITU-T Y.4458 “Requirements and functional architecture of smart street light service”** specifies requirements and the functional architecture of smart street light (SSL) service. Related use cases of SSL service are provided in Appendix I.
- ❖ **Recommendation ITU-T Y.4459 “An architecture for IoT interoperability”** (under approval) introduces the Digital Object Architecture (DOA) and its prospective in addressing security and interoperability among IoT applications. DOA defines a framework for information-oriented services that makes use of existing infrastructures including Internet infrastructure to enhance secure and managed information sharing over a distributed networking environment. It defines framework for information management based on the use of digital object, and a common set of secure services that will help the registration, discovery, resolution, and dissemination of such digital objects. The set of DOA services is designed to facilitate sharing across any storage boundaries, any heterogeneous application boundaries, and any organization boundaries. DOA defines a minimum set of needed architectural components, protocols, and services to provide a generic information and service interoperability. It will facilitate the interoperability of identification, description, representation, access, storage and security of IoT devices. DOA encourages a common security and management interface across different IoT applications. Under DOA, information represented in digital form is structured as Digital Objects (DOs), each of which has an associated unique identifier, which targeted to be persistent. However, metadata contained in the DOs (e.g. location of the object) could be updated without changing its identifier. The identifier allows the DOs to be identified and discovered, regardless where they are located or stored. DOs are not confined within any particular application boundary and may be moved from host to host, accessed from application to application, shared from organization to organization, without losing its ownership or management control, in order to enhance interoperability. The DO’s data model allows ownership and access control information to be defined by data owners independent

of any specific applications. DOA can be used in line with different identification and addressing protocols (e.g. IP and/or non IP based networks).

- ❖ **Recommendation ITU-T Y.4460 “Architectural reference models of devices for IoT applications”**: Processing power and communication capabilities define how the device communicates and interacts with other entities in an IoT solution. This Recommendation describes the architectural reference models of devices for IoT applications, based on a classification of devices defined by processing power and communication capabilities. The architectural reference models described also includes the device's functional entities and the functional entities interaction for each device's architectural reference model.
- ❖ **Recommendation ITU-T Y.4555 “Service functionalities of self-quantification over Internet of things”** describes service functionalities of self-quantification over Internet of things. It clarifies the concept of self-quantification services, identifies their considerations, and specifies their requirements and functionalities.
- ❖ **Recommendation ITU-T Y.4556 “Requirements and functional architecture of smart residential community”** (under approval) presents the key components and specifies requirements and the functional architecture of smart residential community (SRC).
- ❖ **Recommendation ITU-T Y.4904 “Smart sustainable cities maturity model”** (under approval) contains a maturity model for smart sustainable cities. This maturity model helps identify the goals, levels and key measures that are recommended for cities to effectively examine their current situation and determine critical capabilities needed to progress toward the long-term goal of becoming SSCs.
- ❖ **Recommendation ITU-T Y.4905 “Smart sustainable city impact assessment”** is a holistic impact framework for assessment for smart and sustainable cities to address effects of digital innovation on social, economic, and environmental issues. Smart sustainable city (SSC) initiatives have been proposed as potential solutions to economic, social and environmental challenges and pressures encountered by cities. Advances in Information and Communication Technologies (ICTs) enable significant transformation potential in the way city resources, services and infrastructures are planned and managed. More specifically, ICT can play an enabling role to address the urban challenges of 21st century. SSCs harness ICTs (including various subtopics under ICT such as digital transformation, data, IoT, digital services, etc.) and intend to deliver city enhancements through a portfolio of action items. By their very nature, SSC initiatives impact the underlying cities. It is important to identify and assess this impact. Identification and assessment of impact will allow better planning, setting expectations with stakeholders, better informed budgeting, more effective public private partnerships, and promotion of alternative financing mechanisms. This will also help in communicating SSC initiatives.
- ❖ **Recommendation ITU-T Y.4906 “Assessment framework for digital transformation of sectors in smart cities”**: The ultimate objective of this recommendation is to enhance the sustainability of identified priority sectors in smart cities, in order to optimise economic, environmental and social benefits. Cities will decide on their digital transformation priorities. For example, cities might also want to encourage

collaboration to deliver desired outcomes. This kind of engagement based on the assessment framework can incentivize industry engagement and investment.

87. ITU-T Study Group 20 adopted the IoT specifications from OneM2M and published them as Recommendations. Currently ITU-T SG20 is working on draft Recommendation ITU-T Y.oneM2M.SEC.SOL “oneM2M Security Solutions”.
88. Financial Inclusion Global Initiative (FIGI) is a three-year programme of collective action led by ITU, the World Bank Group and the Committee on Payments and Market Infrastructures, with support from the Bill & Melinda Gates Foundation. The initiative is designed to advance research in digital finance and accelerate digital financial inclusion in developing countries.
89. The United for Smart Sustainable Cities (U4SSC) is a United Nations initiative coordinated by ITU, UNECE and UN-Habitat and supported by 13 UN Agencies and Programmes namely: CBD, ECLAC, FAO, UNDP, UNECA, UNESCO, UN Environment, UNEP-FI, UNFCCC, UN-Habitat, UNIDO, UN-Women, UNI-EGOV and WMO. The U4SSC advocates for public policies aimed at ensuring a catalytic role for information and communication technologies (ICTs) in enabling the transition to smart sustainable cities.

The U4SSC has developed the following deliverables:

- Flipbook on "Connecting cities and communities with the SDGs"
- Flipbook on "Enhancing innovation and participation in smart sustainable cities"
- Flipbook on "Implementing SDG11 by connecting sustainability policies and urban planning practices through ICTs".
- U4SSC held its Third meeting on 26 April 2018 in Malaga Spain and is currently working on the following deliverables:
 - Guidelines on tools and mechanisms to finance SSC projects;
 - Guidelines on strategies for circular cities;
 - City science application framework;
 - Guiding principles for artificial intelligence in cities and Blockchain 4 cities, and
 - Thematic Group on “The impact of Frontier Technologies in Cities”:
 - The impact of Sensing Technologies and IoT in cities;
 - The impact of Artificial Intelligence and Cognitive Computing in Cities;
 - The impact of Data Processing and Computation in Cities.

The [Fourth U4SSC meeting](#) will take place on 3 October 2019 in Valencia, Spain during the [9th Green Standards Week](#).

The U4SSC developed a set of international key performance indicators (KPIs) for Smart sustainable cities (SSC) to establish the criteria to evaluate ICT’s contributions in making cities smarter and more sustainable, and to provide cities with the means for self-assessments. This set of KPIs for SSC is based on **Recommendation ITU-T Y.4903/L.1603 “Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals”**. Dubai, Singapore, Montevideo, Manizales, Valencia,

Wuxi, Guangshang, Valencia, Pully, Kairouan, Bizerte, Moscow and over 100 cities are now implementing these KPIs for SSC. The KPIs for SSC are contained in the Flipbook on [“Collection Methodology for Key Performance Indicators for Smart Sustainable Cities”](#).

The following Case Studies have been published:

- “Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The case of Moscow”
- “Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The case of Singapore”
- “Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The case of Dubai”

Currently, several city factsheets are being developed to highlight the experience of the participating cities in the KPIs for SSC implementation.

90. The [ITU/WMO/UNESCO-IOC Joint Task Force on SMART¹ Cable Systems](#) is leading an ambitious new project to equip submarine communications cables with climate and hazard-monitoring sensors to create a global observation network capable of providing earthquake and tsunami warnings as well as data on ocean climate change and circulation.

91. ITU-T is carrying out various activities to encourage and facilitate the participation of academia in the work of the Sector, as well as to benefit from their technical and intellectual expertise.

❖ ITU Journal: *ICT Discoveries*

In December 2018, the ITU Journal published a new special issue on [“Data for Good”](#). This issue contains original academic papers investigating the technical, business and policy challenges underlying effective data management and analysis.

In February 2019, together with the bureau responsible for radio communications (BR), the call for a new special issue on radio wave propagation was announced titled, [“Propagation modelling for advanced future radio systems – Challenges for a congested radio spectrum”](#). This issue is due to be published in December 2019.

As of July 2019, preparations began for a new special issue on [“The future of video and immersive media”](#), with the deadline for paper submissions set for 11 November 2020. This special issue will explore the state of the art in multimedia and the associated challenges.

At the ITU Plenipotentiary Conference in Dubai, 2018, ITU Members resolved to support the development of the ITU Journal and to publish original scientific research with the aim of generating forward-thinking discussions on emerging trends relevant to the work of the ITU. Members further resolved to establish collaborative efforts with the research community and to raise awareness of the ITU Journal worldwide (Resolution 207, Dubai, 2018). The ITU

¹ Science Monitoring and Reliable Telecommunications

Journal embarked on a new expansion effort, signing a co-publishing agreement with Tsinghua University Press in January 2019.

The ITU Journal is available to the public on the ITU website and is free of charge for both readers and authors.

❖ ITU Kaleidoscope Academic conference

The ITU Kaleidoscope series of peer-reviewed academic conferences – technically co-sponsored by the IEEE Communications Society – calls for original research on ICT innovation and related demands on international standardization.

The 10th edition of Kaleidoscope, [Kaleidoscope 2018: Machine Learning for a 5G future](#), was held in Santa Fe, Argentina, 26-28 November 2018, hosted by Universidad Tecnológica Nacional.

Authors of outstanding Kaleidoscope 2018 papers were invited to contribute to the work of the [ITU-T Focus Group on Machine Learning for Future Networks including 5G](#).

92. The 11th ITU Academic conference [Kaleidoscope 2019: ICT for Health: Networks, standards and innovation](#), in collaboration with the World Health Organization (WHO), will take place from 4-6 December 2019 in Atlanta, Georgia, United States and will be hosted by the Georgia Institute of Technology. In June 2019, [The Lancet Digital Health](#) confirmed their technical co-sponsorship for this edition of the conference, with the possibility of publishing selected papers presented at Kaleidoscope. Resolution 177 on Conformance and Interoperability (Dubai, 2018) endorsed the objectives of both Resolution 76 (Rev. Hammamet, 2016) and [Resolution 47](#) (Rev. Dubai, 2014) on conformity and interoperability of ICT equipment. The goal of Resolution 76 (Rev. Hammamet) on Conformance and Interoperability testing is to help in increasing probability of interoperability and to ensure all the countries to benefit of ICTs. WTDC-14 reviewed Resolution 47 on enhancement of knowledge and effective application of ITU Recommendations in developing countries, including Conformance and Interoperability (C&I) testing of systems manufactured on the basis of ITU Recommendations”. C&I issues are in the Dubai Declaration and are part of Regional Initiatives for AFR and ARB. SG11 developed several new testing specifications, including:

- ❖ **Recommendation ITU-T Q.4014.1 “PSTN/ISDN terminal equipment using IP Multimedia core network subsystem; Conformance testing; Part 1: PICS”** is a part 1 of the testing specifications of the terminal equipment used in the IMS-based PSTN/ISDN Emulation subsystem based on the media gateway control protocol, the session initiation protocol and the associated session description protocol. The Recommendation specifies the Protocol Implementation Conformance Statement to test PSTN/ISDN terminal equipment using IP Multimedia core network subsystem.
- ❖ **Recommendation ITU-T Q.4014.2 “PSTN/ISDN terminal equipment using IP Multimedia core network subsystem; Conformance testing; Part 2: TSS&TP”** is a part 2 of the testing specifications of the terminal equipment used in the IMS-based PSTN/ISDN Emulation subsystem based on the media gateway control protocol, the session initiation protocol and the associated session description protocol. The

Recommendation specifies the Test Suite Structure and Test purposes to test PSTN/ISDN terminal equipment using IP Multimedia core network subsystem.

- ❖ **Recommendation ITU-T Q.4042.1 “Cloud interoperability testing about web application – part 1: Interoperability testing between CSC and CSP”** specifies the cloud interoperability testing items about web application between CSC and CSP as part 1. These testing objects are developed on the basis of cloud computing interoperability testing objectives specified in [ITU-T Q.4040]. The test cases for cloud interoperability testing about web application have also been introduced as appendix.
- ❖ **Recommendation ITU-T Q.4043 “Interoperability testing requirements of virtual switch”** specify virtual switch (vswitch) interoperability testing requirements. Firstly, as a basic background, this Recommendation introduces the overview of vswitch and interoperability testing of vswitch, which includes but not limited to the definition, characterises, general capabilities of vswitch as well as the overview of interoperability testing of vswitch. The description of cloud related use cases of vswitch is provided in the appendix, which will describe the involved interaction process. Based on analysis of involved vswitch capabilities in cloud related use cases, the corresponding derived requirements of vswitch’s interoperability testing are introduced.
- ❖ **Recommendation ITU-T Q.4061 “Framework of SDN controller testing”**: The concept of IMT-2020 is represented by a set of wide spectrum of info-communication applications, cloud services and network infrastructure, dynamically responding to the relevant requirements of each service, as already widely used and new. One of the approaches to build network infrastructure is software-defined approach (SDN). It is described in ONF TR-526 (consortium of the Open Network Foundation), and in ITU-R M.2083. This document contains: classification of SDN controller's tests; parameters, structure, sequence and methodology of SDN controller testing; testing report containment.

93. ITU-T CASC (Conformity Assessment Steering Committee) was established by ITU-T SG11 in 2015 to elaborate the recognition procedure of Testing Laboratories (TLs) which have competence for testing against ITU-T Recommendations. Two new ITU-T Guidelines “Testing Laboratories Recognition Procedure” and “ITU-T CASC procedure to appoint ITU-T technical experts” were approved in 2015 and 2017 respectively. Currently, ITU-T CASC is in the process of developing a third guideline, the “ITU-T CASC collaboration procedure with IECEE for TL recognition service on ITU-T Recommendations”, with an anticipated agreement date of October 2019.

94. In March 2019, ITU-T CASC started the process of appointing ITU-T technical experts following procedures defined in the relevant guideline. Following the review of applications, appointments will be announced at the next meeting of ITU-T CASC. ITU-T CASC continues its collaboration with existing conformity assessment Systems and schemes such as IEC and ILAC. The Certification Management Committee (CMC) of IEC has established an IECEE Task Force on “ITU requirements” which finalized the draft Operational Document (OD) “ICT Laboratory recognition Service on ITU-T Recommendations”. The OD is expected to become a dedicated testing laboratory recognition procedure, established by IECEE following the anticipated approval of the OD by IECEE in 2019. This decision will enable all testing laboratories to apply for such recognition following the instructions provided by the OD.

95. At the same time, ITU-T CASC, in collaboration with IECEE, is developing a joint ITU/IEC certification scheme. ITU-T CASC established a list of ITU-T Recommendations that may be addressed by joint ITU/IEC certification schemes with input received from ITU members. Among them are Recommendations ITU-T P.1140, ITU-T P.1100, ITU-T P.1110 and ITU-T K.116.

- 1) The [C&I Portal](#) is responsible to gather all information about the work done in Pillars 1 (conformance assessment) and 2 (interoperability); as Pillars 3 (capacity building) and 4 (assistance in the establishment of test centres and C&I programmes in developing countries).
- 2) The following [ITU guidelines](#) have been published on C&I: *i)* [Guidelines](#) for the development, implementation and management of mutual recognition arrangements/agreements (MRAs) on conformity assessment; *ii)* a [Feasibility Study](#) for the establishment of a Conformance Testing Center; *iii)* [Guidelines](#) on Establishing Conformity and Interoperability Regimes – Basic and Complete Guidelines.; *iv)* [Guidelines](#) for Developing Countries on establishing conformity assessment test labs in different regions.

- 3) ITU has organized [C&I training events and workshops in the regions](#). During these events, key issues were discussed highlighting the relevance of accreditation and certification, including mutual recognition agreements and arrangements to increase confidence in conformity assessment and decreasing the need of repeated testing. Trainings on EMC, mobile terminals, and C&I regimes for experts from Americas, Africa, Arab, CIS, and Asia-Pacific regions has been organized in the premises of partners' laboratories in the regions. Guidelines for building Test Labs for C&I of equipment and systems in developing countries were distributed, during the forums and the training courses.



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- 4) ITU is preparing [assessment studies](#) in the regions to determine C&I areas of commonalities and differences in the concerned countries, allowing to assessing the present situation in each beneficiary country and proposing a common C&I regimes for the participant countries. While promoting regional integration on ICT, the result of the studies can include either building new labs and/or establishing MRAs, as appropriate. Until 2016, assessment studies on C&I for SADC, Maghreb, EAC, COMTELCA the Caribbean Regions were finalized. Follow-up for each of the regions are taking place.

96. The ITU is providing assistance to developing countries on conformity and interoperability tailored to their needs. The ITU assisted Sri-Lanka, Zambia, Tanzania, Paraguay, and Ghana in building national Human capacity for C&I and to Government of Mongolia in setting up Type Approval systems in the country.

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97. The “ICT product conformity database” provides industry with a means to publicize the conformance of ICT products and services with ITU-T’s international standards. Currently, the C&I database contains more than 500 entries which include e-health devices, mobile phones, Ethernet services, IPTV and Mobile Number Portability systems (MNP).
 98. ITU has developed an [‘EMF Guide mobile app’](#) providing an up-to-date reference of the EMF information provided by the [World Health Organization](#) and ITU. The ‘EMF Guide mobile app’ is available in 6 languages. In April 2016, the EMF Guide & Mobile App on EMF was translated into Malay. It was launched during the Symposium on ICT, Environment and Climate Change by Dato'Jailani Johari, Deputy Minister of Communication & Multimedia, Malaysia.
 99. ITU and its partners, sharing a common community of interest, have recognized the relationship between IMT — [International Mobile Telecommunication](#) system — and “5G” and are working towards realizing the future vision of mobile broadband communications. Development of the radio-interface specifications for IMT-2020 has proceeded on schedule towards the timely delivery of the fifth generation (5G) of mobile broadband services. Specifications for UHD TV television with High Dynamic Range (HDR) were also approved in 2017.
 100. ITU-R hosted its major events, RA-15 and WRC-15. These were well attended and successfully brokered a consensus on important issues, including Global Flight Tracking for civil aviation and a number of global allocations to the mobile, fixed-satellite and Earth-exploration satellite services, as well as global identifications for International Mobile Telecommunications (IMT).
 101. ITU-R has advanced significantly with preparations for RA-19 and WRC-19 to underpin growth in the mobile, satellite and broadcasting industries. Consensus is being built on IMT allocations/ identifications above 24 GHz.
 102. Good results were achieved in multilateral meetings hosted by ITU-R to resolve cases of harmful interference and to coordinate frequencies for the transition to digital television broadcasting and the allocation of the digital dividend.
 103. Through its radiocommunication seminars, insightful workshops, and free online access policy, ITU-R continues to work closely with national administrations, influential policy-makers and leading industry executives in outreach and capacity-building on the application of the Radio Regulations and their significance.
 104. ITU celebrated the 110th anniversary of the Radio Regulations in 2016 and the 90th Anniversary of the CCIR/ITU-R Study Groups in 2017. These celebrations provided an opportunity to showcase the vital role of ITU-R in enabling and shaping the sustainable development of radiocommunications globally.

- In the framework of ITU-R Sector and Intersectoral objective number R.1: ‘Meet, in a rational, equitable, efficient, economical and timely way, the ITU membership’s requirements for radio-frequency spectrum and satellite-orbit resources, while avoiding harmful interference’, the following outcomes and outputs have been achieved:

- Outcomes:

- R.1-1: Increased number of countries having satellite networks and earth stations recorded in the Master International Frequency Register (MIFR)
- R.1-2: Increased number of countries having terrestrial frequency assignments recorded in the MIFR
- R.1-3: Increased percentage of assignments recorded in the MIFR with favourable finding
- R.1-4: Increased percentage of countries which have completed the transition to digital terrestrial television broadcasting
- R.1-5: Increased percentage of spectrum assigned to satellite networks which is free from harmful interference
- R.1-6: Increased percentage of assignments to terrestrial services recorded in the MIFR which are free from harmful interference

- Outputs:

- R.1-1 Final acts of world radiocommunication conferences, updated Radio Regulations
- R.1-2 Final acts of regional radiocommunication conferences, regional agreements
- R.1-3 Rules of Procedure adopted by Radio Regulations Board (RRB)
- R.1-4 Results of the processing of space notices and other related activities
- R.1-5 Results of the processing of terrestrial notices and other related activities
- R.1-6 RRB decisions other than the adoption of Rules of Procedure
- R.1-7 Improvement of ITU-R software

Outputs:

R.1-1 Final acts of world radiocommunication conferences, updated Radio Regulations

Following the World Radiocommunication Conference 2015 (WRC-15) held in Geneva from 2 to 27 November 2015, attended by 3 275 participants representing 162 Member States and 130 observer organizations, the updated version of the Radio Regulations (Edition of

2016) was published in December 2016 and made freely available to the public in electronic format.

The Conference took a number of decisions, which are reflected in the updated Radio Regulations or recorded in the minutes of its plenary sessions. The key topics included consideration of spectrum to facilitate global flight tracking for civil aviation (as mandated by PP-14), global allocations to the mobile, fixed-satellite and Earth-exploration satellite services, as well as global identifications of frequency bands for the operation of IMT.

In particular, the Conference approved various resolutions relating to the preparation of WRC-19 and WRC-23. The preparatory studies requested by these resolutions are being conducted within ITU-R, with the support of the regional groups and other international organizations, and address the following topics:

- Earth stations on board unmanned aircraft²
- Earth stations in motion, Non-geostationary systems in the fixed-satellite service, high altitude platform stations (HAPS)³
- International Mobile Telecommunications (IMT)⁴
- Wireless Access Systems including radio local area networks (R-LAN)⁵
- Intelligent Transport Systems (ITS)⁶
- Meteorological-satellite and Earth exploration-satellite services (space-to-Earth)⁷
- Machine-type communication infrastructures⁸

R.1-2 Final acts of regional radiocommunication conferences, regional agreements

No regional radiocommunication conferences were organized during the considered period.

² WRC-15 Res. 155; WSIS AL C2; SDG Targets 2.3, 2.4, 2.a, 14.a

³ WRC-15 Res. 158, 159, 160; WSIS AL C2; SDG Target 9.c

⁴ WRC-15 Res. 238; WSIS AL C2, C3, C7; SDG Targets 1.4, 3.8, 4.2, 4.3, 4.7, 5.b, 8.1, 8.2, 9.1, 9.3, 9.c, 10.2, 11.2, 13.1, 13.3, 16.7, 16.10

⁵ WRC-15 Res. 239; WSIS AL C2, C3, C7; SDG Targets 3.8, 4.2, 4.3, 4.7, 5.b, 8.1, 8.2, 9.c, 10.2, 16.7, 16.10

⁶ WRC-15 Res. 237; WSIS AL C2, C3, C7; SDG Targets 3.6, 9.5, 9.c, 11.2

⁷ WRC-15 Res. 766; WSIS AL C2, C3, C7; SDG Targets 1.5, 2.4, 3.9, 11.5, 11.b, 13.1, 13.3, 13.b, 14.1, 14.2

⁸ WRC-15 Res. 958; WSIS AL C2, C3, C6, C7; SDG Targets 2.3, 2.4, 2.a, 3.6, 11.2, 11.5, 11.b, 13.1[^]

Year	Coordination and notification requests / corresponding number of assignments in unplanned bands	Requests for broadcasting-satellite and associated feeder links Plans / corresponding number of assignments	Requests for fixed-satellite service Plan / corresponding number of assignments
2014	829/319 818	94/43 996	89/3 530
2015	970/804 560	61/34 052	81/5 322
2016	1267/414 865	100/25 484	84/4 087
2017	1186/1 017 489	79/45 522	55/1 692
Total 2014-2017	4252/2 556 732	334/149 054	309/14 631

R.1-3 Rules of Procedure adopted by Radio Regulations Board (RRB)

After the election of its members by PP-14, the Radio Regulations Board (RRB) met three times in 2015, 2016 and 2017. The RRB adopted 40 new or revised Rules of Procedure (RoPs) relating to decisions by WRC-15 and to practices by the Bureau in the application of the Radio Regulations and Regional Agreements. They were published as part of the [2017 edition of the RoPs](#).

R.1-4 Results of the processing of space notices and other related activities⁹

As shown in the table below, over the period 2014-2017, there was a significant increase in the treatment time for satellite notices (e.g. from four months in 2014 to six months in 2016 and 2017, for coordination requests). This was due to:

- modifications and updates in processing software as a result of WRC-15 decisions, and identification and correction of anomalies, which stalled the process for several months;
- multiple submissions of massive non-geostationary constellations in the fixed-satellite service;
- an increase in the number and complexity of geostationary satellite network notices received since WRC-15, as a result of decisions by WRC-15

These difficulties have been regularly reported to RRB and the Radiocommunication Advisory Group (RAG), and corrective measures, including the recruitment of additional staff, have been implemented. The situation with respect to treatment time is expected to return to normal in 2018.

After years of development, the software for the assessment of conformity of non-geostationary satellite constellations with the regulatory limits to protect geostationary

satellite networks became operational by the end of 2017, which enabled the processing of the 46 filings of massive constellations received since 2013.

Concerning satellite cost recovery in application of Council Decision 482, the total invoiced amount (excluding free entitlements) increased from CHF 13'745'128 in 2014, CHF 14'727'833 in 2015 to CHF 17'688'111 in 2016 and CHF 18'865'668 in 2017. The percentage of invoices paid in a timely manner (i.e. within six months of the date of issue) remained constantly higher than 99% over the period 2014-2017. The implementation of this Decision by BR did not give rise to any specific administrative difficulty. At its 2017 session, the Council instructed BR to provide elements toward the application of full cost recovery for non-geostationary satellite systems. These elements were discussed in ITU-R study groups and the RRB and made available to the Council at its 2018 session.

⁹ Art 12 of the CV; Council Dec. 482; Articles 9, 11, 13, 14, 15, 21 and 22, Appendices 4, 5, 7, 8, 30, 30A, 30B of the RR; Res. 4 (Rev.WRC-03), 49 (Rev.WRC-15), 55 (Rev.WRC-15), 85 (WRC-03), 148 (Rev.WRC-15), 539 (Rev.WRC-15), 552 (Rev. WRC-15), 553 (Rev.WRC-15); WSIS AL C2; SDG Target 9.c

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BR also acted as a facilitator for the resolution of disputes between administrations with regard to sharing access to orbit/spectrum resources, and provided assistance for the coordination of space or earth stations (around 80 cases of assistance for space stations and 350 of assistance for earth stations on average per year over the period 2014-2017). BR was also involved in the resolution of a number of cases of harmful interference (around 10 to 30 cases per year). The ITU membership was kept regularly informed of processing activities through [circular letters](#).

R.1-5 Results of the processing of terrestrial notices and other related activities¹⁰

BR continued to process notices to terrestrial services in accordance with the procedures set out in the Radio Regulations and Regional Agreements within the defined periods. The table below summarizes the various areas and corresponding outputs of this processing for the period 2015-2017.

Notices recorded in the MIFR/Plans	54
Review of findings for terrestrial stations recorded in the MIFR	44
Suppression from the MIFR at the end of the transition period defined by the GE06 Agreement (17 June 2015)	17
Notifications of coast and ship stations for recording in the ITU maritime database	55
High-frequency broadcasting requirements	60
Monitoring observations concerning the monitoring programme at 2 850- 28 000 kHz and 406-	11
Reports of harmful interference	5
	7

¹⁰ Art. 12 of the CV; Art. 9, 11, 12, 13, 14, 15, 16, 19, 20, 21, 23, 24, 27, 28, 43, 50, 51, 52, 56, 58, Appendices 4, 5, 17, 25,

26, 27 of the RR; Res. 1 (Rev.WRC-97), 12 (Rev.WRC-15), 13 (Rev.WRC-97), 122 (Rev. WRC-07), 205 (Rev.WRC-15), 207(Rev. WRC-15), 331 (Rev.WRC-12), 339 (Rev.WRC-07), 356 (Rev.WRC-07), 417 (Rev. WRC-15), 424 (WRC-15), 535 (Rev.WRC-15), 612(Rev.WRC-12), 647(Rev.WRC-15), 749 (Rev.WRC-15), 760 (WRC-15), 906 (Rev.WRC-15); Regional Agreements ST61, GE75, RJ81, GE84, GE85-M, GE85-N and GE06; WSIS ALC2; SDG Target 9.c

On 17 June 2015, following the end of the transition period defined by the GE06 Agreement, all UHF and relevant VHF analogue entries were cancelled from the GE06 Plan. Examination of the status of the analogue television assignments recorded in the MIFR resulted in the suppression of 17 554 assignments of 28 administrations, and the retention in the MIFR, for information only, of 26 330 assignments of 56 administrations.

Significant progress was made in resolving recurring cases of harmful interference/spill-over in the VHF/UHF band (broadcasting and mobile), through multilateral meetings between the administrations concerned, mediated and assisted by the BR.

The ITU membership was kept regularly informed of processing activities through [circular letters](#), website real-time updates and regulatory and service publications according to standard mechanisms:

- The BR International Frequency Information Circular (BR IFIC), published in DVD-ROM format.
- The List of Coast Stations and Special Service Stations (List IV) and the List of Ship Stations and Maritime Mobile Service Identity Assignments (List V) published every two years and every year respectively, in CD-ROM format, with a quarterly update of all changes notified to ITU.
 - a. The High-Frequency Broadcasting Schedules (HFBC), published monthly.
 - b. The Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services, published after each WRC.

R.1-6 RRB decisions other than the adoption of Rules of Procedure

The Board adopted its [Report on Resolution 80 \(Rev. WRC-07\)](#), which brought several issues to the attention of WRC-15 on cases presented to the Board. All of the Board’s reported decisions were endorsed by WRC-15. RRB decisions taken in 2015-17 on specific cases of satellite networks are summarized in the following table.

Extension of the regulatory deadlines of satellite networks	Cases referred to WRC while continuing to take into account the	Maintain satellite networks in or suppress them from the MIFR	Resubmission of satellite networks	Reinstatement or re-examination of satellite networks with unchanged date	Transfer of a satellite network to another notifying
13 cases accepted (9 for <i>force majeure</i> , 4 for co-passenger delay)	5 cases referred to WRC-15 (4 late requests for suspension, 1 case of extension of date of bringing into use)	2 cases maintained 4 cases suppressed	1 case accepted 1 case noted	4 cases accepted (2 due to late payment, 1 related to CS Article 48, 1 related to Appendix 30B)	1 case rejected 1 case not accepted based on elements provided
Other cases were referred to WRC-15 or WRC-19 (see next column)	2 cases referred to WRC-19 (2 late positioning of real satellites but no <i>force</i>			2 cases refused (1, related to Resolution 553, 1	

The RRB regularly reviewed the longstanding situation of harmful interference caused by Italian television and sound broadcasting stations in the VHF and UHF bands to its neighbouring countries. Concerning television, a three-year legal, financial and regulatory effort by the Italian Administration resulted in the successful switch-off of Italian TV transmissions causing harmful interference to the services of other countries on 61 frequencies.

The RRB also regularly reviewed the harmful interference caused by the Iridium satellite network (HIBLEO-2) to the radio astronomy service (RAS) in the band 1 610.6 – 1 613.8 MHz. Resolution of this issue is expected once the new constellation of Iridium satellites becomes fully operational in 2018.

R.1-7 Improvement of ITU-R software

Over the period 2015-2017, the Bureau continued to develop software applications and databases to enable efficient and timely processing of notices and to facilitate the use of ITU-R outputs by the ITU membership.

Activities for space applications resulted in the following achievements:¹¹

- Delivery of new and updated versions of the reference databases
- Migration of several software applications from Ingres to SQL Server
- Development of a secure communications system with and among administrations, in response to Resolution 907 (Rev. WRC-15), with expected delivery in 2018
- In 2015, delivery to administrations of the web application for the electronic submission and publication of space network filings, in line with Resolution 908 (Rev. WRC-12), upgraded in 2018 following WRC-15 decisions
- In 2018, delivery of the Space Interference Reporting and Resolution System (SIRRS), in response to Resolution 186 (PP-14)
- Delivery of new and improved versions of space services processing software for external use (BR IFIC (Space))
- In 2017, integration of the software for the assessment of conformity of non-GSO constellations with the regulatory limits (epfd).

For terrestrial services, these activities resulted in the following achievements:

- In 2016, delivery of new and updated versions of all terrestrial services processing software and reference databases, both for internal (TerRaSys) and external (BR IFIC (Terrestrial)) use, taking into account WRC-15 and RRB decisions
- Continuing integration of the various terrestrial Plans in **TerRaSys** (GE06, GE75, RJ81)
- Development of web applications providing online access to the MIFR and validation of notices
- Migration from Ingres to SQL server of various databases used in the processing of terrestrial notices
- Integration of the relevant BR outgoing correspondence in the myAdmin portal for broadcasting services, ensuring reliable communications with administrations
- Delivery of additional online calculation tools for Regional Plans and regional frequency coordination activities in the VHF and UHF bands.

¹¹ PP Res. 186, Art. 12 of the CV, Art. 9, 11, 13, 14, 15, Appendices 4, 5, 7, 8, 30, 30A, 30B of the RR, Res. 85 (WRC-03), 163 (WRC-15), 164 (WRC-15), 417 (Rev. WRC-15), 907 (Rev. WRC-15), 908 (Rev. WRC-15); RRB RoP; RAG Advice to the Director; WP4A (Doc. 4A/669 Annex 14); WSIS Action Line C2; SDG Targets 1.4, 9.c, 17.7, 17.8, 17.9, 17.16

The above-mentioned online web applications are currently used by more than 175 administrations. The Bureau also continued to improve the security aspects of its databases and software applications, including disaster recovery and business continuity procedures, isolation and protection from outside exposure. In addition, the Bureau developed new application tools, which were made available to the membership in 2017/2018:

- The [ITU Radio Regulations Navigation Tool](#)
- A spectrum management tool on the Table of Frequency Allocations of Article 5 of the Radio Regulations, for use in preparations for WRCs and national spectrum management
- A [search tool for ITU-R Recommendations](#), developed with financial support and participation by experts from the Japanese Administration
- Two [mobile applications for RA-15 and WRC-15](#). Following the positive feedback received, work started to make these applications available for all ITU-R meetings.

105. In the framework of ITU-R Sector and Intersectoral objective number R.2 to: ‘Provide for worldwide connectivity and interoperability, improved performance, quality, affordability and timeliness of service and overall system economy in radiocommunications, including through the development of international standards’, the following outcomes and outputs have been achieved:

Outcomes:

R.2-1: Increased mobile-broadband access, including in frequency bands identified for international mobile telecommunications (IMT)

R.2-2: Reduced mobile-broadband price basket, as a percentage of gross national income (GNI) per capita

R.2-3: Increased number of fixed links and increased amount of traffic handled by the fixed service (Tbit/s)

R.2-4: Number of households with digital terrestrial television reception

R.2-5: Number of satellite transponders (equivalent 36 MHz) in operation and corresponding capacity (Tbit/s); Number of VSAT terminals; Number of households with satellite television reception

R.2-6: Increased number of devices with radionavigation-satellite reception

R.2-7: Number of Earth exploration satellites in operation, corresponding quantity and resolution of transmitted images and data volume downloaded (Tbytes)

Outputs:

R.2-1 Decisions of Radiocommunication Assembly, ITU-R resolutions

R.2-2 ITU-R recommendations, reports (including the CPM report) and handbooks

R.2-3 Advice from the Radiocommunication Advisory Group

Outputs:

R.2-1 Decisions of Radiocommunication Assembly, ITU-R resolutions

In 2015, the Radiocommunication Assembly (RA) held from 26 to 30 October 2015, with 457 participants representing 96 Administrations and 38 Sector Members and Academia members approved 36 new or revised ITU-R Resolutions, notably on:

- Studies of disaster prediction, detection, mitigation and relief (<http://www.itu.int/pub/R-RES-R.55>)⁹
- Reduction of energy consumption for environmental protection and mitigating climate change by use of ICT/radiocommunication technologies and systems ¹⁰
- Principles for the process of future development of IMT for 2020 and beyond beyond (<http://www.itu.int/pub/R-RES-R.65>)¹¹
- Studies related to wireless systems and applications for the development of the Internet of Things (IoT) (<http://www.itu.int/pub/R-RES-R.66>)
- Telecommunication/ICT accessibility for persons with disabilities and persons with specific needs (<http://www.itu.int/pub/R-RES-R.67>)¹²
- Improving the dissemination of knowledge concerning the applicable regulatory procedures for small satellites, including nanosatellites and picosatellites (<http://www.itu.int/pub/R-RES-R.68>)¹³
- Development and deployment of international public telecommunications via satellite in developing countries (<http://www.itu.int/pub/R-RES-R.69>)¹⁴

R.2-2 ITU-R recommendations, reports (including the CPM report) and handbooks

Over the period 2014-2017, ITU-R approved 225 new or revised ITU-R Recommendations, 179 new or revised ITU-R reports, the Conference Preparatory Meeting Report to the World Radiocommunication Conference 2015 and eight new or revised ITU-R handbooks. Notably, adhering to its published schedule related to the development of IMT-2020 terrestrial radio interface technology, the three ITU-R Reports [M.2410](#), [M.2411](#) and [M.2412](#) were completed on time in 2017. These reports make up the three critical pillars underpinning [the IMT-2020 process](#) for technologies to obtain global IMT-2020 designation from ITU by early 2020. The table below summarizes the outputs of ITU-R study groups over the period 2015-17 in terms of Recommendations and reports adopted.

⁹ PP Res. 136; Res. ITU-R 55; WSIS AL C2, C7; SDG Targets 1.5, 2.4, 9.C, 11.5, 11.b, 13.1

¹⁰ Res. ITU-R 60-1; WSIS AL C2, C3, C7; SDG Targets 1.5, 2.4, 3.9, 7.3, 11.5, 11.b, 13.1, 13.3, 13.b, 14.1, 14.2

¹¹ PP Res. 137, 139, 197, 200, and 203; Res. ITU-R 65; WSIS AL C2, C3, C7; SDG Targets 1.4, 3.8, 4.2, 4.3, 4.7, 5.b, 8.1, 8.2, 9.1, 9.3, 9.c, 10.2, 11.2, 13.1, 13.3, 16.7, 16.10

¹² PP Res. 80 and 175; Res. ITU-R 67; WSIS AL C2, C4; SDG Targets 10.2, 11.2, 11.5, 11.B, 4.5, 4.A, 8.5

¹³ PP Res. 80; Res. ITU-R 68; WSIS AL C6; SDG Target 17.6

¹⁴ PP Res. 30, 34, 80, 135, 137, 139, 178, and 203; Res. ITU-R 69; WSIS AL C2; SDG Targets 9.C, 17.614 Report on the implementation of the strategic plan and activities of the Union

Subject	New or revised ITU-R Recommendations approved	New or revised reports approved
International Mobile Telecommunications (IMT) vision, frequency arrangements, radio interface, spectrum sharing and global circulation of terminals, enabling global mobile broadband development	M.1036-5 , 1457-13 , 1579-2 , 1580-5 , 1581-5 , 1850-2 , 2012-2 , 2014-1 , 2070-1 , 2071-1 , 2083-0 , 2090-0 , and 2101-0	M.2039-3 , 2290-0 , 2320-0 , 2324-0 , 2334-0 , 2370-0 , 2373-0 , 2374-0 , 2375-0 , 2376-0 , 2410-0 , 2411-0 and 2412-0
Maritime and aeronautical systems operational characteristics, identities and protection, including wireless avionics and global flight tracking	M.541-10 , 585-7 , 690-3 , 1371-5 , 2058-0 , 2092-0 M.2059-0 , 2067-0 , 2068-0 , 2085-0 and 2089-0	M.2231-1 , 2317-0 , 2358-0 , 2371-0 and 2372-0 , M.2318-0 and 2319-0 M.2396-0 and 2413-0 (flight tracking)
Land mobile communications, including cognitive radio systems, broadband wireless, railway communication and Intelligent Transport Systems (ITS) radio interface standards	M.2068-0 , 2084-0 (ITS)	M.2014-3 , 2227-1 , 2330-0 , 2378-0 , 2395-0 and 2418-0 M.2228-1 (ITS)

¹⁴ PP Res.137, 139, 197, 200, and 2
 9.1, 9.3, 9.c, 10.2, 11.2, 13.1, 13
 03; Res. ITU-R 65; WSIS AL C2, C3, C7; SDG Targets 1.4, 3.8, 4.2, 4.3, 4.7, 5.b, 8.1, 3, 16.7, 16.10
 7; WSIS AL C2. C4; SDG Targets 10.2, 11.2, 11.5, 11.B, 4.5, 4.A.

Subject	New or revised ITU-R Recommendations approved	New or revised reports approved
<p>Television and sound signals coding, production, exchange and broadcasting for HDTV, UHD TV and 3D, and sharing of broadcasting with other services, laying the foundation of the development of advanced television and sound technologies</p>	<p>Television: BO.1784-1 and 2098-0, BT.709-6, 1203-2, 1206-3, 1306-7, 1364-3, 1367-2, 1368-13, 1543-1, 1674-1, 1680-1, 1735-3, 1833-3, 1847-1, 1848-1, 1852-1, 1870-1, 1871-1, 1893-1, 2020-2 and 2021-1 Sound: BS.774-4, 1114-9, 1116-3, 1196-5, 1348-3, 1534-3, 1660-7, 1679-1, 1738-1, 1770-4, 2051-1, 2076-1, 2088-0, 2094-1, 2102-0 and BT.1365-2</p>	<p>BO. 2019-1, BS.2054-4, 2159-7, 2213-3, 2213-4, 2214-2, 2217-2, 2266-2, 2300-0, 2340-0, 2384-0, 2388-1 and 2399-0, BT. 2049-7, 2069-7, 2140-9, 2140-10, 2142-2, 2215-6, 2245-1, 2245-3, 2246-5, 2246-6, 2247-3, 2249-5, 2252-3, 2254-2, 2254-3, 2265-1, 2267-5, 2267-6, 2267-7, 2293-1, 2295-1, 2295-2, 2298-0, 2301-1, 2301-2, 2302-0, 2337-0, 2338-0, 2339-0, 2341-0, 2342-0, 2343-1, 2343-2, 2344-1, 2380-1, 2381-0, 2382-0, 2382-1, 2383-0, 2383-1, 2384-0, 2385-0, 2386-1, 2387-0, 2389-0, 2390-2, 2390-3, 2400-0, 2407-0 and 2408-0</p>
<p>Fixed communications technical and operational characteristics, channelling arrangements and spectrum sharing for radio-relays and fixed wireless access</p>	<p>F.557-5, 758-6, 1247-4, 1249-4, 1336-4, 1497-2, 1509-3, 1763-1, 1777-1, 1778-1 and 2086-0 M.1450-5, 1824-1 and 2003-1</p>	<p>F.2323-0, 2326-0, 2327-0, 2328-0, 2331-0, 2333-0, 2379-0, 2393-0, 2394-0</p>
<p>Radars technical and operational characteristics, protection, including aeronautical, meteorological and automotive radars</p>	<p>M.1460-2, 1463-3, 1464-2, 1465-2, 1466-1, 1638-1, 1796-2, 1849-1, 2008-1, 2057-0, 2069-0</p>	<p>M.2316-0, 2321-0 and 2322-0</p>
<p>Search and rescue, Public Protection and Disaster Relief (PPDR) radio interface standards, frequency arrangements and provision of services, enabling global harmonization</p>	<p>M.1478-3, 2009-1, 2015-1 and BO.1774-2 and BS.2107-0, F.1105-3 and SM 1051-3</p>	<p>BT. 2299-1 and 2299-2 M.2291-1, 2359-0 and 2377-0</p>
<p>Fixed, mobile, broadcasting and radionavigation-satellite systems characteristics and sharing of orbit/spectrum resources among GSO and non-GSO satellite systems, enabling the sustainable development of the space ecosystem</p>	<p>BO.1443-3, 1784-1, 2063-0, 2098-0 M.1174-3, 1787-2, 1827-1, 1831-1, 1906-1, 2014-1, 2031-1, 2082-0 and 2091-0 S.1587-3, 1717-1, 2062-0 and 2099-0</p>	<p>BO. 2007-2 and 2397-0 M.2305-0, 2360-0, 2369-0 and 2398-0 S.2173-1, 2223-1, 2306-0, 2357-0, 2361-0, 2362-0, 2363-0, 2364-0, 2365-0, 2366-0, 2367-0, 2368-0 and 2409-0</p>
<p>Radio amateur communications</p>	<p>M.1544-1, 1732-2</p>	<p>M.2335-0</p>

Subject	New or revised ITU-R Recommendations approved	New or revised reports approved
Propagation measurement, data analysis, modelling and prediction in various parts of the spectrum up to 375 THz, laying the foundation for the design of radiocommunication systems and the assessment of interference	P.311-17 , 341-6 , 372-13 , 452-16 , 453-13 , 525-3 , 527-4 , 530-17 , 531-13 , 533-13 , 617-4 , 618-13 , 619-3 , 620-7 , 676-1 , 678-3 , 679-4 , 681-10 , 684-7 , 832-4 , 833-9 , 834-9 , 835-6 , 836-6 , 837-7 , 840-7 , 841-5 , 1057-5 , 1144-9 , 1238-9 , 1240-2 , 1321-5 , 1406-2 , 1407-6 , 1411-9 , 1510-1 , 1511-1 , 1621-2 , 1812-4 , 1816-3 , 2001-2 , 2040-1 , and 2108-0	P.2145-2 , 2345-1 , 2346-1 , 2346-2 and 2402-0
Earth exploration-satellite, Meteorological-satellite, Space Research and Radioastronomy services characteristics, protection/sharing, including manned research, data relay, nano satellites, enabling prediction of weather, monitoring of Earth's resources and understanding of climate	RA.1513-2 , RS.2066-0 and 2065-0 , RS.2042 , 2043 , 2064-0 , 2105-0 and 2106-0 , SA.510-3 , 1014-3 , 1018-1 , 1019-1 , 1026-5 , 1027-5 , 1155-2 , 1159-4 , 1160-3 , 1161-2 , 1276-5 , 1414-2 , 1810-1 , 2078-0 and 2079-0 .	RA.2332-0 and 2403-0 RS.2308-0 , 2310-1 , 2311-0 , 2313-0 , 2314-0 , 2315-0 , 2336-0 and 2350-0 SA. 2276-1 , 2307-0 , 2309-0 , 2312-0 , 2325-0 , 2329-0 , 2348-0 , 2349-0 , 2401-0 , 2403-0
Spectrum Management , including methods for identification and elimination of interference, data dictionary, spectrum redeployment, spectrum use measurement, unlicensed and shared uses of spectrum, dynamic spectrum access, smart grids and wireless power transmission	SM.1046-3 , 1268-3 , 1268-4 , 1413-4 , 1541-6 , 1600-3 , 1603-2 , 1875-2 , 1880-2 , 2060-0 , 2061-0 , 2080-0 , 2093-0 , 2096-0 , 2097-0 , 2103-0 , 2104-0 and 2110-0	SM.2012-5 , 2028-2 , 2056-1 , 2093-2 , 2130-1 , 2153-6 , 2182-1 , 2211-1 , 2256-1 , 2257-3 , 2257-4 , 2303-1 , 2303-2 , 2304-0 , 2351-2 , 2352-0 , 2353-0 , 2354-0 , 2355-0 , 2356-1 , 2391-0 , 2392-0 , 2404-0 and 2405-0
Accurate Time and Frequency signals transmission, including consideration of the leap second	TF.374-6 , 538-4 , 1153-4	
Vocabulary and terminology harmonization	V.430-4 , 431-8 , 573-6 , 574-5 , 665-3	
Radiocommunication systems for persons with disabilities	M.1076-1	BT. 2207-3

ITU-R study groups also adopted eight new and updated handbooks: Computer-aided Techniques for Spectrum Management (CAT); Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction; National Spectrum Management; Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction; Amateur and amateur-satellite services; Guidance for bilateral/multilateral discussions on use of frequency range 1350 MHz-43.5 GHz fixed service systems; Global Trends in International Mobile Telecommunications and Digital Terrestrial Television Broadcasting networks and systems implementation.

R.2-3 Advice from the Radiocommunication Advisory Group

The Radiocommunication Advisory Group (RAG) The Radiocommunication Advisory Group (RAG) reviewed the priorities and strategies adopted in the Sector and provided guidance for the work of the study groups. The outputs of the RAG included¹⁷ advice on the BR information system, the working methods of ITU-R study groups and radiocom- munication assemblies, RA-19 and WRC-19 preparations, and coordination with ITU-D on WTDC Resolution 9 (Rev. Dubai 2014).

106. In the framework of ITU-R Sector and Intersectoral objective number R.3: ‘Foster the acquisition and sharing of knowledge and know-how on radiocommunications’, the following outcomes and outputs have been achieved:

Outcomes:
R.3-1: Increased knowledge and know-how on the Radio Regulations, Rules of Procedures, regional agreements, recommendations and best practices on spectrum use
R.3-2: Increased participation in ITU-R activities (including through remote participation), in particular by developing countries
Outputs:
R.3-1 ITU-R publications
R.3-2 Assistance to members, in particular developing countries and LDCs
R.3-3 Liaison/support to development activities
R.3-4 Seminars, workshops and other events

Outputs:

R.3-1 ITU-R publications

The new edition of the Radio Regulations was released in November 2016, incorporating all changes decided by WRC-15. The associated Rules of Procedure, updated by the RRB, were released in 2017.

In addition, 180 ITU-R Recommendations, 124 ITU-R reports and seven ITU-R Handbooks were published over the period 2015-17. Given the success of the free online access policy, all ITU-R Handbooks have also been made available for download free of charge since January 2017.

During the period 2014-2017, there were over 5 million downloads of ITU-R Recommendations (18 Series), over 1 million downloads of ITU-R reports (13 Series); 41 000 downloads of ITU-R handbooks, the most popular of which was the Spectrum Monitoring Handbook; 35 000 downloads of the Radio Regulations; and 8 000 downloads of the Rules of Procedure. These documents were downloaded from 190 countries around the world.

The Radio Regulations (2012 edition) sold more than 18 000 copies in 37 months, while the Radio Regulations (2008 edition) sold 15 000 copies over 51 months in the absence of the free download policy. This confirms the positive impact of this policy from both financial and outreach perspectives.

R.3-2 Assistance to members, in particular developing countries and LDCs

In close cooperation with BDT and ITU regional offices, assistance continued to be given to the ITU membership, in particular developing countries, on matters relating to radiocommunications, in particular by providing:

- Support to national spectrum management activities, long-term frequency management, such as the transition to digital broadcasting and allocation of the digital dividend, including the provision of technical assistance and capacity building.
- Individual or group training at ITU headquarters on radio regulatory procedures at the request of interested administrations.
- Support to meetings of the regional groups, in particular for WRC preparations and associated initiatives such as frequency coordination activities in the UHF band in the Caribbean and Central American Region, in cooperation with CITEC, COMTELCA and CTU, in South-East Europe (SEDDIF), and in the Black Sea and Caspian Sea area.

R.3-3 Liaison/support to development activities¹⁵

Strong cooperation was maintained with international organizations such as the International Maritime Organization (IMO), International Civil Aviation Organization (ICAO), World Meteorological Organization (WMO), UN Office for Outer Space Affairs (UN-COPUOS), and regional and subregional organizations (including APT, ASMG, ATU, CEPT, CITEC, RCC, EBU, ABU, ESOA, IEC, GSMA, GSA, GVF, ICTO, ITSO, UNDAC, CTU, PITA, and CTO).

ITU-R maintained close liaison with standards-making bodies through participation in various forums such as Global Standards Collaboration (GSC), World Standards Collaboration (WSC), and 3rd-Generation Partnership Projects (3GPP), and provided support for the work of ITU-D on topics such as spectrum management, IMT, digital broadcasting and emergency communications. Liaison and coordination with ITU-T also took place, particularly in the area of power line telecommunications (PLT) and electromagnetic fields (EMF). Specific activities included:

- Contributions to the ITU Global Symposium for Regulators (GSR).
- Support for BDT in gathering ICT sector metric data, expanding on spectrum regulatory aspects through the ITU's ICT-Eye portal for data and statistics, and development of relevant ICT definitions to measure the information society in areas specific to radiocommunications.
- Cooperation with the World Telecom/ICT Indicators Symposium (WTIS).
- Participation in the joint BR/BDT project to develop a spectrum management training programme (SMTP).

¹⁵ Res. 9, 71, 72; WSIS AL C11; SDG Targets 17.7, 17.8, 17.9, 17.16, 17.19

R.3-4 Seminars, workshops and other events

With the objective of informing and assisting the ITU membership, in particular developing countries, on radiocommunication-related matters, BR continued to organize spectrum-related workshops, seminars, meetings and capacity-building activities, with the support of the Regional Offices and BDT and in cooperation with the relevant international organizations and national authorities.

As a complement to the traditional biennial world radiocommunication seminars (WRS), BR has implemented, in consultation with RAG, a regional outreach strategy through the organization of yearly cycles of regional radiocommunication seminars (RRS) held in different regions worldwide, fostering human capacity building on the use of the radio-frequency spectrum and satellite orbits, and the application of the ITU Radio Regulations. These seminars are hosted by the entity in charge of spectrum management in the host country, in cooperation with the relevant regional organizations and ITU regional/area offices.

In the 2015-2017 period, 90 partial and 30 full fellowships were granted by BR for RRS participants. A total of 11 seminars gathered more than 1 300 participants from more than 160 countries:

- Four RRSs in 2015: for Eastern Europe and the CIS countries (Kyrgyzstan), Africa (Niger), Asia and the Pacific (Philippines), and the Americas (El Salvador), with a total of 296 participants from 80 countries.
- WRS-16, with 453 participants from 109 countries.
- Two RRSs in 2016: for the Americas (Trinidad and Tobago) and Asia and the Pacific (Samoa), with 104 participants from 21 countries.
- Four RRSs in 2017: for Africa (Senegal), the Americas (Peru), Asia and the Pacific (Cambodia) and the Arab countries (Oman), with 450 participants from 80 countries.

Support was also provided to other ITU seminars related to topics such as spectrum management, space radiocommunication applications, climate change and emergency telecommunications. Other supported events included satellite symposia and an Internet of Things workshop. All workshops and events organized within ITU-R can be found at: www.itu.int/en/ITU-R/seminars/Pages/default.aspx.

In 2016 and 2017, ITU celebrated the [110th anniversary of the Radio Regulations](#) and the [90th anniversary of the CCIR/ITU-R Study Groups](#) respectively. These celebrations provided an opportunity to showcase the essential role of ITU-R activities and processes in enabling and shaping the sustainable development of the radiocommunication ecosystem globally. Celebrations included panel discussions with the main spectrum stakeholders. The events were attended respectively by over 540 participants from 106 countries (on 12 December 2016) and by 257 participants from 59 Member States and 47 Sector Members (on 21 November 2017). Current and former officials of the Union, and current and former members of the Radio Regulations Board (RRB), as well as ITU-R and former CCIR study group chairmen, were also present.

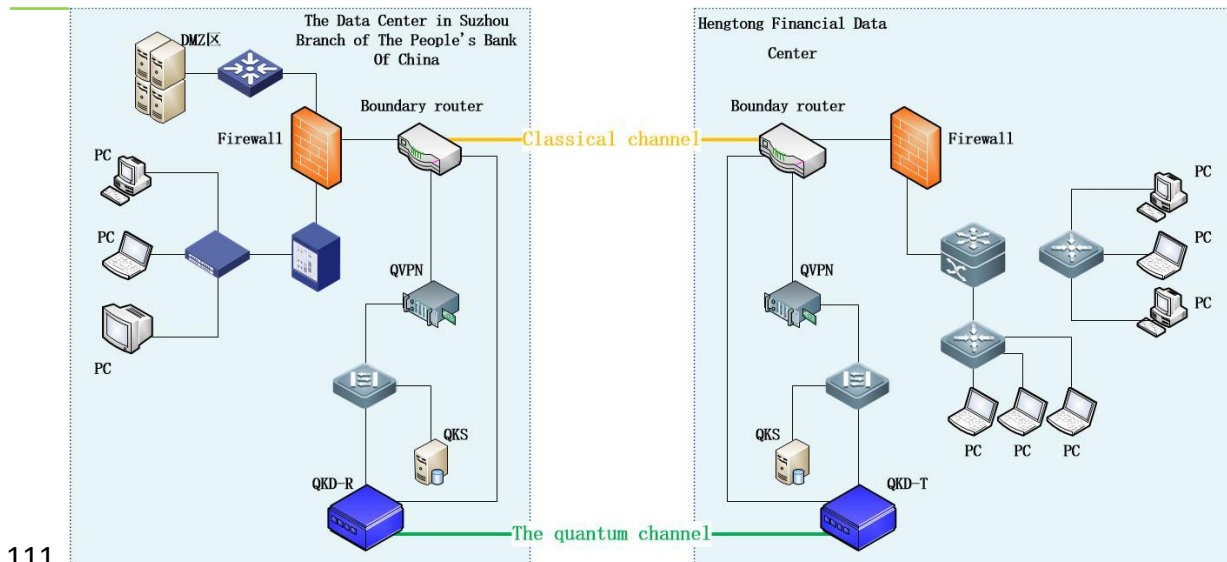
Action Line C5: Building Confidence and Security in the use of ICTs (also related to the 2030 Agenda for Sustainable Development)



Related to SDGs: SDG 1 (1.4), SDG 4 (4.1, 4.3, 4.5), SDGs 5 (5.b), SDGs 7 (7.1, 7.a, 7.b), SDG 8 (8.1), SDGs 9 (9.1, 9.c),



107. A fundamental role of the ITU, following the WSIS Summit and the 2006 ITU Plenipotentiary Conference, is to build confidence and security in the use of ICTs.
108. The 14th Action Line C5 facilitator's meeting was held on Thursday, 11 April 2019. The theme of this year was **"Importance of measurement in Cybersecurity"**. The session aimed to discuss the importance of measuring cybersecurity capacity, through data collection, analysis and research, in order to identify good practices and lessons learned in support of policy and decision-making processes.
109. As the main outcome of this session, it was agreed that cybersecurity is a critical challenge and there are a number of different ways in which efforts undertaken by countries, as well as the level of preparedness to properly respond to threat from the various angles, can be measured and assessed. More details about the meeting are available here.
110. The WSIS Prizes 2019 Winner for the Action Line C5 is China United Telecommunications Co., Ltd. for the project "Data Encryption Leak-proof and Tamper-resistant Network System Based on Quantum Communication Trunk Line". With the development of Information and Communication Technology (ICT), more people have access to the Internet and massive information, however, security concerns are increasing in parallel and require particular attention. To protect the information security of citizens and to facilitate the realization of WSIS Action Lines in order to facilitate sustainable economic development and information security, China United Telecommunications Co. Ltd. and Hengtong Optic-Electric Co. Ltd. have actively assumed corporate social responsibility and have developed an information encryption anti-leakage and anti-eaves dropping system based on the Beijing-Xiong'an & Nanjing-Shanghai Quantum Secure Communication Trunk. This project adopts the self-developed F-M phase coding system and won the pilot project of network security for the telecommunications and Internet industry of the Ministry of Industry and Information Technology.



In the future, the construction results based on this project can serve Beijing-Tianjin-Hebei Quantum Communication Ring Network; Yangtze River Delta Quantum Communication Ring Network can be constructed to provide secure quantum communication services for the urban agglomerations. The most important result of this project is to provide a paradigm for protecting the information security of global citizens, which makes the project replicable and extensible. More details [here](#).

112. Cybersecurity and Countering Spam Activities:

- The Global Cybersecurity Agenda (GCA) provides a framework for international cooperation aimed at enhancing confidence and security in the information society. Resolution 130 (Rev. Dubai, 2018) clearly endorses the GCA as the ITU-wide strategy on cybersecurity.
- The GCA is built upon five strategic pillars or work areas around which its work is organized: (i) Legal Measures, (ii) Technical and Procedural Measures, (iii) Organizational Structures, (iv) Capacity Building and (v) International Cooperation. Within ITU, the activities below, organized along the five pillars of the GCA, shows the complementary nature of existing ITU work programmes and facilitates the implementation of BDT, TSB and BR activities in this domain.

(i) Legal Measures (SDG 7 (7.1, 7.a, 7.b), SDG 9 (9.1, 9.c), SDG 11 (11.3, 11.b), SDG 16 (16.2), SDG 17 (17.8))

113. As part of Objective 2/Output 2.2 of the Buenos Aires Action Plan, and taking into account ITU-D Q 3/2 (former Q22/1), ITU is assisting Member States in understanding the legal aspects of cybersecurity through its [ITU Cybercrime Legislation Resources](#) in order to help harmonize their legal frameworks.

114. In the area of legal measures, ITU collaborates closely with partners such as UNODC and others that may have expertise in this area.

(ii) Technical and Procedural Measures (SDG 1 (1.4), SDG 7 (7.1, 7.a, 7.b), SDG 9 (9.1, 9.c), SDG 11 (11.3, 11.b), SDG 17 (17.8))

115. In order to identify cyberthreats and countermeasures to mitigate risks, ITU-T has developed Recommendations of security requirements, guidelines and specifications for ICT and IP-based systems. ITU-T also provides an international platform for the development of the protocols, systems and services that protect current and Next Generation Networks (NGN). ITU-T's work on secure communication services, reviews enhancements to security specifications for mobile end-to-end data communications and considers security requirements for web services and application protocols.
116. [ITU-T Study Group 17 \(SG17\)](#) is the lead study group on security and identity management with its role being reinforced by WTSA-16 Res. 50 and 52. SG17 is also working on the implementation of WTSA-12 Res. 58 to “Encourage the creation of national Computer Incident Response Teams, particularly for developing countries” and is following Resolution 130 of the Plenipotentiary Conference (Rev. Dubai, 2018). Study Group 17 has continued its responsibility for building confidence and security in the use of information and communication technologies (ICTs) and continues to be instrumental in study and standardization in the areas of cybersecurity, anti-spam, IdM, ITU-T X.509 certificates, information security management, ubiquitous sensors networks, telebiometrics, mobile security, virtualization security towards cloud computing security, personally identifiable information protection and security architecture and application security, often in cooperation with external Standards Developing Organizations and Consortia. intelligent transport system security, cybersecurity, countering Instant Messaging Spam, identity management, X.509 certificates, information security management, telebiometrics. SG17 approved the following Recommendations:
- ❖ **Recommendation ITU-T X.1042 “Security services using the software-defined networking”** supports the protection of network resources using security services based on software-defined networking (SDN). This Recommendation first classifies the network resources for SDN-based security services: SDN application, SDN controller, SDN switch and security manager (SM). This Recommendation then defines security services based on SDN.
 - ❖ **Recommendation ITU-T X.1043 “Security framework and requirements of service function chain based on software-defined networking”** analyses security threats to the software-defined networking (SDN) based service function chain (SFC) and defines security requirements. The corresponding security countermeasures are also given. This Recommendation helps the reader to understand the security risks encountered when using the SDN-based SFC and further help to develop and implement secure service chain architecture.
 - ❖ **Recommendation ITU-T X.1093 “Telebiometric access control with smart ID cards”** describes the general scheme for logical and/or physical access control using the biometrics-on-card. This Recommendation can be applied to the recent emerging area of requiring secure physical and also logical access control management.
 - ❖ **Recommendation ITU-T X.1094 “Telebiometric authentication using biosignals”:** Biometric technology in mobile devices is frequently used in various areas that require a high level of reliability, such as smart car, e-banking, e-payment, telemedicine and

e-healthcare services. In particular, it is necessary to implement countermeasures, which can pre-emptively cope with fake physiological biometrics to ensure mobile telebiometric data security to presentation attacks. Therefore, Recommendation ITU-T X.1094 specifies new secure and strong telebiometric authentication methods using biosignals.

- ❖ **Recommendation ITU-T X.1147 “Security requirements and framework for big data analytics in mobile Internet services”** mainly analyse the security requirements of big data analytics in mobile Internet services, and provide security framework.
- ❖ **Recommendation ITU-T X.1215 “Use Cases for Structured Threat Information Expression (STIX)”** provides various use cases for how the STIX language may be used to support cyber threat intelligence and information sharing. This Recommendation also describes concepts and functionality of Structured Threat Information Expression (STIX). It is targeted to support a range of use cases involved in cyber threat management, including analysing cyber threats, specifying indicator patterns for cyber threats, managing response activities, and sharing cyber threat information. Given this kind of information, a security decision can be made on how to best defend against the threat. It is intended to support both more effective analysis and the continued exchange of cyber threat information. The STIX suite of specifications is maintained under the responsibility of OASIS. See https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=cti
- ❖ **Recommendation ITU-T X.1249 “Technical framework for countering mobile in-application advertising spam”** provides a technical framework for countering mobile in-application advertising spam. Mobile in-application advertising spam is the sending of unsolicited advertisements, which are displayed within a mobile phone application. This unsolicited advertising can appear on the display screen of a mobile device as a banner at the top or bottom of the screen, a mobile interstitial, or an overlay. Along with the rapidly increasing development of mobile applications, mobile in-application advertisement has been surging dramatically. Filtering malicious advertisements may improve the user experience and even security. Therefore, it may be beneficial to establish a practical framework for countering mobile in-application advertising spam, which can reasonably integrate the advantages of all countermeasures.
- ❖ **Recommendation ITU-T X.1277 “FIDO Universal Authentication Framework (UAF)”** enables online services and websites, whether on the open Internet or within enterprises, to transparently leverage native security features of end-user computing devices for strong user authentication and to reduce the problems associated with creating and remembering many online credentials.
- ❖ **Recommendation ITU-T X.1278 “Client To Authenticator Protocol/Universal 2-factor framework”** describes an application layer protocol for communication between an external authenticator and another client/platform, as well as bindings of this application protocol to a variety of transport protocols using different physical media.
- ❖ **ITU-T X.Suppl.34 – Supplement 34 to ITU-T X.1051 | ISO/IEC 27011 (2016) “Information technology – Security techniques – Code of practice for information security controls based on ISO/IEC 27002 for telecommunications organizations”** highlights and shares the implementation of code of practice for information and network security management by Malaysian information and communication industry

based on ITU-T X.1051. The sets of requirements have been identified and documented in the “Requirements for Information and Network Security (INS)” developed by MTSFB and approved by MCMC on 5 October 2016. The requirements are based on ITU-T X.1051 for establishing, implementing, maintaining and continually improving an information and network security management within the context of an organization. The code of practice for information security controls based on ITU-T X.1051 for Malaysian telecommunication organizations provide four (4) families of control focusing on organization, infrastructure, people and environment.

117. ITU-T Study Group 3 initiated work on a policy framework and principles for data protection in the context of big data relating to international telecommunication services.
- ❖ ITU-T Study Group 13 progressed the work on inter-cloud trust management. **Recommendation ITU-T Y.3517 “Cloud computing - Overview of inter-cloud trust management”** provides an overview of inter-cloud trust management by specifying isolation and security management mechanism, inter-cloud trust management model, reputation-based trust management in inter-cloud environment, cloud service evaluation framework and the relationship with cloud computing reference architecture. It also provides requirements for inter-cloud trust management derived from the corresponding use cases.
 - ❖ **Recommendation ITU-T Y.3053 “Trustworthy networking deployment architecture and procedure – Amendment 1”** contains modifications to add trustworthy networking deployment architecture and procedures for IP networks in the Internet.
 - ❖ **Recommendation ITU-T Y.3053 (2018) Amd.1 “Framework of trustworthy networking with trust-centric network domains: Amendment 1 - Trustworthy networking deployment architecture and procedures”** contains modifications to add trustworthy networking deployment architecture and procedures for IP networks in the Internet.
 - ❖ **Recommendation ITU-T Y.3800 “Framework for Networks supporting Quantum Key Distribution”** (under approval) specifies a framework for networks supporting quantum key distribution (QKD). This Recommendation provides support for design, deployment, operation and maintenance to implement QKD technologies with user networks in terms of opened and standardized technologies. In this Recommendation, the relevant network aspects for main structure, layered model and basic functions are within the scope of the Recommendation to support its implementation.
118. ITU-T Study Group 20 is the lead Study Group for IoT identification and within Q6/20 on “Security, privacy, trust and identification for IoT and SC&C” developed draft Recommendation ITU-T Y.4459 “An architecture for IoT interoperability”.
119. ITU-R’s work in radiocommunication standardization continues, matching the constant evolution in modern telecommunication networks. ITU-R established clear security principles for IMT (3G, 4G and 5G) networks (Rec. ITU-R M.1078, M.1223, M.1457, M.1645, M.2012 and M.2083). It has also issued Recommendations on security issues in network management architecture for digital satellite systems (Rec. ITU-R S.1250) and performance enhancements of transmission control protocol over satellite networks (Rec. ITU-R S.1711). Futuristic mobile technologies foresee “IMT for 2020 and beyond”, please read more here: <https://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2020/Pages/default.aspx>

(iii) Organizational Structures (SDG 1 (1.4), SDG 7 (7.1, 7.a, 7.b), SDG 9 (9.1, 9.c), SDG 11 (11.3, 11.b), SDG 17 (17.8))

120. ITU continues to help build capacity at regional and international levels. ITU has undertaken technical assessments to evaluate the preparedness for the establishment of Computer Incident Response Teams (CIRTs) in 76 countries and is continuing with the necessary follow-up actions. National CIRT establishment and improvement is currently underway in Botswana, Burundi, Gambia, Palestine, Chad, Malawi, Kenya and Zimbabwe after the successful completion of related activities in 18 countries.
121. ITU partnered with the Global Cyber Security Capacity Centre at the Oxford Martin School, and jointly performed Cybersecurity Capacity Reviews in Thailand, Sierra Leone, and Madagascar. Following a project funded by the Australian Government (DOCA), in 2019, ITU has executed CIRT assessments in Samoa and Tonga, Vanuatu and Papua New Guinea, which will be followed by Cybersecurity Capacity Reviews.
122. ITU continues to conduct Cyber Drills for its partner countries. So far, ITU has conducted 25 Cyber Drills involving more than 100 countries. In the past year, international Cyber Drills were held on 27-31 May 2019 in Bucharest, Romania for the Europe region, and drills are planned for **a)** 23-27 September 2019 in Kuala Lumpur, Malaysia for Asia-Pacific region, **b)** 27-31 October 2019 in Muscat, Oman for the Arab region, **c)** tentatively on 4-8 November 2019 in Neuquen, Argentina for the Americas region and **d)** 18-22 November 2019 in Kampala, Uganda for the Africa region.
123. The Guide to Developing a National Cybersecurity Strategy (NCS Guide), that has been developed and launched during ITU Telecom World in September 2018, is now being deployed in several Member States and regions. Regional workshops were held on 26-28 June 2019 in Skopje, Republic of North Macedonia for the Balkan States and more workshops are planned on 24-29 August 2019 in Jakarta, Indonesia for the Asia-Pacific region. National deployments are being carried out in Benin, Bahamas, Botswana, and Malta. A plan to update the existing guide is also under way.
124. In April 2019, within the framework of the ITU European Regional Initiative on Enhancing Trust and Confidence in the use of ICTs, an event on safe internet day was organized in Albania where ITU provided strategic points of view taking into account ongoing discussions on CIRT implementation in Albania.
125. A National CIRT planning and implementation for Vanuatu workshop, organized in collaboration with the Global Centre for Cybersecurity Capacity Building, was held on 18-22 March 2019 at Port Vila, Vanuatu to assist in (a) the execution of CIRT design activity and (b) reaching agreement on a roadmap for implementation. A national cybersecurity assessment was conducted using the Cybersecurity Capability Maturity Model (CMM).
126. ITU participated in the Vienna Cybersecurity Week from 11-15 March 2019 in Vienna, Austria, with ITU represented in several relevant sessions focusing on cybersecurity in order to present ITU's work and activities. ITU also moderated some sessions, and presented the ITU Regional initiative for Europe on cybersecurity.
127. From 27-31 May 2019, ITU organized a cybersecurity week and cyberdrill with the Government of Romania in Bucharest to help countries identify their capacity in

cybersecurity and coordinate the execution of cyberdrills for countries from the Europe region in order to improve effectiveness of CIRTs.

128. In June 2019, ITU, in collaboration with DCAF, organized a Regional Workshop for Europe on “National Cybersecurity Strategies for Western Balkan Economies”. The Workshop took place in Skopje, Republic of North Macedonia, from 26-28 June 2019. The aim of the event was to deliver training on National Cybersecurity Strategies and perform hands-on exercises designed to assist participating countries on how to improve their strategies.
129. A coordination meeting was hosted by the World Bank in Washington from 11-16 April 2019 for the Mission Billion Challenge. ITU was invited as the judge for the ID4D Mission Billion Challenge and also to present progress related to the National Cybersecurity Strategy initiative. The meeting also highlighted the steps that ITU is undertaking to carry out deployment of the NCS Guide at the regional and national level within Member States.
130. Under the framework of the ITU European Regional Initiative on Enhancing Trust and Confidence in the use of ICTs, ITU moderated a conference on cybersecurity on 5-6 June 2019 in the Republic of North Macedonia, with an aim to present ITU’s cybersecurity activities and, in particular, to elaborate upon the ITU regional initiatives for Europe on cybersecurity.

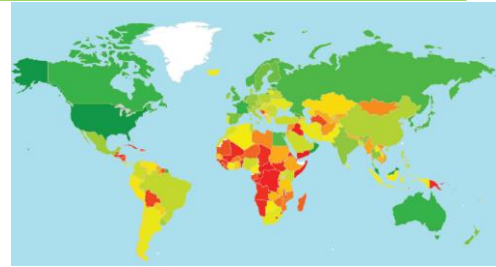
(iv) Capacity Building (SDG 1 (1.4), SDG 7 (7.1, 7.a, 7.b), SDG 9 (9.1, 9.c), SDG 11 (11.3, 11.b), SDG 17 (17.8))

131. ITU continues to organize regional cybersecurity forums for all ITU regions, using them as a capacity-building vehicle for different BDT programmes and activities as well as an operational platform for cooperation at the regional and international level.
132. In February 2019, ITU participated in the Cyber Defence summit that was held in Riyadh, Saudi Arabia to share information about ITU’s activities with other participants and also to continue discussions with the Government of Saudi Arabia on the subject.
133. A three-day workshop to advise the INTERPOL General Secretariat on policy formulation and project implementation regarding programmes and operations related to cybersecurity was held on 24-26 April in Lyon, France. The meeting brought together representatives from law enforcement, private sector, academia and international organizations across the world to enhance cooperation on cybercrime.
134. A workshop organized by ITU, in consultation with Deloitte, was held in Ivory Coast from the 29 July–2 August. The aim of the workshop was “information gathering” to improve cybersecurity in Ivory Coast. The collaboration will focus mainly on drafting a proposal with a blueprint and inputs to the National Cybersecurity Strategy.
135. Within the framework of GCA, the ITU in collaboration with the Global Forum on Cyber Expertise (GFCE) will participate in a thematic workshop on national strategies and CIRTs from 8-10 October 2019, in Addis Ababa, Ethiopia to present ITU’s activities on the NCS Guide and the CIRTs initiatives.
136. ITU continues to organize, co-organize, and participate in various human capacity-building forums and meetings as described below. Extensive information can be found in BDT’s

quarterly and annual performance reports, available at <<https://www.itu.int/en/ITU-D/Pages/OperationalPlansPerformanceReports.aspx>>.

137. Sub- regional training on the role of information and communication technologies (ICTs) in the context of regional and international security was held on the 23-24 May 2019 in Sarajevo, Bosnia upon invitation by OSCE to showcase ITU activities on cybersecurity and to advance collaboration on the National Cybersecurity Strategy initiative. This meeting also accelerated the handing over of the revised CIRT assessment report to Bosnia and facilitated discussions on the follow-up funding for CIRT implementation of Bosnia.
138. A regional capacity building workshop on National Cybersecurity Strategy was held from 26-30 August 2019 in Jakarta, Indonesia. The aim of the event was to deliver training on National Cybersecurity Strategies and perform hands-on exercises designed to assist participating countries on how to improve their own strategy.
139. Training courses in cybersecurity are being identified, and discussions have been initiated with a view to providing courses through the ITU Academy. To facilitate regional training in cybersecurity, the ITU Centre of Excellence Global network has endorsed five training institutions; namely two in the Africa region, one in Asia-Pacific and two in Europe. These institutions have been conducting training in Cybersecurity as part of their regional training plans under the Centres of Excellence initiative.
140. The cybersecurity needs of least developed countries (LDCs) are the focus of particular attention under ITU's "Enhancing Cybersecurity in Least Developed Countries" project. This project focuses on assisting the LDCs to enhance their capabilities, capacity, readiness, skills and knowledge in the area of cybersecurity. Apart from human capacity building, the project is also geared towards providing the appropriate enabling technologies and related tools to assist LDCs in carrying out activities with regard to securing their cyberspace.
141. To date, the project has been implemented in Sierra Leone, Republic of Guinea, Djibouti, Comoros and Vanuatu, and is at different stages of implementation in Afghanistan, Angola, Bhutan, Burundi, Chad, Haiti, Kiribati, Lao, Mauritania, Myanmar, Rwanda, Tanzania, Uganda and Zambia. Given the strong interest of Gambia in enhancing its cybersecurity capabilities, the project in Gambia has been augmented to a national CIRT establishment.
142. A workshop to provide assistance to Cote d'Ivoire on drafting its National Cybersecurity Strategy was organized by ITU in consultation with Deloitte from 29 July-2 August 2019. The aim of the workshop was "information gathering" to improve cybersecurity in Cote d'Ivoire. The collaboration will focus mainly on drafting a proposal on the blueprint and providing assistance to the Ministry of Communications, Digital Economy and the Post of Cote d'Ivoire with inputs to the National Cybersecurity Strategy.
143. In ITU-D Study Group 2, the renewed Question 3/2: Securing information and communication networks: Best practices for developing a culture of cybersecurity in the 2018-2021 study period will work towards producing reports and guidelines on emerging cybersecurity issues as well as sharing material to be used in training and capacity building activities.

144. Capacity Building also implies having factual information about the state of cybersecurity readiness at a national and international level. On 27 March 2019, BDT has launched the 3rd iteration of the Global Cybersecurity Index (GCI) aimed at measuring the commitment of Member States of the ITU to cybersecurity. The third iteration of GCI captures more details on cybersecurity, and expands the partnership into a multi-stakeholder collaborative platform. 155 Member States participated in the survey conducted to prepare the GCI. ITU has also initiated the preparation phase for the GCIv4 process in April 2019.



145. ITU-T SG17 in its March 2017 meeting supported the proposal to create a Regional Group for Arab Region (SG17RG-ARB). The third meeting of SG17RG-ARB meeting was held in Tunis on 2 - 3 April 2019, jointly with SG17RG-AFR.

(v) International Cooperation (SDG 1 (1.4), SDG 7 (7.1, 7.a, 7.b), SDG 9 (9.1, 9.c), SDG 11 (11.3, 11.b), SDG 17 (17.8))

146. The GCA is based on international cooperation and strives to engage all relevant stakeholders in a concerted effort to build confidence and security in the use of ICTs. ITU continues to develop relationships and partnerships with various regional and international organizations and initiatives, including the Commonwealth Cybercrime Initiative, ENISA, INTERPOL, ECOWAS, the World Bank, FIRST, and regional CSIRT/CERT associations, such as AP CERT, AFRICA CERT, and OIC CERT.

147. The FIRST Annual conference was held on the 16-21 June 2019 in Edinburgh, Scotland to progress collaboration with ITU, refining the MoU which is currently in force, and to advance the joint work on training curricula which is to be integrated in the ITU Academy as well as that relating to assisting Member States in building National CIRTs.

148. ITU is also currently working on an upcoming collaboration with CERT regional groups namely AfricaCERT, APCERT and OIC CERT. These collaboration will synergise ITU's activities in the regions and will enhance CERT specific knowledge exchanges between regions.

149. ITU continues to organize regional cybersecurity forums for all ITU regions, using them as a capacity-building vehicle for different BDT programmes and activities as well as an operational platform for cooperation at the regional and international level.

(vi) The Child Online Protection (COP) Global Initiative (SDG 4 (4.1, 4.5) and SDG 16 (16.2))

150. Within the framework of the GCA, the Child Online Protection (COP) Initiative was established by ITU as an international collaborative network for action to promote the online protection of children worldwide.

151. ITU has been raising awareness on COP issues through organizing workshops, strategic dialogues and regional forums, holding several workshops at different international conferences and leading or participating in different projects.

152. The Council Working Group on Child Online Protection (CWG-COP) is continuing to discuss issues related to online safety for children. The next session of the Group is on 26 September 2019.
153. ITU assisted Sudan in the development of its national COP strategy. In addition, advocacies and competition challenges were organized in several Arab countries to raise awareness about Internet safety among children, educators, and parents in collaboration with relevant stakeholders.
154. Within the framework of the ITU Regional Initiative for Europe, ITU assisted Georgia in the development of its national COP strategy. Similar activities are planned in other countries in the upcoming period. In addition ITU co-organized a series of events aimed at building human capacity, including the National Event on Child Online Protection: Awareness Day for Children and Teens, held on 9 May 2019 in Noto, Italy and Safer Internet Day 2019, held from 5 to 6 February 2019 in Tirana, Albania.
155. ITU and its partners continue to work closely in order to progress the Sustainable Development Goals, and particularly SDG 16.2 “End abuse, exploitation, trafficking and all forms of violence against and torture of children”.

ITU celebrated Safer INTERNET day 2019 with various activities, including promoting protection of children online.

Action Line C6: Enabling Environment (also related to the 2030 Agenda for Sustainable Development)



Related to the SDGs: SDG 2 (2.a), SDG 4 (4.4), SDG 5 (5.b), SDG 8 (8.2, 8.3), SDG 9 (9.1, 9.c), SDG 10 (10.3), SDG 11 (11.3, 11.b), SDG 16 (16.3, 16.6, 16.7, 16.10, 16.b), SDG 17 (17.6, 17.14, 17.16)



156. Recognizing the strong commitment of ITU’s work towards bridging the digital divide in the area of the enabling environment, UNDP officially handed over the lead facilitation role on WSIS Action Line C6 Enabling Environment to the ITU in May 2008. Since then, ITU has been acting as the sole facilitator for this Action Line building upon its regular work carried out within the three sectors framework of the ITU-D Programme 3: Enabling Environment.
157. ITU carries out several activities directly related to WSIS Action Line C6, through projects such as the ones listed below. More information on these projects as well as the other projects can be found on the ITU-D Projects webpage (here). The 14th Action Line C6 facilitation meeting was held as an integral component of the 2019 WSIS Forum, on Monday, 8 April 2019. The theme of this year was: **“Enabling Environment: Collaborative regulation for digital transformation”**. This session was mostly focused on the interplay between ICT markets and regulation and the innovative regulatory tools and processes at hand to support Membership and stakeholders to further enable digital transformation. In

this regard, telecommunication/ICT regulation should not only focus on competition and consumer protection, but integrate additional goals such as economic development, equitable prices for consumers, and access for all. Governments should ensure they have the tools by which they can have a mature dialogue among all regulators from all sectors. Regulation is a key instrument to enable markets and countries to build the digital economy. In Africa, one of the biggest issues is still broadband deployment, it is important to address fiscal issues and incentives to facilitate manufacturing and deployment to enable the achievement of SDGs. Gender responsive policies are relevant - women are less connected and not representative in the digital economy. A gender inclusive regulatory response should be considered as a priority for governments. Trust in the system is needed and this requires transparency and improved accurate information.

158. As a main outcome of this session, ICT Regulators, Policy Makers and private sector recognize that regulation – and importantly collaborative regulation – play an important role in digital transformation. One of the main challenges of collaborative regulation at national and regional level is to break across silos, to bring together the expertise and the enforcement power needed to level the playing field across borders. The details of the meeting are available [here](#).

159. This session on Action Line 6 was mostly linked to the SDG 9.

The WSIS Prizes 2019 Winner for the Action Line C6 is the Bangladesh Computer Council (BCC). The project of **“Establishment of Bangladesh National Digital Architecture (BNDA) and e-Government Interoperability Framework (e-GIF)”**. This project has been envisioned to deliver a conceptual blueprint that defines the structure and operation of the Government of Bangladesh and a common integrated interoperability platform for information exchange and host the national portal that will act as a single window for all govt e-Services and electronic information to be delivered to citizens (G2C), businesses (G2B) and govt departments (G2G). The objective is to assist GoB through BCC to design, develop, deploy and use the National Digital Architecture (NDA) and e-Government Interoperability Framework (e-GIF) to develop strategies, processes, plans, structures, technologies and systems across the Government, thereby developing an environment that enables the Government agencies to achieve its key objectives and outcomes through increased interoperability, better asset management, reduced risk and lower procurement costs. Based on the envisaged NDA and e-GIF structures, Government agencies would then be required to detail out their strategic transformation roadmap to migrate from its current state in terms of business processes, technology and information systems to its desired target state. The NDA and e-GIF will ensure that all investments in process improvement, information systems and technology support are made in a disciplined and planned manner. This project is linked to SDGoal 8: Decent work and economic growth. More details [here](#).



160. ITU continues to assist Member States and Sector Members in developing pro-competitive policy and regulatory frameworks for telecommunications. More specifically, through

Objective 3/Output 3.1: Enabling environment: Products and services on telecommunication/ICT policy and regulation for better international coordination and coherence, ITU has undertaken numerous activities that foster the development of an enabling environment worldwide including High Level Exchange Platforms on ICT Policy and Regulation for Digital transformation, ICT Policy and Regulation Data and Knowledge Platforms for evidence based decision making, and support for the development and strengthening of ICT Policy and Regulatory Frameworks and Capacity Development. The main purpose of our work is to provide the tools for an effective policy, legal and regulatory environment for the ICT sector.

161. We convene global and regional forums to discuss global trends in regulation for Sector Members and other national and international stakeholders, through organizing the Global Symposium for Regulators (GSR) as well as strategic dialogues on topical policy, legal, regulatory, as well as on economic and financial issues and market developments.
162. We provide data, research and analysis and tools to support our members in defining, elaborating, implementing and reviewing transparent, coherent and forward-looking strategies, policy, legal and regulatory frameworks as well as in moving towards evidence-based decision-making.
163. We provide knowledge exchange tools and platforms to enable inclusive dialogue and enhanced cooperation to help countries achieve a more inclusive information society and to raise national and regional awareness about the importance of an enabling environment.
164. We provide direct assistance to countries and regions on an enabling environment for smart connected societies.
165. Examples of projects are listed below.
166. We produce a number of flagship reports including the Global ICT Regulatory Outlook Report focusing on best practice regulation to enable ubiquitous broadband markets to thrive. Various thematic studies provide valuable viewpoints and strategies on multiple issues that affect regulation and economics in a converged broadband world.
 - The Global Regulatory Outlook was launched in 2017 (executive summary available at <http://www.itu.int/en/ITU-D/Regulatory-Market/Pages/Outlook/2017.aspx>) – this is in a new annual series tracking market and regulatory trends in the ICT sector and their implications across the economy. The 2018 Report was launched in Q4 2018, integrating and analyzing data from the 2018 regulatory and tariff surveys and is available [here](#).
 - ITU prepared publications on topical regulatory and market environment issues, including [The economic contribution of broadband, digitization and ICT regulation](#), an Econometric study on the impact of broadband, digital transformation, and the interplay of ICT regulation on the economy.
 - ITU made improved tools for evidence-based decision-making available to Membership including publications on topical regulatory and market environment issues, including on 5G; Regulatory challenges and opportunities in the new ICT ecosystem; Digital Identity Roadmap and Paper; Empowering the Digital Economy;

Maximizing Availability of international connectivity in the Pacific, and a series of GSR discussion papers on AI for Development.

- Key regulatory and tariff data was gathered, analyzed and published to facilitate evidence-based decision making through ICT Regulatory Tracker, ICT Eye, and relevant reports.
- ITU-D is implementing a 3-year project to harness the potential of Information and Communication Technologies (ICTs) to strengthen Digital Financial Services (DFS) and Digital Financial Inclusion (DFI) in China, Egypt and Mexico. Within this context, ITU-D is raising awareness on the enabling environment for Financial Inclusion in China, Egypt and Mexico through the preparation draft country assessment reports, research on issues relating to ICTs for Digital Financial Inclusion and is working with the countries to define priority areas of leveraging ICTs for DFI as part of the Financial Inclusion Global Initiative.
- ITU-D’s Chief Regulatory Officers (CRO), its Working Group on DFI in particular, recommended that members together with ITU define activities to collaborate with members and partners to create an enabling legal and regulatory framework for DFI, focusing in particular on collaborative regulatory approaches between both sectors and pilot projects to progress to increase telecommunication/ICT access and innovative solutions for DFI as well as to increase awareness on the importance of collaborative regulation between the financial and telecommunication/ICT sectors and competition authorities.
- ITU developed a course in collaboration with the Government of India about the emerging digital landscape and regulatory framework in which digital payments operate as well as the new market participants and products that have disrupted the market.
- ITU-D continues to enhance knowledge-exchange tools and platforms such as the ICTEye, the ICT Regulation Toolkit, and the ICT regulatory knowledge centre.
- ITU web portals have been published on [International Mobile Roaming \(IMR\) Resources](#) , [Quality of Service](#), [the Digital Ecosystem](#), [Infrastructure Development](#) and a new Regional Regulatory Associations Portal was also published to bring together regulatory resources and ITU activities on such issues as well as activities and initiatives by regulatory associations, regional and international organizations and other stakeholders. These portals also highlight key findings from ITU publications, studies, research, ITU Study Groups, and data and analysis from the ITU ICT Eye.

167. Key ITU-D gathers and publishes **regulatory and tariff data to facilitate evidence-based decision making**, that include:

- ITU-D has developed the [ICT Regulatory Tracker](#), a unique data-based tool that covers over 186 countries for a period of nine years, showcasing national, regional, and global regulatory progress.

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- The annual ITU-D regulatory and tariff questionnaires have been sent to membership to gather information on [regulatory and policy issues](#) and [tariff policy issues](#). 2017 regulatory and policy data has been published on the ICT Regulatory Tracker, and made available on the [website](#). Contributions have been made with specific regulatory and policy and tariff/economic information and reports submitted to ITU-D Study Groups and published on the [website](#).
168. ITU-D fosters **key strategic dialogues**, including the Global Symposium for Regulators and the strategic dialogue on International Mobile Roaming, and Economic and Financial Forums, and delivers best practice guidelines on key regulatory and policy issues and approaches.
 169. The 19th edition of the Global Symposium for Regulators (GSR-19), held in Port Vila, Vanuatu, from 9 to 12 July, attracted over 325 participants including Government Ministers, Heads of Regulatory Authorities and C-level industry executives from 64 countries. GSR-19 was organized by the International Telecommunication Union (ITU) in collaboration with the Government of Vanuatu. Chaired by Mr Brian Winji, Chairman of the Telecommunications, Radiocommunications and Broadcasting Regulator of the Republic of Vanuatu, the theme of GSR-19 was “Inclusive connectivity: The future of regulation.”
 170. A series of pre-events took place on 9 July, including the Regional Regulatory Associations’ Meeting (RA), the Private Sector Chief Regulatory Officers’ Meeting (CRO), the Heads of Regulators’ Executive Roundtable and a training session for policy makers and regulators on Competition policy in the ICT/mobile sector.
 171. Throughout the four-day GSR programme, participants acknowledged the importance of more actionable, collaborative and innovative outcome-based approaches to regulation to unlock the full potential of digital technologies and accelerate progress towards the United Nations Sustainable Development Goals (SDGs).
 172. Regulators from around the world identified and endorsed a set of regulatory Best Practice Guidelines to fast forward digital connectivity for all and allow people across geographies, economic and social status to benefit from the digital transformation and participate in today's digital economy. The Guidelines urge regulators and all stakeholders to be open to new regulatory tools and solutions and act without further delay.
 - ITU is undertaking several activities within its mobile roaming initiative LET’S ROAM THE WORLD. This initiative started with the organization of the [LET’S ROAM THE WORLD: The ITU Global Dialogue on International Mobile Roaming](#) in Geneva on 18 September 2015 back to back with the ITU-D Study Groups meetings. The main objective of this initiative is to support Members in the definition and adaptation of best practices and guidelines for all stakeholders around the world on IMR. Collaboration with regional regulatory organizations resulted in draft strategic guidelines on IMR.
 173. **ITU-D Study Groups** examine specific task-oriented telecommunication/ICT questions of priority to developing countries, to support them in achieving their development goals and SDG targets. Study questions relevant to Action Line C6 in ITU-D Study Group 1 include: [Question 1/1](#): Strategies and policies for the deployment of broadband in developing countries, [Question 3/1](#): Emerging technologies, including cloud computing, m-services,

and OTTs: Challenges and opportunities, economic and policy impact for developing countries, [Question 4/1](#): Economic policies and methods of determining the costs of services related to national telecommunication/ICT networks, [Question 5/1](#): Telecommunications/ICTs for rural and remote areas, [Question 6/1](#): Consumer information, protection and rights: Laws, regulation, economic bases, consumer networks, and [Question 7/1](#): Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs.

174. Outputs agreed on in the ITU-D Study Groups, and related reference material, are used as input for the implementation of policies, strategies, projects and special initiatives in Member States. These activities also serve to strengthen the shared knowledge base of the membership. (<http://www.itu.int/ITU-D/study-groups>).
175. International mobile roaming is an important area of work for ITU-T Study Group 3. ITU-T Study Group 3 has approved Recommendation ITU-T D.262 "Collaborative Framework for OTTs" addressing the relationship between network operators and providers of over-the-top (OTT) services. The standard provides parameters for the analysis of the new financial dynamics of the ICT ecosystem and how regulation economic, policy, and regulatory frameworks could support competition, consumer protection, consumer benefits, dynamic innovation, sustainable investment and infrastructure development, accessibility and affordability in relation to the global growth of OTTs. ITU-T Study Group 3 has approved **Recommendation ITU-T D.263 "Costs, Charges and Competition for Mobile Financial Services (MFS)"** proposing a possible approach to reduce high retail and wholesale telecommunication charges related to mobile financial service (MFS).
176. ITU also provides support, assistance and training to developing countries in bridging the standardization gap on ICT technologies. ITU-T has 23 Regional Groups to stimulate effective participation in ITU-T Study Groups and increase the number of quality Contributions from the various regions - eight in Africa, four in the Americas, five in the Arab region, two in the APT region and four in the Eastern Europe, Central Asia and Transcaucasia. ITU-T also continues to offer a mentoring programme for new delegates to ITU-T Study Groups. Remote participation is offered during all study group meetings. Closing plenaries benefit from full interpretation.
177. ITU organizes annual Regional ICT Standardization Forums as part of activities under WTSA Resolution 44 on bridging the standardization gap. The Forums discuss current standardization topical issues in ITU-T study groups and focus groups to engage more developing countries in the standardization work and could also feature capacity building on ITU-T Recommendations.
178. An ITU-T Global Portal is maintained with special focus on activities in the Africa, Asia Pacific, Arab, and Americas regions.
179. ITU is actively supporting implementation of enabling environment frameworks to promote ICT accessibility for persons with disabilities in line with Output 4.3 of the 2017 World Telecommunication Development Conference and Connect 2020 Target 2.5B. This work includes:

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- The development of key resources in ICT accessibility, including:
 - A set of three free self-paced online certificate training courses entitled “ICT Accessibility: the key to inclusive communication” was developed in 2018 in response to the outcomes of WTDC-17, and the ITU Regional Initiative for Europe, aiming to provide a general understanding of ICT accessibility policies, regulations, technology trends, and public procurement rules. These consist of three modules as follows: Module 1: Enabling communication for all through ICT accessibility; Module 2: ICT accessibility policy regulations and public procurement standards; Module 3: Achieving ICT accessibility through public procurement.
 - Fifteen video tutorials on how to develop and remediate accessible digital documents (e.g., Word, Pdf, Excel, PP, etc.) were developed in Spanish, English, and French and launched during the Study Group on Q7/1 to ITU Members on 28 September 2018.
 - An online self-paced course entitled ‘Web Accessibility - The cornerstone of an Inclusive Digital Society’ is being developed in 2019, to be made available through ITU Academy, which is composed of 3 modules: Module 1: Executive tools for developing a web accessibility policy; Module 2: Essentials of implementing a web accessibility evaluation; Module 3: Technical skills for designing and developing accessible websites. The learner develops an overall understanding of the main issues relating to web accessibility, including: web accessibility policy development, the creation of accessible digital content, the evaluation of level of accessibility of the websites, principles related to the design and development of accessible websites and maintenance of accessible websites, in line with the international standards related to web accessibility.
 - A series of reports to support decision makers on how to ensure accessible ICT devices and services are widely available in their countries. These publications, available in all 6 official ITU languages and accessible e-book versions, include the following:
 - [Model ICT Accessibility Policy Report](#). This report includes model policy, regulations, codes of conduct and legislation that can be adopted and adapted by ITU Member States based on their priorities (mobile, web, public access center and TV/audio visual media accessibility as well as changes to existing ICT legislation and a model policy for the public procurement of accessible ICTs);
 - [Making Mobile Phones and Services accessible for Persons with Disabilities. G3ict-ITU](#);
 - [Making Television Accessible Report. G3ict-ITU](#),
 - In the 2017-2021 study period this topic is addressed by ITU-D Study Group 1 Question 7/1: Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs. The final report from the 2014-2017 study period on “Access to telecommunications/ICT services by persons with disabilities and with specific needs” is available at the following link. Throughout the study periods BDT has

provided capacity building and training to the members on ICT accessibility and related topics.

- Capacity in ICT Accessibility was built among all participants to the meeting of the Rapporteur Group of Q7/1 on 28 September 2018.
- ITU continues to develop standards in ITU-T study groups (SGs) to promote accessible ICT technologies: Work on human factors is now reinforced within SG16 after its move from SG2 in 2017. ITU-T Q24/16 (Human factors related issues for improvement of the quality of life through international telecommunications) and ITU-T Q26/16 (Accessibility to multimedia systems and services) progressed their work on Accessibility and Human factors related issues for improvement of the quality of life through international telecommunications. The ITU Inter-sector Rapporteur Group on Audio-visual Media Accessibility studies topics related to audio-visual media accessibility for all media delivery systems including broadcast, cable, Internet, and IPTV.
- ITU-T Study Groups develop technical standards (called *Recommendations*) to further the use of ICTs to enable accessibility. A sample of recently developed standards include:
 - ITU-T SG16 developed Recommendations **ITU-T F.930** for multimedia telecommunication relay services, **ITU-T F.921** for indoor and outdoor network navigation for persons with visual impairments, and **ITU-T H.781** with guidelines for safe listening when using personal sound amplification devices.
 - **Recommendation ITU-T H.871 “Safe listening guidelines for personal sound amplifiers”** complements recommendation ITU-T H.870 “Guidelines for safe listening devices/systems”: There is currently no international standard for Personal Sound Amplifiers (PSAs), which is needed to ensure these devices are safe for the user and do not further damage the users hearing, since they are freely available to anyone. Personal Sound Amplifiers (PSAs) are non-medical devices, intended for people with normal hearing and (a) can have a design physically comparable to hearing aids, in which case it is called Personal Sound Amplification Product (PSAP) or (b) can also simply be an app on any smartphone or other device, in which case it is called Personal Sound Amplification App (PSAA). As is defined in H.870, the sound exposure should be limited to an accumulated dose (100 % CSD) over 7 days of in total 1.6 Pa2h which corresponds to 80 dBA for 40 hours to prevent noise induced hearing loss. When the 100% CSD is reached, the sound level should suddenly drop, and the user will get the suggestion to lower the sound level, since the weekly sound listening dose is exceeded. When PSAPs and PSAAs do not have the capacity to measure CSD, the output level of the device needs to be permanently limited to 95 dBA, so that the user is unlikely to use the device at a level higher than 80 dBA, since the dynamic range of speech has a crest factor of 12 to 17 dB.
 - ITU-T SG 2- developed **Recommendation ITU-T Y.4204 “Accessibility requirements for the Internet of things applications and services”** provides accessibility requirements specific to Internet of Things (IoT) applications and services. Benefits of accessible IoT applications and services are addressed, and accessibility requirements for IoT

applications and services for persons with disabilities, persons with age related disabilities and those with specific needs to utilize the benefits of IoT applications and services, are specified. Some use cases are also provided in the Appendix to illustrate the need for IoT accessibility. This Recommendation complements existing Recommendations specifically defined for certain platforms in case such platforms are applied in the IoT context.

- The Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF) is mandated to reinforce cooperation within ITU, other UN agencies and activities, ISO, IEC, regional and national SDOs, industry groups, academia, disability organizations and telecommunication user groups for persons with disabilities, with the aim of increasing standardization experts' awareness of the importance of accessibility to ICTs and the need to mainstream the consideration of accessibility in international standardization efforts.
- JCA-AHF meetings take place at least twice a year with accessibility experts including persons with disabilities, each with TSB-provided teleconference facilities, a tool for remote sharing of documents (Adobe Connect), sign-language interpretation and real-time captioning on request.
- BDT developed, organized and led three sessions on ICT accessibility in the framework of the 2019 World Summit on the Information Society:
 - Through the workshop on “Older persons and new technologies: a smart mix” on 8 April 2019, organized in partnership with AARP Research Center, Long Life Joy - Environment for Older People: CSEND, French Institute of Health, DID raised awareness and strengthened capacity of the participants on the ITU work in ICT accessibility and older persons.
 - In collaboration with WHO, ITU developed a workshop on “Safe Listening devices and Systems” on 8 April 2019 to raise awareness and strengthen the capacity of ITU members, policymakers and stakeholders on the over 1 billion youth in danger of hearing loss due to unsafe listening devices and systems. ITU provided information on the related ITU Standard H870 and the toolkit for its implementation and incentivized all stakeholders to join us in the global implementation process.
 - BDT developed a High Level Dialogue on “ICT Accessibility: the key to inclusive communication” on 10 April 2019, with the participation of top-level policymakers from the governments of Spain and Mexico and representatives and international experts from the European Commission; UNDP, W3G, etc. DID raised awareness on ITU-D related work and resources and strengthened capacity of ITU members and policymakers on the key role of ICT accessibility in developing inclusive digital societies. Good practices were shared and ITU was positioned as a key partner to support global implementation of ICT accessibility as a sine qua non condition to inclusive communication.
- BDT developed the ‘National Programme on Web Accessibility: Internet for @ll’, and implemented it in Guyana from 17 to 24 May 2019 (and online from 24 May to 28

June 2019) to support its government efforts in web accessibility and build the country's capacity in the creation of accessible digital content, as well as the design and development of public websites in an accessible format. The programme of work consisted on three main activities:

- A political buy-in session for Members of the Government and respective communication and IT managers to understand the importance of the digital inclusion and respective impact of the ICT accessibility in the public information and digital services. The representatives of the University of Guyana, the National Commission of Persons with Disability representatives, as well as end users such as persons with visual and hearing disabilities also attended the session. In doing so, Guyana will ensure that all its citizens – including persons with disabilities – will have access to public online information, products and services without discrimination; thereby ensuring that no one is left behind.
 - A two (2) day 'train the trainer' course was held on the "Creation and Remediation of accessible digital content". This training facilitated the knowledge development of 34 media and communication officers throughout the Government of Guyana, who successfully achieved their certification (delivered by ITU Academy based on end user validation- persons with visual disability-and ITU experts in the field). The purpose is to insure that the digital content posted in the websites are fully accessible (word docs, PDF, photos, etc.)
 - This was followed by a three (3) day 'train the trainer' course in "Design and Development of accessible websites" intended for IT websites managers. This then continued for 1 month on-line with ITU experts. The purpose was to ensure that the trainees will achieve the necessary knowledge and skills to continue working in their respective websites and apply the learned techniques to enhance the accessibility of public websites in Guyana. The evaluation of the learned skills will lead to the acquirement of the certificates.
 - The University of Guyana was empowered with the curricula to continue developing experts in web accessibility, while the government of Guyana received advice on developing and implementing a national ICT accessibility policy and strategy. Subsequently, the university and government will sign an agreement for a self-sustainable educational model, which will generate funds to train persons with disabilities on navigating accessible websites.
- From 10 to 13 June 2019, ITU participated in the 12th session of the Conference of States Parties to the Convention on the Rights of Persons with Disabilities (CRPD) held in NYC. BDT developed a comprehensive work programme that included the following activities:
- BDT developed and ensured moderation of a side-event on "ICT Accessibility: The Key to Inclusive Digital Society" in collaboration with UN DESA and other entities and governments, with the participation of speakers from: EU Commission, UN DESA, G3ict, Gov. Guyana, Gov. Ecuador, EDF, CDPF and Rehabilitation International. DID delivered presentations on the ITU-D work to support the development of inclusive digital societies globally through the ICT accessibility.

- On behalf of the SG, BDT presented a report of the work of ITU and the initiatives carried out in promotion for and support to State Parties in the implementation of CRPD, in particular our efforts to ensure and improve ICT accessibility for the empowerment of all, including persons with disabilities.
- BDT developed and delivered a presentation at a UN DESA side-event on “UN Disability-Inclusive Strategy for an Inclusive, Accessible and Sustainable World: Linking the Global Commitment with Local Action”, where awareness was raised on the ITU-D resources to support the implementation of an inclusive, accessible and sustainable world. DID positioned ITU as a key partner in the topic and shared information on the type of assistance ITU provides to Member States to support them in developing inclusive societies in their countries, with concrete examples of implementation in the field.
- BDT developed and delivered a presentation in a Qatar side-event on “How assistive technology can help people with Autism” where awareness was raised on the importance of the use of accessible ICTs and assistive technologies by persons with disabilities and ITU’s work in encouraging the development of assistive products and services.
- BDT developed and delivered a presentation in an Essl Foundation side-event on “Artificial Intelligence and the Potential to Increase Inclusion, Participation and Independence for People with Disabilities” raising awareness on how AI can empower people living with disabilities to participate more fully in every aspect of society while highlighting ITU-D related resources in this area.
- BDT provided input and participated in a European Disability Forum (EDF) side-event on “Accessible Public Procurement: Making sure tax payers’ money is spent on accessibility”.
- BDT provided input and participated in a side-event titled “1 Billion Voices Making the Invisible Visible: the power of sports and expressive arts”.
- ITU organized a workshop together with G3ict on Inclusive ICTs for Disaster and Emergency Preparedness for Persons with Disabilities and those with specific needs, 12 June 2017 during WSIS Forum. The workshop highlighted the urgent needs of ICT accessibility in emergency situations, to save the lives of those persons (two to four times more likely to get injured or die in case of a disaster), which can be improved by implementing ICT accessibility standards including ITU-T’s.
- Information on ITU-D’s work activities and events and key resources to support our Members in implementation of ICT accessibility globally was shared among over 500 key thought leaders, professionals, corporations, service organizations and related representatives of the assistive and accessible technologies market during an interactive session on “Global Accessibility Policy Up-date” at the 2018 M-Enabling Summit, held from 11 to 13 June in Washington DC, US.
- Awareness was raised among nearly 700 participants from over 70 countries on the importance of implementing ICT Accessibility and key resources developed by BDT during the ITU Forum on ICT Accessibility organized within the Zero Project Conference

in Vienna (Austria) on 21-23 February 2018. At the Forum, BDT also announced the first joint ITU-EU Accessible Europe event to take place in December 2018 and positioned BDT as a key partner in the implementation process.

- The ITU annual regulatory survey includes questions on ICT accessibility policies in ITU Member States in order to measure progress in achieving Connect 2020 Target 2.5B. The survey results show that around 40 out of 193 ITU Member States have an ICT accessibility policy.
- Implementation of Regional Initiatives on ICT accessibility in the ITU regional offices includes:
 - In collaboration with the Regional Office for the Arab States, assistance to formulate the national ICT Accessibility Policy of Sudan was provided in 2018, and similar assistance is being given to Iraq during 2019.
 - In support to the Arab States Regional Initiative, a course “Train the trainers” was developed and customized for the Arab Region on “Accessible Digital Content and Remediation for the stakeholders delivering digital financial services”. The training was delivered to over 40 persons on 16-18 October 2018 in Cairo, Egypt.
 - In support of AMS Regional Initiative at the regional event “the 5th Accessible Americas V: ICTs for ALL” which took place in Jamaica on 28-30 November 2018, ITU’s work in digital inclusion and existing key resources available to support ITU members and stakeholders in implementing ICT accessibility to create digital inclusive societies in the Americas region was shared with 214 participants. In support of the development of ICT accessibility experts in the Americas, a training session on “Fundamentals in ICT accessibility” was provided by the BDT Focal Point in ICT Accessibility to all participants. 90 trainees successfully demonstrated their acquired knowledge and obtained ITU certifications
 - In support of EUR Regional Initiative implementation in ICT accessibility, at the 1st Regional event Accessible Europe- ICT for ALL in Austria on the 12-14 December 2018, awareness was raised to 150 participants on ITU’s work and the key resources available to support regional implementation. In addition, available resources and existing best practices in purchasing accessible public procurement and developing accessible websites and digital accessible content were shared during this regional forum.
 - In support to the ITU Regional Initiatives for Europe on Digitization (EUR2) and Digital Inclusion (EUR3), ITU conducted a ‘Workshop on Enhancing Human Life Using e-Services’ on 25 March 2019 focused partially on how e-services could enhance our lifestyles by addressing technologies for areas such as health and agriculture, among other. Awareness was raised and the capacity of ITU members was strengthened on the need to develop and implement ICT public procurement policies and available BDT resources were shared to support ITU members in their implementation process. A background paper, ‘Standards in the procurement of accessible ICT products and services’, was prepared in February and March 2019 for the workshop.

- In the framework of the ITU Workshop on "The Future of Television for Europe" on 7 June 2019 BDT developed and delivered a tailored presentation on ICT accessibility policy and regulation for the EUR region in order to raise awareness and develop the capacity of ITU members on the topic while supporting the EUR regional implementation of TV accessibility.

180. More details about other activities implemented by BDT in all ITU regions can be found in BDT's quarterly and annual performance reports: <<https://www.itu.int/en/ITU-D/Pages/OperationalPlansPerformanceReports.aspx>>.

(c) Co-facilitator of Action Lines C1, C3, C4, C7, C11 and Partners for C8 and C9.

Action Line C1: The Role of Public Governance Authorities and all Stakeholders in the Promotion of ICTs for Development



Related to SDGs: SDG 1, SDG 3 (3.8, 3.d), SDG 5, SDG 10 (10.c), SDG 16 (16.5, 16.6, 16.10), SDG 17 (17.18)



181. In accordance with its mandate, the ITU continues to foster international and regional cooperation on a broad range of activities. ITU conducted several meetings, conferences and symposiums to provide a platform to broaden international dialogue on innovative means in harnessing ICTs for advancing development.



In 2019, ITU organized a number of events. Series of regional meetings on private-public partnerships as a solution to address the needs of regions for digital technology deployment were organized. At the occasion of the WSIS 2019, several meetings were organized for various Action Lines offering platforms for discussion, networking and collaboration for stakeholders on projects and initiatives to promote of ICTs for Development. The 14th Action line Facilitation meeting of C1, C7 and C11 was held on Monday, 8 April 2019 on the topic of "Digital Government Assessment, Promotion of New Technologies and Partnerships". This session was focused on how governments can better incorporate ICT and eGovernment strategies within their National Development Strategies to reap the benefits of these technologies in building resilience and sustainable development. Three main issues were debated: Promotion of ICTs for SDGs (C1),

eGovernment (C7), and Partnerships (C11). Concerning the Action Line C1, the following points have been discussed:

- Need for governments at all levels, the private sector, international organizations, civil society, the technical and academic communities and other relevant stakeholders to be aware of the impact of the latest developments in new technologies in achieving the Sustainable Development Goals. The low visibility of ICTs in the 2030 Agenda for Sustainable Development, National Development Plans, and in the High level political forum (HLPF).
- Roles of public policymakers in amplifying transformative impact of rapid technological changes in public service delivery (e.g. blockchain, AI and big data)
- Preparing public institutions for the ongoing transformation, Kind of capacities needed for institutions and officials
- Key challenges of rapid technological changes and how to overcome those and their impact on the most vulnerable people and countries

182. Concerning the outcomes of this session, they are as follows: The adoption and use of emerging technologies (namely AI and blockchain) in the public sector is critical, recognize the importance of collecting the right data, not all data, governance of digital government as a critical dimension recognized by countries for a sound digital transformation of the public sector, Private-public partnership will be key for the realizations of digital transformational plans, and importance of regional collaborations . For more details on the sessions and the outcomes, please see [here](#).

183. Digital Government is a central point of the ICT 4 SDGs thematic and it can be linked to all SDGs. It is an important factor for achieving the SDGs and can generate benefits in the form of eliminating poverty and increasing prosperity. Exploiting ICTs through digital government has far-reaching potential in improving public services that are critical to the poor. ICTs can ensure inclusion and participation to fulfil the motto of leaving no one behind. Increasing access to digital technologies brings more choice and greater convenience for the most vulnerable. Through inclusion, and innovation, poor and disadvantaged are provided by opportunities that were previously out of reach. Governments by exploiting ICTs can provide new services or improve existing ones that are critical to the poor in ending poverty, hunger and achieving food security as well as ensuring healthy lives and empowering women and girls. Two Emerging Trends related to WSIS Action Lines were identified during the meeting: Digital marketplace for public sector to connect Government ICT projects with people and technology particularly from SMEs; Service through public private partnerships or in partnerships with civil society organizations. Also, a suggestion for thematic aspects that might be included in the WSIS Forum 2019 was issued: “Empowering people and ensuring inclusiveness and equality” in line with the theme of the HLPF 2019.

184. The WSIS Prizes 2019 Winner for the Action Line C1 is the National Social Insurance Fund (CNAS) from Algeria. The project named “**The e-payment of social security contributions**” is an e-declaration portal which allows employers, via a private account, to calculate and pay social security contributions in real time, avoiding the need to move to CNAS structures.

The portal allows employers to establish monetary transactions with banks and synchronize employer accounts at the CNAS level. The e-payment service is realized in collaboration with banks and the Automation of Interbank Transactions and Electronic Banking Company. The project aims at enrichment of e-services offered to social insured, employers and partners by integrating e-management with all internal and external activities. This project is linked to SDGs 1,3,4,8,9,10. More information [here](#).



185. Under the auspice of WSIS 2017, ITU and ILO launch a “Digital Skills for Decent Jobs for Youth” campaign, as part of the Global Initiative on Decent Jobs for Youth, that aims to foster decent and inclusive employment and entrepreneurship opportunities at country and regional levels. . The campaign will engage with governments, the private sector and other stakeholders in the information and communication technology sector to realize commitments to train young men and women in basic and advanced digital skills as well as to encourage widespread sharing of data on job openings for youth with digital skills. The Global Initiative is the first United Nations system wide effort for the promotion of youth employment worldwide. It represents a unique collaboration platform to join hands – within and beyond the UN system – to tackle the youth employment challenge and assist Member States in targeting a crucial goal of the 2030 Agenda for Sustainable Development. More information [here](#).
186. In the continuity of this previous work, the WSIS Forum 2018 held a High Level Dialogue on “The Skills Mismatch: the digital skills employers are looking for” (more details [here](#)) as well as a thematic workshop in collaboration with the UN MGCY (United Nation Major Group for Children and Youth) named “Future of Work/Decent Jobs for Youth” discussing the advantages and the significant challenges that exist and need to be proactively examined to adapt to the effect of the fast-developing technologies (automation, AI...) on work and society, as they offer opportunities for improved productivity, cost optimization and decent jobs. More details [here](#).
187. In April 2018, ITU launched the [Digital Skills Toolkit](#) as a resource freely available in all UN languages to help policymakers and other stakeholders develop a national digital skills development strategy which is inclusive and gender-responsive. The toolkit forms part of ITU's commitment to the Global Initiative on Decent Jobs for Youth to tackle youth

unemployment, for which it leads the digital skills thematic area together with ILO. This also includes leading the Digital Skills for Jobs Campaign to increase young people's employability and address skills shortages in the digital economy through digital skills training.

188. From 28-29 May 2019, ITU participated in the Annual Conference on Global Initiative on Decent Jobs for Youth in Rome, to raise awareness about the Digital Skills for Jobs Campaign, the potential of digital skills development as a strategy for youth employment, and ITU resources to boost digital skills for youth (including the Digital Skills Toolkit).
189. In a converged ICT ecosystem, in 2017, ITU/BDT continues its efforts to broaden its partners base and to promote collaboration with a wide range of global, regional and national stakeholders (from public and private sectors, foundations, multi-/bi-lateral agencies, academia, etc.) from diverse sectors (Multi-Sector Partnership – MSP - e.g. health, finance, e-waste) to support projects' implementation at global, regional and national levels in a wide range of thematics/areas of action (e.g. health, finance, climate change and e-waste).
190. The ITU has been contributing greatly to WSIS implementation and follow-up from 2005 to the present. In 2017, ITU, in close partnership with other United Nations agencies and all WSIS stakeholders, has been leading numerous activities worldwide in the field of information and communication technologies for development, these activities are reflected throughout the report. This section will present major and the most significant initiatives fostered by ITU in 2017. ITU presented its vision at the Plenary Session of OECD Ministerial Meeting held in June 2016 in Cancun, Mexico. This was an opportunity to highlight ITU 'Connect 2020 Agenda' which was universally adopted by ITU's 193 Member States at ITU Plenipotentiary Conference in 2014. This Agenda sets an ambitious global connectivity goals and targets, to which Member States have committed to achieve in collaboration with all stakeholders across the ICT ecosystem.
191. ITU also co-organized ITU-OECD "Innovation Dialogue" during the OECD Ministerial Meeting drawing the attention to the need to strengthen the digital innovation capacity of countries to integrate ICT innovation into their national development agendas – in recognition not just of the digital divide, but a growing innovation divide in particular. Other ITU collaborative platforms were also highlighted such as the UN Broadband Commission for Sustainable Development, which was set up by ITU and UNESCO in 2010, with a refreshed mandate in 2016 to bring it into line with the SDGs.
192. ITU Telecom World 2016 took place from 14-17 November in Bangkok, Thailand. As the global platform for accelerating ICT innovation for social good, it brought together governments, corporates and small and medium enterprises (SMEs) from emerging and developed markets around the world. It combined an exhibition for digital solutions, a forum for sharing knowledge, an Awards programme recognizing excellence and innovation in ICT solutions with social impact and was a networking hub between nations, organizations and individuals. The event focused on the importance of collaboration across the ICT ecosystem to grow the digital economy, and the vital role of SMEs. By accelerating ICT innovation to improve lives faster, ITU Telecom World 2016 aimed to make the world better, sooner. The outcomes are available here: http://telecomworld.itu.int/wp-content/uploads/2016/12/wt16_post_event_report_web.pdf

193. ITU Telecom World 2017 was held from 25-28 September in Busan, Korea. Please read the outcomes and other details here: <http://telecomworld.itu.int/>.

194. Advisory **Groups for each Sector: Advisory Groups for each Sector meet every year and review priorities, strategies, operations and financial matters of the Sector.** Please see the Advisory Groups for the sectors below:

- The Telecommunication Development Advisory Group (TDAG) for the ITU-D. The 23rd meeting of the Telecommunication Development Advisory Group (TDAG) took place from 9 to 11 April 2018 at ITU headquarters in Geneva. (Please see <https://www.itu.int/en/ITU-D/Conferences/TDAG/Pages/TDAG23/default.aspx>)
- Telecommunication Standardization Advisory Group (TSAG) for the ITU-T Sector. Two meetings of the Telecommunications Standardization Advisory Group took place from the 10-14 December 2018, and 23-27 September 2019. (Please see <http://www.itu.int/en/ITU-T/tsag/2017-2020/Pages/default.aspx>)
- Radiocommunication Advisory Group (RAG) for the ITU-R. This year, the Radiocommunication Advisory Group took place from the 26-28 April 2017. (Please see <http://www.itu.int/en/ITU-R/conferences/rag/Pages/default.aspx>)

195. **Study Groups for each sector:**

- Standardization work is carried out by the technical Study Groups (SGs) in which representatives of the ITU-T membership develop Recommendations (standards) for the various fields of international telecommunications.
- ITU-D Study Groups provide an opportunity for all Member States and Sector Members (including Associates and Academia) to share experiences, present ideas, exchange views, and achieve consensus on strategies to address ICT priorities. ITU-D Study Groups are responsible for developing **Reports, Guidelines, Best Practices and Recommendations** based on input received from the membership. Information is gathered through contributions, case studies and surveys and is made available for easy access by the membership using content management and web publication tools. The Study Groups examine specific task-oriented telecommunication/ICT questions of priority to countries, especially developing countries, to support them in achieving their development goals and SDG targets.
- Outputs agreed on in the ITU-D Study Groups, and related reference material, are used as guidance for the implementation of policies, strategies, projects and specific telecommunication/ICT initiatives in membership. These activities also serve to strengthen the **shared knowledge base** of the membership. Sharing of topics of common interest is carried out through face-to-face meetings, multilingual remote participation and online collaborative sites, in an atmosphere that encourages **open debate** and **exchange of information** and for receiving input from experts on the topics under study.
- ITU-D Study Group 1 scope focuses on "Enabling environment for the development of telecommunications/ICTs" while the work of ITU-D Study Group 2 relates to "ICT services and applications for the promotion of sustainable development".

The following events were held for Study Group 1 in 2018:

- [First meeting of ITU-D Study Group 1 \(2018-2021 study period\)](#)
30 April - 4 May 2018, Switzerland [Geneva]
- [ITU-D Study Group 1 Rapporteur Group meetings](#)
17 - 28 September 2018, Switzerland [Geneva]
 - [Q1/1 topical session on policies and regulatory methods for broadband deployment and broadband access technologies](#) (17 September 2018)
 - [Q4/1 topical session on economic issues in modern telecommunication/ICT markets](#) (25 September 2018)
 - [Q7/1 capacity building session on ICT accessibility](#) (28 September 2018)

The following events were held for Study Group 2 in 2018:

- [First meeting of ITU-D Study Group 2 \(2018-2021 study period\)](#)
7 - 11 May 2018, Switzerland [Geneva]
 - Q5/2 panel session on Early Warning Systems (EWS) (8 May 2018)
 - [ITU-D Study Group 2 Rapporteur Group meetings](#)
1 - 12 October 2018, Switzerland [Geneva]
 - [Q1/2 related GMIS-UNIDO-ITU special session on Technology and Innovation Powering Connectivity for Inclusive and Sustainable Industrial Development](#) (1 October 2018)
 - [Q5/2 topical session on technological evolution, ICT exercises and disaster management drills](#) (3 October 2018)
 - [Q4/2 topical session on combating counterfeit ICT devices](#) (4 October 2018)
 - [Q2/2 topical session on the adoption of new digital health technologies](#) (5 October 2018)
 - [Q3/2 topical session on cybersecurity emerging issues](#) (9 October 2018)
 - [Q6/2 topical session on e-waste policies, strategies and frameworks](#) (9 October 2018)
 - [Q7/2 topical session on modern policies, guidelines, regulations and assessments of human exposure to RF-EMF](#) (10 October 2018).
- In addition, ITU-D Study Group 1 and 2 Expert Exchanges on emerging topics were held in conjunction with the Regional Seminar of 5G Implementation in Europe and CIS in July 2018 in Hungary, and together with the Regional Economic Dialogue of Telecommunications/ICTs for Latin America and the Caribbean in September 2018 in Mexico.
- The ITU-R Study Groups develop the technical bases for decisions taken at World Radiocommunication Conferences and develop global standards (Recommendations), Reports and Handbooks on radiocommunication matters. More than 4 000 specialists, from administrations, the telecommunications industry as a whole and academic organizations throughout the world, participate in the work of the Study Groups on topics such as efficient management and use of the spectrum/orbit resource, radio systems characteristics and performance, spectrum monitoring and emergency

radiocommunications for public protection and disaster relief. (Please see <http://www.itu.int/en/ITU-R/study-groups/Pages/default.aspx>)

196. World Telecommunication Development Conferences

- The World Telecommunication Development Conference (WTDC) sets the agenda and guidelines for the ITU-D Sector for the following four-year cycle, while Regional Conferences review "work-in-progress" towards the overall objectives and ensure that goals are met. The Telecommunication Development Conferences serve as forums for the discussion of the digital divide, telecommunications and development by all stakeholders involved in and concerned with ITU-D's work. In addition, they review the numerous programmes and projects of the Sector and Telecommunication Development Bureau (BDT). Results are reported and new projects are launched. Each Regional Preparatory Meeting brings together the countries in its region to explore and discuss their needs and the present and future projects of the Sector.
- The *World Telecommunication Development Conference (WTDC)* is an international event organized every 4 years by the ITU. **The seventh WTDC (WTDC-17) of ITU** was held from 9 to 20 October 2017 in Buenos Aires, Argentina, under the theme of "ICT for Sustainable Development Goals". It attracted 1368 participants from 134 Member States, 62 ITU-D Sector Members, 10 Academia, observers and the United Nations and its Specialized Agencies. The conference opened with a welcoming video message by Mr António Guterres, United Nations Secretary-General. During the first three days of WTDC-17, four plenary sessions were dedicated to the High-Level Segment during which 53 speakers addressed the conference, including the key note statement from Dr Tedros, Director General of WHO, provided by a WHO representative in Buenos Aires. Side events on 10 most relevant topics were held during the WTDC-17. In addition, 2 Ministerial Roundtables and a gala event were organized to celebrate the 25th Anniversary of ITU-D. All former Directors of the Telecommunication Development Bureau (BDT) were present in the celebrations. WTDC-17 prepared the way forward for ITU-D and BDT for the upcoming period.
- The main outcomes of the conference were:
 - Adopted the Buenos Aires Declaration, highlighting the main conclusions and priorities established by the conference, and reinforcing the political support towards ITU's development mission and strategic objectives;
 - Agreed on the ITU-D contribution to the strategic plan of ITU for 2020-2023;
 - Adopted the Buenos Aires Action Plan (BaAP) that aligns the work of the ITU-D with the strategic objectives of ITU so as to assist countries in harnessing the full benefits of ICTs.
- Moreover, WTDC-17 adopted five regional initiatives per development region. It also adopted the composition of the TDAG Bureau and appointed the TDAG Chairman and vice-chairmen; and ITU-D Study Groups Chairmen and Vice-Chairmen. The Conference approved 42 revised and 4 new Resolutions and abrogated 6 Resolutions, 5 of which

were merged with other existing ones. WTDC-17 adopted 14 Questions for Study Groups 1 and 2.

For additional information please see:

<http://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC17/Pages/default.aspx>

Regional preparatory meetings (RPMs)

In preparation for WTDC-17, BDT organized one regional preparatory meeting (RPM) per region, each preceded by a one-day meeting of the regional development forum (RDF). In 2016, the RPMs were organized in the Kyrgyz Republic, for the Commonwealth of Independent States (CIS) and in Rwanda, for Africa. In 2017, the remaining RPMs were organized in Sudan, for the Arab States, in Paraguay, for the Americas, in Indonesia, for Asia and the Pacific, and in Lithuania, for Europe.

All six RPMs were held with the objective of identifying priorities at the regional level for the development of telecommunications and information and communication technologies (ICTs). They gave careful consideration to the results of the implementation of the Dubai Action Plan since 2014 and mainly focused their discussions on the priority issues, topics, Questions, and regional initiatives included in the Buenos Aires Action Plan (BaAP). All RPMs recognized that ITU-D regional initiatives constituted an effective mechanism for fostering implementation of the WSIS outcomes and 2030 Agenda for Sustainable Development, including the achievement of the Sustainable Development Goals. In addition, all RPMs arrived at a set of proposals on priority issues for their respective regions that served as a basis for the formulation of contributions to WTDC-17.

Action Line C3: Access to Information and Knowledge, (also related to the 2030 Agenda for Sustainable Development)



Related to SDGs: SDG 1, SDG 2, SDG 3, SDG 4, SDG 5, SDG 6, SDG 7, SDG 8, SDG 9, SDG 10, SDG 11, SDG 12, SDG 13, SDG 14, SDG 15, SDG 16, SDG 17



197. At the WSIS Forum 2019, UNESCO **hosted** a session on WSIS Action Lines C3 and C7 E-Science: Access to Scientific Information – Are we ready for the Global South and SDGs?. This session launched the Global Alliance of Open Scholarly Communication



Platforms (GLOALL) with a recognition of the principle that scientific and scholarly knowledge is a global public good essential for the achievement of the UN SDGs.

198. At a session organized by UNESCO on 8th April at the WSIS Forum 2019 in Geneva, coordinators of six platforms – AmeliCA - based in Mexico, AJOL - African Network based in South Africa, Érudit - based in Canada, J-Stage - based in Japan, OpenEdition - based in France, and SciELO Network covering Latin America, Portugal and Spain agreed to join forces to improve the democratization of scientific knowledge following a multicultural, multi-thematic and multi-lingual approach.

199. The WSIS Prizes 2019 **Winner** for the Action Line C3 is the St. Petersburg State Unitary Enterprise "St. Petersburg Information and Analytical Centre" (IAC) from the Russian Federation. Its project, the "United libraries portal - free knowledge for all", aimed to provide a qualitatively new level of civil service, increasing the demand, availability and comfort of the libraries services. 198 city public libraries united into a single digital space with a single library card and new forms of services through the <https://spbilib.ru> portal: reading online, searching through a single directory with viewing information about the publications availability, online ordering and reservation and delivery services automation, online consultations, electronic form, event poster. Books are a source of knowledge and wisdom. Libraries provide free access to books, knowledge and experience of generations. However, commercial market and its advertising industry moved library work to the back. People start to find alternative sources of information, digital inequality and social exclusion of certain groups of the population aggravate.



A rapid decline in library attendance, low demand for library services among the population, and their inconsistency with the modern needs of society is a problem everywhere. Libraries suffer from informational fragmentation, poor resource sharing. Aging of middle-aged staff and readers becomes a trend. The capacity of libraries to participate in the information support of education and production is reduced. Library services demand among the population significantly increased due to the project. The involvement of the younger generation (the proportion of the age group 18-34 years - 47%). The continuous increase in the number of remote calls to the Portal (up to 9 thousand per day). The multiple increase in the services orders (up to 10 times in 2018) and the reduction of failures. Single demanded book fund of the city. Saving financial citizens costs to purchase expensive literature. Improving of the budget spending efficiency for the literature purchase, due to the equal distribution of funds between the city libraries. This project is mainly linked to the SDG 4, Quality of Education. Please find more details [here](#).

200. In 2017-2018 ITU-D held numerous workshops, conferences and symposiums, making materials widely available for free on the web. In addition, a number of information-rich resources have been made available including web-based information portals, practical ICT toolkits and online databases have been launched and/or existing resources updated.
201. ITU developed a set of “Guidelines for Promoting ICT Accessibility for Persons with Disabilities in the Americas Region”. These Guidelines are available in English, Spanish and Portuguese.
202. The joint ITU-G3ict Model ICT Accessibility policy report was launched during the Accessible Americas event November 2014.
203. The “Smart Accessibility on Connected TV” workshop was held in Barcelona on 18 March, 2015 organized by the Autonomous University of Barcelona in partnership with the International Telecommunication Union and European Commission.
204. Concerning broadband Access ITU, with support from Korea, has assisted countries in developing broadband policies and plans. Currently, support has been provided to develop Wireless Broadband Master Plans and National Broadband Plans/Policies to Fiji, Cambodia, Brunei, Vietnam, Samoa, Nepal, Myanmar, Bhutan, Bangladesh, Papua New Guinea, Indonesia, Pakistan, Lao PDR, Vanuatu, Marshall Islands, Philippines and St Lucia, Malawi, Congo Brazzaville, South Sudan and Bissau Guinea.
205. ITU developed and is maintaining a database for following the transition from analogue to digital terrestrial television broadcasting :

<http://www.itu.int/en/ITU-D/Spectrum-Broadcasting/Pages/DSO/Default.aspx>

206. The **World Radiocommunication Conference 2015 (WRC-15)**, was held in Geneva from 2-27 November 2015. It is the job of WRC to review, and, if necessary, revise the Radio Regulations, the international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits. Revisions are made on the basis of an agenda determined by the ITU Council, which takes into account recommendations made by previous world Radiocommunication conferences. The Radio Regulations edition following the decisions of the WRC-15 and it’s Final Acts came into force on 1 January 2017.

Regulatory publications

207. During the 2012-2015 time-frame, the preparation of the ITU-R regulatory publications followed the standard pattern, as foreseen in the Operational Plan, including the edition of the Radio Regulations reflecting the changes decided by WRC-12 in all ITU languages; the consolidated version of the Rules of Procedure reflecting the WRC-12 decisions was published with seven updates with the modifications decided by the RRB. The Rules of Procedure and their updates are published in all ITU languages.

Service publications

208. The Bureau prepares and issues various service publications, as specified in Article 20 of the Radio Regulations (RR).

209. In view of the importance of the operational information contained in the maritime-related service publications, particularly with regard to safety, administrations are required to communicate the necessary amendments, as stipulated in No. 20.16 of the RR.

210. **Service publications include:**

- -List of Coast Stations and Special Service Stations (List IV);
- -List of Ship Stations and Maritime Mobile Service Identity Assignments (List V);
- -List of International Monitoring stations (List VIII)
- -Maritime Manual

211. ITU hosted the World Radiocommunication Seminar 2016 (WRS-16) in Geneva from 12 to 16 December 2016, offering training focusing on the application of the ITU Radio Regulations and regulatory aspects of the use of the radio-frequency spectrum and satellite orbits. More than 400 participants attended from over 90 countries. ITU organizes world seminars on spectrum management every two years, as well as regional seminars aimed in particular at addressing the needs of developing countries. During WRS-14, the Director of the Radiocommunication Bureau (BR), noted that “Radiocommunication today are undergoing constant changes. These changes occur as a result of technological improvements and changes in practice and they need to be reflected in the international regulations on spectrum. [...] They need to be reflected in the World Radiocommunication Conferences, ITU Radiocommunication Sector (ITU–R) Recommendations, best practices on spectrum use, and the software tools used by ITU to process the thousands of notices we receive every week reliably and efficiently”. “. The WRC-18 is scheduled to be held in Geneva, Switzerland from 3 – 7 December 2018.

Action Line C4: Capacity-Building (also related to the 2030 Agenda for Sustainable Development)



Related to SDGs: SDG 1 (1.b), SDG 2, SDG 3 (3.7, 3.b, 3.d), SDG 4 (4.4, 4.7), SDG 5 (5.5, 5.b), SDG 6 (6.a), SDG 12 (12.7, 12.8, 12.a, 12.b), SDG 13 (13.2, 13.3, 13.b), SDG 14 (14.a), SDG (16.a), SDG 17 (17.9, 17.18)

212. Within the framework of its mandate as facilitator for Action Line C4, the ITU organized the facilitation meeting of Action Line C4 on capacity building which took place as an integral part of the WSIS Forum 2019. The meeting took place on Monday, April 8th from 11:00 to 13:00 was conducted under the theme “New teaching approaches for higher learning in the digital era”. The session was attended by around 40 participants. The session focused on how capacity building using ICTs supports the achievement of Sustainable Development Goal Number 4 (SDG 4) on ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all by 2030. The session specifically contributes to target 4a, which aims at ensuring, building and upgrading education facilities that are child, disability, gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all. The session was conducted in the form of a roundtable for academia and was moderated by Professor Tim Unwin from the University of London.



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213. Several conclusions were reached during the meeting such as:

- creating an international network of professional collaborators that can help sustain institutional partnerships between the university, industry, government and civil society
- introducing training of teachers on new technologies especially non ICT faculty members
- adapting curricula to new ICT tools and interactive technologies
- ICT based pedagogies should begin from basic ICT training, procuring hardware and software as well as ensuring maintenance of the equipment
- exploring how ICTS are used in education
- ICTs are just one way of enhancing education
- developing and developed countries cannot have the same solutions due to the different level of digital penetration and therefore need different ICT approaches in education
- curricula should be designed to ease students’ entry into the workforce

- main purpose of teaching is to inspire students to develop critical thinking and research skills
- while traditional method of teaching can be efficient, it limits the instructor as to what students can learn
- teachers need training, both ICT and non-ICT faculty
- increasing role of citizen science: you don't need a degree to make an impact in the world.

214. Please find the complete details on session and the outcomes [here](#).

215. The Action Line 4 thematic is linked to many SDGs.

- SDG 1: development of domestic policies to ensure that ICTs are fully integrated in education and training at all levels. Creation of policy frameworks requires stakeholder engagement, analysis and interpretation of data for targeted policy interventions which can be achieved through skills development programs.
- SDG 2: With the emergence of e-agriculture and the growing need for the knowledge in the use of ICT's, capacity building interventions focused at development and promotion of programmes to eradicate illiteracy using ICTs at national, regional and international levels, will contribute to knowledge growth and inclusion. It also focuses on building the capacity to use ICT tools to increase crop production, adopt modern farming methods, predict weather patterns, and in the process work towards eliminating hunger and creating food security.
- SDG 3: To support research and strengthen capacity of developing countries for early warning, risk reduction and management of national global health risks, activities include design of specific training programmes in the use of ICTs in order to meet the educational needs of information professionals, such as archivists, librarians, museum professionals, scientists, teachers, journalists, postal workers and other relevant professional groups which focuses not only on new methods and techniques for the development and provision of information and communication services, but also on relevant management skills to ensure the best use of technologies.
- SDG 4: Action line C4 focuses on development and promotion of programmes to eradicate illiteracy using ICTs at national, regional and international levels, with the aim of increasing the number of people with relevant ICT skills and to facilitate employment and entrepreneurship in the ICT sector.
- SDG 5: Work on removing the gender barriers to ICT education and training and promoting equal training opportunities in ICT-related fields for women and girls, is part of the action line, with early intervention programmes in science and technology targeting young girls with the aim of increasing the number of women in ICT careers as well as promotion the exchange of best practices on the integration of gender perspectives in ICT education.
- SDG 6: Development of distance learning, training and other forms of education and training as part of capacity building programs, is part of the capacity building initiatives that supports countries interventions giving special attention to developing countries and especially LDCs in different levels of human resources development.

- SDG 12: Raising awareness on sustainable consumption and production in today's era requires the use of technology. The action line therefore impacts on this SDG by enhancing technological capacity of countries through training and development initiatives that target ICT's and related areas, as well as building a more inclusive information society.
- SDG 13: Action line C4 promotes creation by governments, in cooperation with other stakeholders, of programs for capacity building with an emphasis on building a critical mass of qualified and skilled ICT professionals and experts.
- SDG 14: Empowering communities in ICT use and promoting the production of useful and socially meaningful content is a capacity building intervention that can increase scientific knowledge and promote innovation and research.
- SDG 16: The C4 action line focuses on promotion of international and regional cooperation in the field of capacity building, including country programmes developed by the United Nations and its Specialized Agencies.
- SDG 17: Capacity building initiatives contributes to the SDG through the design and implementation of regional and international cooperation activities to enhance the capacity, notably, of leaders and operational staff in developing countries and LDCs, to apply ICTs effectively in the whole range of educational activities. Also through the launch of pilot projects to design new forms of ICT-based networking, linking education, training and research institutions between and among developed and developing countries and countries with economies in transition.

216. Two Emerging Trends related to WSIS Action Lines were identified during the meeting:

- The need to take technology to those who need it, and teach them how to use it continues to be a priority in many parts of the world
- Innovation of education, both in its pre-university and university tracks

217. The WSIS Prizes 2019 Winner for the Action Line C4 is the Paschim Banga Society for Skill Development, Dept of Technical Education, Training & Skill Development, Govt. of West Bengal (WB). The governmental project, named "Capacity Building through end-to-end ICT enabled "Utkarsh Bangla" programme", is the flagship program of integrated skill development steered by the Government of West Bengal. With an annual target of 600,000 persons, the programme aims at creating a pool of skilled candidates who are industry ready. Catering to youths, who are mostly from underprivileged backgrounds, it also encourages school graduates to enroll in technical trainings. While expanding the outreach of skilling, the e-Governance portal of Utkarsh Bangla allows a cogent monitoring and capacity building of all stakeholders involved.



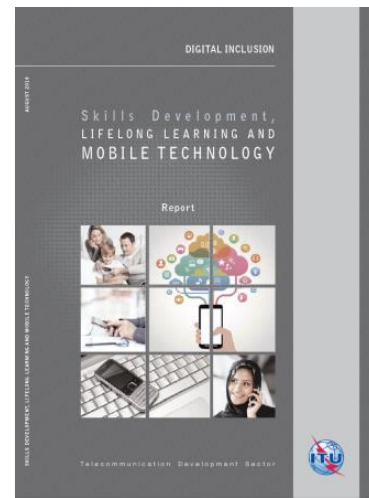
The portal has helped in broadening the canvas of the skill ecosystem, the portal has allowed the convergence with different departments & stakeholders, including Government & private partners to deliver the mandate of skilling in a holistic manner. The portal has made the scheme accessible to most marginalized sections while creating a ready repository of trained youth for employment. It offers end-to-end e-Services for trainees, from course enquiry till final certification and industry connect. The portal also facilitates Recognition of Prior Learning (RPL) by providing training on soft skills & entrepreneurship to persons who are already working in the unorganized sector. The portal has been instrumental in providing accessibility to skill training and takes firm strides towards achieving inclusive growth. This project is directly linked to the SDGs 1, 2, 3, 4, 5, 8, 10, 16 and 17. More details can be found [here](#).

218. The ITU continues to support its [Centres of Excellence \(CoEs\)](#). The CoEs are institutions sharing expertise, resources and capacity-building know-how in telecommunications and ICTs training/education, distributed around the world. Designed to offer training to ICT managers in the public and private spheres through face-to-face or distance learning programmes, the Centres serve as regional focal points for professional development, research, and knowledge sharing, as well as providing specialist training services to external clients. CoE networks have been established in all regions including Africa, the Americas, Arab States, Asia-Pacific, Commonwealth of Independent States (CIS) and Europe. Under the umbrella of the ITU Academy, these regional networks are now being joined together into a single global network sharing training curricula, resources and expertise.
219. Following the adoption of the priority areas for the next four years by the World Telecommunication Development Conference (WTDC 2017), an open and transparent application and selection process for new Centres of Excellence for the next four years was undertaken. A total of 29 new Centres were selected for the 2019-2022 cycle, out of a total of 64 applications received and processed. Regional Steering Committee meetings were held in the first quarter of the year, and all the centres are now fully functional. Training activities under the Centres of Excellence have been taking place in all the 6 regions.
220. A regional governance structure for the Centres of Excellence has been put in place in the form of regional Steering Committees which meet once every year to oversee the operations of the Centres of Excellence and provide strategic direction and advice to ITU.

The Centres of Excellence have proved to be a key vehicle for training and capacity building for the ITU membership.

221. CoE trainings cover topics such as Spectrum Management, Digital Broadcasting, Cybersecurity, Innovation & Entrepreneurship, Digital Economy, Wireless and Fixed Broadband, Internet of Things, Big Data & Statistics, Artificial Intelligence, Smart Cities & Communities, ICTs & the Environment, ICT Applications, Digital Inclusion, and Conformance & Interoperability.

222. As the main ITU umbrella for training activities, the ITU Academy has finalised the development of the ITU [Spectrum Management Training Programme \(SMTP\)](#). This program consists of 9 modules at Basic level and six modules at Advanced level, leading to the award of a professional ITU certificate, or even a degree, if taken through University. Agreements have been signed with partners to deliver SMTP and discussions are ongoing with other Universities and training institutions such as Centres of Excellence, interested in delivering this program as part of their curricula. A Quality of Service Training Program (QoSTP) has also been developed and is ready for delivery. A training programmes which is currently being developed is the Internet of Things Training Programme. A Masters in Communications Management degree programme in collaboration with the United Kingdom Telecommunications academy (UKTA) is ongoing with a significant number of participants.



223. The ITU Academy website has been redeveloped and redesigned to provide users with a user-friendly interface, easier navigation, and modern feel and look. The innovative design and features transform the new ITU Academy into the main online gateway to all ITU's capacity development activities. The primary objective of the new website is to harmonize and integrate all ITU capacity development products and services. The new website menu and structure provide an opportunity for all three ITU bureaus to showcase their work in capacity development activities and updated it on a regular basis. With the introduction of menu items such as "Capacity development", "Curriculum development", "Research and publications" and an improved course search, the ITU Academy caters to the need of all ITU divisions to share their latest work in capacity development in an online access point that is specifically dedicated to learning and training resources and activities. Close contact has continued with the BDT on work of mutual interest to ITU R and ITU D. The BR has participated in relevant meetings of ITU D Study Groups, Rapporteur Groups and TDAG, where liaison activities have involved topics such as spectrum management, digital broadcasting and migration from analogue systems, transition towards and implementation of IMT, and broadband wireless access technologies. These topics are in addition to the collaboration undertaken through ITU D Question 9-3/2 that calls for the identification of study topics in ITU R (and ITU T) considered of particular interest to developing countries.

224. In response to requests from the BDT, experts from ITU-R and BR have participated in ITU seminars and workshops organized by ITU-D (see also Section 8.2.4). Within the framework of Resolution ITU-R 11-4 (Further development of the spectrum management system for developing countries), BR has been involved with the design, testing and training associated with the software SMS4DC (Spectrum Management System for Developing Countries), with advice provided on the use of relevant ITU-R Recommendations. In addition, ITU-R Study Group 1 has continued to work closely with the ITU-D Study Groups in pursuing studies on spectrum usage in accordance with Resolution ITU-D 9.
225. In 2013, the BR developed jointly with the BDT an ITU Report on the Digital Dividend. On this basis, ITU-R Study Group 1 has since developed and recently adopted an ITU-R Report on this subject.
226. With the needs of developing countries always in mind, the production of Handbooks has continued to be viewed as a major Study Group activity. In this respect, new or revised Handbooks have been developed on topics such as spectrum monitoring, radiowave propagation information for designing terrestrial point-to-point links, amateur and amateur-satellite services, migration to IMT-2000 systems and use of radio spectrum for meteorology – weather, water and climate monitoring and prediction.
227. Since 2013, the BR actively participated in a joint project with the BDT to develop the Spectrum Management Training Programme (SMTP) through its different phases: design, material preparation, peer review, pilot test (conducted in 2015 and now under evaluation). In 2016, it is planned to implement the full SMTP programme for training of the staff of a Spectrum Regulatory Authority in a developing country.
228. In addition to climate change and emergency communications, topics of mutual interest between ITU-R and ITU-T include IMT 2020, the effects of human exposure to radio frequencies, power line transmission systems, intelligent transport systems, common patent policy and intellectual property rights and audiovisual media accessibility.
229. SG 6 established a new Intersector Rapporteur Group (IRG) on Integrated Broadband Broadcasting (IBB) systems in addition to the two existing IRGs on audiovisual media accessibility (IRG-AVA) and on audiovisual quality assessments (IRG-AVQA).
230. There continues to be a requirement for close coordination on the various topics being addressed by ITU-T that impinge on radiocommunication issues to reduce the potential for overlap, duplication and conflict of work undertaken by the two Sectors.
231. A publication on Skills Development, Lifelong Learning and Mobile Technology, has been produced and released in 2017. The document is the work of an international team of experts, who have contributed to nine chapters dealing with using mobiles for learning and capacity building.
232. Under a partnership with International Telecommunications Satellite Organisation (ITSO), a number of training activities on satellite communications were held in Maputo, Mozambique, for English speaking Africa in June, 2019 and in July, Abidjan Côte d'Ivoire, for French speaking Africa in. Another two trainings were conducted in April, 2019. One was in Asuncion, Paraguay for the Americas region and one was in Minsk, Belarus for the CIS region.

233. In June 2018, ITU organised the Global ICT Capacity Building Symposium (CBS), held in Santo Domingo Dominican Republic. The Symposium attracted 331 participants from 36 countries. The issues discussed at the symposium included new skill sets required for the 21st century information age and job markets, ICT skills and capacity building for achievement of SDGs, and the importance of public-private partnerships (industry, government, academia) in capacity building.



234. The ITU annual regional human capacity building workshop on “Strengthening capacities in Internet governance in Africa” was held in Abuja, Nigeria, from 27-29 August 2018. The workshop was organized by the ITU Telecommunication Development Bureau in partnership with DiploFoundation and hosted by the Digital Bridge Institute (DBI) of Nigeria. The workshop attracted 101 participants from 14 countries and 6 international/regional organizations including ICANN, ISOC and AFRINIC. Among the participants were professionals from governments, regulatory authorities, public and private organizations, universities and research institutions. The objectives of the workshop were to strengthen capacities of the ITU membership in the field of Internet governance, involving different stakeholders in the delivery of the workshop, and to provide a general overview of key aspects related to international Internet governance discussions. This corresponds to the outcomes of the ITU World Telecommunication Development Conference (WTDC) 2017, where ITU Member States agreed that capacity building of the ITU membership in international Internet governance is one of the priority issues to be addressed by ITU’s capacity building programme.
235. Following a Capacity building Cooperation Agreement signed between ITU and Intel in 2014 during WTDC-14, a virtual Classroom training on Universal Service Policy for Broadband Rollout and Implementation of Smart Learning was run in March for the Arab States. The training covered areas such as Universal Service Policy for Broadband Rollout; Effective use of Universal Service Funds (USF) for broadband projects; and Leveraging ICTs for education in a broadband environment. Programme (STM Programme) is being negotiated for the Americas region. This project is designed to improve the managerial skills and competencies of the professional and executives working in the ICT sector in the Americas Region. The STM Program will comprise of 9 modules to be delivered through a constellation of partner universities within the region.
236. ITU Regional Radiocommunication Seminars (RRS): The Radiocommunication Bureau (BR) organizes world seminars on spectrum management every two years in Geneva, as well as regional seminars aiming at the particular needs of developing countries.

The main objectives of BR seminars and workshops are:

- to provide assistance to Member States in spectrum management activities, e.g. through training, information meetings, seminars, development of handbooks and the provision of tools for automated spectrum management; and
- to expand the assistance offered to Member States in coordinating and registering frequency assignments and in applying the Radio Regulations, with special attention to developing countries and Member States that have recently joined the Union.

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238. The following RRS were held in 2015 -2018:

- 1) **RRS-15-Eastern Europe and CIS**, Bishkek, Kyrgyz Republic, 2-6 March 2015
- 2) **RRS-15-Africa**, Niamey, Niger, 20-24 April 2015
- 3) **RRS-15-Asia-Pacific**, Manila, Philippines, 25-30 May 2015
- 4) **RRS-15-Americas**, San Salvador, El Salvador, 27-31 July 2015
- 5) **RRS-16-Americas**, Port of Spain, Trinidad and Tobago, 18-22 July 2016
- 6) **RRS-16-Asia-Pacific**, ITU/PITA Regional Radiocommunication Seminar 2016 for Asia&Pacific, Apia, Samoa, 19-23 September 2016.
- 7) **RRS-16-Americas** - Port of Spain, Trinidad and Tobago, 18-22 July 2016.
- 8) **RRS-17-Africa**, Dakar, Senegal - ITU-ATU Regional Radiocommunication Seminar 2017 for Africa, 27-31 March 2017
- 9) **RRS-17 Asia Pacific**, Phnom Penh, Kingdom of Cambodia, 4-7 December 2017
- 10) **RRS-17 Arab Countries**, Muscat, Oman, 10-14 December 2017
- 11) **RRS-18 Asia-Pacific**, Thimphu, Bhutan, 23-28 July 2018
- 12) **RRS-18 Americas**, San Jose, Costa Rica, 28-29 September 2018

239. **Inter-Sectoral cooperation on ITU Workshops**

The period since WRC-15 witnessed a busy schedule of events organized entirely by BR or in cooperation with BDT/TSB and/or other bodies (see <http://www.itu.int/ITU-R/go/seminars>). A new series of workshops on the efficient use of the orbit and spectrum was organized with a view to openly discussing issues often

qualified as “sensitive” and making progress on the exchange of ideas to adapt and improve the international satellite regulatory registration framework at the next WRC.

BR continues to pursue its objective of informing and assisting the ITU membership, in particular in developing countries, on issues relating to radiocommunication matters. For this purpose, the BR organizes and participates in a number of spectrum related workshops, seminars, meetings and capacity building activities. These actions are being carried out in close cooperation with the BDT and the ITU regional and area offices, and the relevant international organizations and national authorities.

In particular, the BR keeps participating on Meetings and Workshops of Experts on WTDC Resolution 9 (Rev. Dubai, 2014), as well as those of Expert Group on Telecom-ICT Indicators (EGTI), aimed to review the mobile and wireless broadband access indicators, and the new ones (under preparation) related to IMT-2020.

In addition to climate change and emergency communications, topics of mutual interest between ITU-R and ITU-T include IMT-2020, the effects of human exposure to radio frequencies, power line transmission systems, intelligent transport systems, common patent policy and intellectual property rights and audio-visual media accessibility.

BR representatives attended the World Telecommunication Standardization Assembly 2016. The BR was also present at the Kaleidoscope academic conferences organized by ITU-T during ITU Telecom World 2016, where the BR chaired a session on Spectral efficiency in wireless networks.

There continues to be a requirement for close coordination on the various topics being addressed by ITU-T that impinge on radiocommunication issues to reduce the potential for overlap, duplication and conflict of work undertaken by the two Sectors.

Furthermore, BR and TSB jointly organized a session on 5G/IMT 2020 during GSR-17.

Within the framework of the ITU Centres of Excellence for Asia-Pacific Region, the Bureau organized the first online training program on "Satellite Network Registration Procedures and International Regulations" for the Asia-Pacific Region jointly with the ITU office in Bangkok (Thailand) and the State Radio Monitoring Centre (SRMC), MIIT, China, from 1st till 28th June 2015. The program focused on Satellite Network Registration Procedures and International Regulations and covered an introduction to satellite projects, the Radiocommunication Sector in the ITU & Orbit-Spectrum Regulations, Non-planned Space Services Procedures, Planned Space Services (BSS & FSS) Procedures and other topics.

The course objectives were to develop a basic knowledge of satellite projects, to understand the international regulations governing satellite network registration, to understand in detail, the coordination procedures concerning satellite registration and share experiences and challenges concerning satellite network registration.

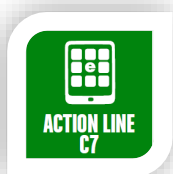
An ITU Symposium and Workshop on small satellite regulation and communication systems was also held in Prague, Czech Republic, 2-4 March 2015. The three-day event focused on the regulatory aspects of the use of the radio-frequency spectrum and satellite orbits for small satellite communication systems, in particular on the application of the provisions of the [ITU Radio Regulations](#). It was organized by the ITU in cooperation with the Czech Technical University's [Faculty of Electrical Engineering \(CTU FEE\)](#), an ITU Academia Member. It was attended by more than 160 participants from around 40 countries.

The participants concluded the Symposium with the unanimous endorsement of the ‘[Prague Declaration](#) on Small Satellite Regulation and Communication Systems’, which urges the small satellite community to comply with the applicable international and national laws, regulations and procedures, indispensable to guarantee the long-term sustainability of small satellite projects, the avoidance of harmful interference and proper management of space debris. The declaration also recommends that ITU continue capacity-building activities on the regulation of satellite communication systems (see <http://www.itu.int/en/ITU-R/space/workshops/2015-prague-small-sat/Documents/Prague%20Declaration.pdf>).

The Bureau intends to continue its cooperation with the ITU Centres of Excellence for Asia-Pacific Region and to organize, on a regular basis, online courses on satellite network registration procedures. In view of the success of this activity, the Bureau intends also to develop the same online course for Africa and the Americas.

Action Line C7: ICT Applications

Action Line C7: E- Government



Related to the SDGs: [SGD 9 \(9.c\)](#), [SDG 16 \(16.6, 16.7, 16.10\)](#), [SDG 17 \(17.8\)](#)



240. The Action line C7 E- Government Facilitation Meeting was held on Monday, 8 April 2019 together with the Action Lines C1 and C11. This session was Digital Government for Empowering People and Ensuring Inclusiveness and Equality”.



Concerning the E-Government issues, the session discussed how the United Nations E-Government Survey best contribute to the realization of the SDGs for all segments of society, the main modalities for delivering services in digital government, and the critical trends in digital government and main issues and challenges. Find more details on this session [here](#).

241. The WSIS Prizes 2019 Winner for the Action Line 7 on EGovernment is the Ministry of Environment Water & Agriculture (mewa) for their project “Licenses Portal”. This project is coming under the digital transformation initiative that focusing on providing electronic services to help the beneficiaries to get their services in less time and good quality. In addition to enable the ministry to track, manage and improve the beneficiaries experience and enhance the social life for the communities. The project scope is developing electronic portal that will contains 80 types of agriculture licenses that can any investor apply for them to get the license electrically without visiting the ministry or any of its branches.



These are the main objectives for develop this system:

- Manage and tracking the licenses in centralized portal that will be accessible for all investors (individuals and organizations)
- Getting the needed licenses without visiting the ministry or any of its offices
- Paperless environment by reduce the paper work inside the ministry and its offices
- Digitalized government to be aligned with digital transformation strategy for the ministry as one the main initiative for the kingdom vision 2030
- Transparently and ability to monitor the requests statuses from the beneficiaries by tracing the request ID through the centralized portal
- Reduce the violations and make more control on the non-licensed investors
- Ability to add the violations in easy and accurate way by License number.

The vision is to achieve sustainability of environment and natural resources, in such a manner that would ensure water security, contribute to achieving food security, and improve quality of life in KSA. Our mission is to maintain distinguished performance in developing and applying comprehensive policies and effective strategies, as well as promoting services by engaging the private sector and the competent authorities, with a view to achieving prosperity and sustainability of the environment, water and agriculture. This project is linked to SGDs 2, 3, 8, 6, 10, 11 and 12. More details [here](#).

Action Line C7: E-Health



Related to the SDGs: e-health: SDG 1 (1.3, 1.4, 1.5), SDG 2 (2.1,2.2), SDG 3 (3.3, 3.8), SDG 5 (5.6, 5.b), SDG 17 (17.8, 17.19)



242. The Action line C7 E Health Facilitation meeting was held on Monday, 8 April 2019 co-organized by WHO and ITU. The topic of the meeting was “Towards health sector Digital Transformation”. The session brought together a number of organizations working on E-Health to share experiences and latest lessons learned and trends.



The goal was to provide an overview of the global status of E-Health and the way forward. It focused on how appropriate E-Health solutions can strength health systems and empower community health workers to manage delivery and promotion of healthcare particularly to reach the last mile in resource constrained environments. More details [here](#).

243. The WSIS Prizes 2018 Winner for Action Line C7 on E-Health is the Ministry of Health from Brazil with the project “E-Health Mato Grosso (Telessaude Mato Grosso)”. Telessaude Mato Grosso is part of The National Telehealth Brazil Networks Program, which was established through the Ordinance of the Ministry of Health nº 35 of January 2007, and is coordinated by the Secretariats of Labor and Health Education (SGTES) and Health Care (SAS).



Indicadores de desempenho do Telessaúde MT

Desenvolvido em  Power BI

Web Classes of the Week

November

Sec 19	
Tue 20	
Wed 21	
Thu 22	From 14 To 16 - Web Site: The Joint Health Of Patients With Hemophilia. Speaker: Ms. Delma R. Della Riva
Fri 23	

More web classes



It enables the strengthening and improvement of the quality of primary care services in the Unified Health System (SUS), integrating Permanent Health Education (EPS) and health care support through information and communication technologies (ICT) tools and technologies. It is constituted by State, Intermunicipal and Regional Nuclei, that develop and offer specific services for professionals and workers of the SUS. The first project to implement Telehealth in Mato Grosso was prepared in 2009, covering 100 initial points. In December 2011 an agreement was signed between the Ministry of Health (SGETS) and the State Health Secretariat, for the cost of Telehealth. This project mainly contributes to Goal 3: Good health and well-being. More information can be found [here](#).

244. A High-Level joint ITU-World Health Organization (WHO) “Digital Health Policy Dialog” held in Geneva on 23-24 May 2016 which shared experiences and identified strategies among 250 participants, including five ICT and five Health ministers on how policies and cross-sectoral collaboration between the health and ICT sectors could foster innovation to improve the quality, equity and accessibility of health services.
245. Technical Assistance provided to Benin, Mali and Tunisia to develop and validate their national e-Health Strategy.
246. A “Toolkit and Implementation Guidelines for a Digital Health Platform” was developed to guide decision makers and health planners in designing and implementing a national "digital health platform".
247. A joint effort was launched with WHO African Region to scale up Digital Health services in Africa. The partnership will focus on building a capable workforce to effectively use ICT as well as addressing the need of multi-stakeholders partnership models that can bring about sustainable adoption of Digital Health.

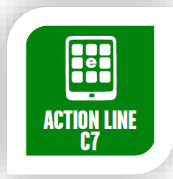
248. “Be He@lthy, Be Mobile” is a global joint initiative launched in 2012 between ITU and WHO to use mobile for non-communicable diseases (NCDs). The initiative works with governments to identify and scale up evidence-based interventions to use mHealth to address NCDs and their associated risk factors. It currently provides technical and financial support to programmes in nine countries (Egypt, Tunisia, India, the Philippines, Costa Rica, Norway, the United Kingdom, Zambia and Senegal) across a range of income groups and disease areas, including mSmokingCessation, mDiabetes and mCervicalCancer and mCOPD. It also promotes a highly multisectoral approach to ensure that the programmes are sustainable. This is achieved through encouraging partnership between ministries of health and ministries of ICTs, together with support from other groups such as academia, multilateral agencies and relevant partners from the private sector.
249. In the context of this initiative, three different mDiabetes programme were launched in Senegal, India and Egypt in collaboration between the Ministry of Health and the Ministry of ICT to help diabetic patients to safely manage their illness and reduce the number of emergency hospitalizations. Currently 100,000 users are subscribed in India, and 112,000 and 100,000 users are subscribed respectively in Senegal and Egypt, all of whom receive regular messages about diabetes prevention and control.
250. Another three mSmokingCessation programmes were launched in India, Tunisia and the Philippines to use mobile applications to assist smokers to quit smoking. Close to 2,000,000 users are subscribed in India, with the launch of the pilot phase already begun for Tunisia and Philippines.
251. Guidelines on the use of mobile applications for smoking cessation, diabetes prevention and control and cervical cancer were developed in collaboration with WHO.
252. Built the human and institutional capacity of 7 Afghan participants on mobile application development to address the existing gaps and lack of skilled professionals in mobile application development in Islamabad, Pakistan, from 16-26 February 2016.
253. A major agreement was signed with the European Commission and WHO to set an mHealth Innovation and Knowledge Hub in Europe. The Hub will be collecting and disseminating research and experience relating to the large-scale implementation of mHealth programs and support Member States in setting up large-scale mHealth programs.
254. A West African Regional Workshop on National eHealth Strategy Implementation held on 26-27 April 2016 in Abuja, Nigeria, which supported 50 participants from ministries of Health and ICT from 15 countries in the West African region to develop and/or to implement their national eHealth strategies. A regional workshop on National eHealth Strategy development organized in Cotonou, Benin on 24-26 November 2015, which built the capacity of 30 delegates from ministries of Health and ICT in 6 Francophone countries to develop national eHealth Strategies.
255. Assistance was provided to Zimbabwe through an infrastructure and equipment audit to extend telemedicine services in remote areas of the country, as well as in-country training.
256. An e-Health workshop was organized in Harare, Zimbabwe, aiming at using ICT to support healthcare for children and women in the framework of ITU/WHO partnership through the COIA (Commission of Information and Accountability).
257. The WHO-ITU have initiated a project (2017-2021) to establish an mHealth Knowledge and Innovation Hub through financial support the European Commission (EC) Horizon2020 Programme. This will enable both the development of national mHealth

- interventions in selected EU member states to champion the uptake of mHealth and the foundation and maintenance of a centralised ‘Knowledge and Innovations Hub for mHealth’ to monitor and enable mHealth adoption and innovation.
258. ITU developed content for the specialized multimedia courses focusing on the use of ICTs in healthcare, including telemedicine and courses for IT specialists on the maintenance of medical information systems (jointly with Odessa National Academy of Telecommunications, Ukraine).
259. In the 2017-2021 study period this topic is addressed by ITU-D Study Group 2 [Question 2/2: Telecommunications/ICTs for e-health](#). The final report from the 2014-2017 study period on “Information and telecommunications/ICTs for e-health” is available at the following [link](#).
260. ITU-T SG16 developed updates to the personal connected health specifications in the **ITU-T H.810-H.850 series of Recommendations**, where two new and 37 revised conformance testing specifications were approved for the third edition of the Continua Design Guidelines (CDG) in the ITU-T H.810 series. With this updates, developers will be able to check compliance of their implementations of H.810 devices and systems to the latest version of the CDG.
- ITU-T SG16 developed new and updated conformance testing specifications for the **ITU-T H.810 Continua Design Guidelines (CDG)** in the ITU-T H.810-series of Recommendations has been updated to the 4th edition ("Keratin", CDG 2017) with 5 new and 7 revised draft texts under approval. The updates cover testing for new device specializations for power status monitoring and updated glucose monitors, and updates the PCD-1 observation upload capability.
 - **Recommendation ITU-T H.846 (revised) “Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 6: Device specializations: Personal Health Gateway”** provides a test suite structure (TSS) and the test purposes (TP) for Personal Health Gateways in the Personal Health Devices (PHD) interface, based on the requirements defined in the Recommendations of the ITU-T H.810 sub-series, of which Recommendation ITU T H.810 (2017) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface. Recommendation ITU-T H.846 is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 6: Device Specializations. Personal Health Gateway (Version 1.9, 2016-09-20), that was developed by the Personal Connected Health Alliance. A number of versions of this specification existed before transposition. This Recommendation includes an electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A. This revision includes the Power Status Monitor of Personal Health Devices device specialization (ISO/IEEE 11073-10427:2018) test cases as well as minor corrections.
 - **Recommendation ITU-T H.849 (revised) “Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 9: Transcoding for Bluetooth Low Energy: Personal Health Devices”** provides a test suite structure (TSS) and the test purposes (TP) for the transcoding by personal health devices in the Personal

Health Devices (PHD) interface of application-level data between the Bluetooth Low Energy Bluetooth Generic Attribute Profile format and the IEEE 11073-20601 data format, based on the requirements defined in the Recommendations of the ITU T H.810 sub-series, of which Recommendation ITU T H.810 (2017) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface. Recommendation ITU-T H.849 is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 9: PHD Transcoding Whitepaper. Personal Health Device BLE (Version 1.6, 2016-09-20), that was developed by the Personal Connected Health Alliance. A number of versions of this specification existed before transposition. This Recommendation includes an electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A. This revision provides updates account for the inclusion of pulse oximeter and continuous glucose monitoring Bluetooth Low Energy profile test cases.

- **Recommendation ITU-T H.871 “Safe listening guidelines for personal sound amplifiers”** complements recommendation ITU-T H.870 “Guidelines for safe listening devices/systems”: There is currently no international standard for Personal Sound Amplifiers (PSAs), which is needed to ensure these devices are safe for the user and do not further damage the users hearing, since they are freely available to anyone. Personal Sound Amplifiers (PSAs) are non-medical devices, intended for people with normal hearing and (a) can have a design physically comparable to hearing aids, in which case it is called Personal Sound Amplification Product (PSAP) or (b) can also simply be an app on any smartphone or other device, in which case it is called Personal Sound Amplification App (PSAA). As is defined in H.870, the sound exposure should be limited to an accumulated dose (100 % CSD) over 7 days of in total 1.6 Pa2h which corresponds to 80 dBA for 40 hours to prevent noise induced hearing loss. When the 100% CSD is reached, the sound level should suddenly drop, and the user will get the suggestion to lower the sound level, since the weekly sound listening dose is exceeded. When PSAPs and PSAAs do not have the capacity to measure CSD, the output level of the device needs to be permanently limited to 95 dBA, so that the user is unlikely to use the device at a level higher than 80 dBA, since the dynamic range of speech has a crest factor of 12 to 17 dB.
- ITU-T SG20 under Q3/20 “Architectures, management, protocols and Quality of Service” is working on draft Recommendation ITU-T Y.cnce-IoT-arch “Functional architecture of cellular-radio network capability exposure for smart hospital based on Internet of things”. Additionally, Q7/20 “Evaluation and assessment of Smart Sustainable Cities and Communities” is working on draft Recommendation ITU-T Y.IoT-EH-PFE “Performance evaluation frameworks of e-health systems in the IoT”.

Action Line C7: E –Agriculture



Related to the SDGs: e-agriculture: SDG 1 (1.5) , SDG 2 (2.3,2.4,2.a) , SDG 3(3.d), SDG 4, SDG 5 (5.5), SDG 8 (8.2) , SDG 9 (9.1, 9.c) . SDG 12 (12.8), SDG 13 (13.1, 13.3), SDG 17



261. The Action line C7 E-Agriculture Facilitation meeting was held jointly with the Food and Agriculture Organization (FAO) entitled “Community of Practices and Integrated Platforms - Knowledge Sharing in Food and Agriculture” on Monday, 8 April 2019. The session presented cases which the use of ICTs and innovative solutions for agriculture, livestock, water and others sectors are playing a decisive role in terms of access to information, knowledge, improving productivity and ensuring new incomes as well as social inclusion for the people in rural areas. More details on the session [here](#).

262. E-agriculture has been a WSIS action line led by the FAO with support from ITU since the Geneva 2003 and Tunis 2005 Summits. Many e-Agriculture applications today are the product of numerous years of this fruitful bilateral cooperation. This year session highlighted that:

- People care about their problems not digital solutions. Innovation design decisions must be rooted in solving real problems suffered by actual users, or they’re not useful. Therefore, it is critical to learning with the community, designing with the community and testing with the community.
- When doing innovation, it is important to consider both frontend and backend, if you don’t understand what to do at the backend, you actually don’t understand the frontend well either.
- When doing e-Agriculture, it actually takes many differences to meet farmers’ need. If only offering knowledge, and there are no way farmers to get seeds or other services, then there will be no concrete results at all. That’s why it is important to develop partnerships with other stakeholders to complete the comprehensive program from frontend to backend. It is important to know backend. It is important to know the users. The number of people to use the device will generate data to help you make better decisions. To avoid using technology to easily get project deployed for incentives to see success, instead using technology to bridge the gap and let people further behind benefit from the development of technology.
- Digital innovation framework is a platform for multi-stakeholders to work together with innovative technology and practices, as well as innovative business models and processes. FAO and ITU, as well as the entire UN community, need to be able to work with all sectors. It’s important to engage multi-stakeholders to promote digital innovation and achieve successful business model.

263. Digital innovation has the potential to transform the approach to all 17 SDGs. Specifically, the development of a strategic framework for digital innovation in the food and agriculture sector will provide a systematic process and sustainable business model for creating, testing, funding, and scaling new digital solutions to achieving the SDGs, particularly 1, 2, 8,

and 13. Through this process, youth entrepreneurship, capacity development, and multi-stakeholder partnerships will be formed that will enable a permanent and systematic approach to integrate digital technologies and innovation into local communities and national action plans. These activities contribute to SDGs 1, 2, 6, 8, 9, 13, 14 and 15 as well as establishing business models to produce new ideas and products aimed at contributing and achieving all the SDGs. In addition to that, numerous Emerging Trends related to WSIS Action Lines identified during the meeting: Digital innovation ecosystem; the framework of digital innovation in agriculture; National e-Agriculture Strategy; Common digital platform; Precision and smart agriculture; Human centred-design; Machine Learning and data analytics.

264. The WSIS Prizes 2019 Winner is the International Fund for Agricultural Development for its project “**mLab Southern Africa**” in South Africa. South Africa's first livestock and agricultural trading platform that enables all agricultural users to communicate and have a direct source of contact with the agri network in and around South Africa. Swift Vee (Livestock) is an agri-platform addressing water scarcity, food security and market efficiency for the livestock sector. It brings livestock trading into industry 4.0. by offering substantial profit margins that facilitate sustainability and social impact. Swift Livestock has been recognised as one of SA’s top 100 most innovative companies (TT100) and has global scaling potential. What began as an idea from a university student grew into an award-winning start-up that provides a better way of doing business. Swift Livestock draws on blended skill-sets of agricultural expertise, software engineering, and legal acumen. More details [here](#).



265. A joint ITU-FAO e-Agriculture Strategy Guide was published to provide countries with a framework to develop their national e-agriculture strategies. E-agriculture strategies will help to rationalize both financial and human resources, and address ICT opportunities for the agricultural sector in a more holistic and efficient manner.

266. The Joint ITU-FAO e-Agriculture Solutions Forum, held in Bangkok on 29 August - 31 September 2016 shared e-Agriculture solutions amongst more than 120 participants from 29 countries that benefited agriculture stakeholders and established an Experts Group among e-Agriculture solution providers. In addition, the capacity was built on developing e-Agriculture strategies in a training held following the Forum on 1-2 September 2016.

267. A Cooperation Agreement with FAO was prepared to reinforce the working relationship on e-Agriculture issues and expand the scope and depth of activities.

268. FAO and ITU published E-agriculture in Action with focus on Drones in Agriculture case studies.

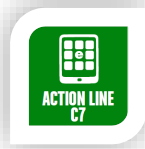
269. In partnership with FAO, Technical Assistance was provided towards development of the e-Agriculture Strategy for Sri Lanka, Fiji, Philippines and Papua New Guinea and the national E-Renewable Natural Resources Master Plan for Bhutan.
270. Presentation delivered about the ITU and FAO joint effort related to “E-agriculture Strategy- Sustainable ICTs for Agriculture” at the 6th International Conference on Oil Palm and the Environment (ICOPE 2018), Bali (Denpasar), Indonesia.
271. E-Agriculture forum on developing an e-agriculture strategy for the Americas: A Regional Capacity Development Workshop on national e-Agriculture strategies in the Caribbean took place during the week of 13-17 July 2018.
272. Preparations are under way for the regional e-Agriculture Strategy Development Regional Workshop for the Caribbean (July 2018).
273. Assistance was provided to Afghanistan in development of their E-agriculture strategy in partnership with FAO and national government;
274. In the 2017-2021 study period this topic is addressed by ITU-D Study Group 2 Question 1/2: Creating smart cities and society: Employing information and communication technologies for sustainable social and economic development. The final report from the 2014-2017 study period on “Creating the smart society: Social and economic development through ICT applications” available at the following link.



275. ITU-T Study Group 20 within Q4/20 on “e/Smart services, applications and supporting platforms” is working on a draft **ITU-T Recommendation on “Framework of Smart Greenhouse service”**. Smart greenhouse is an IoT-based approach toward food production. The goal of smart greenhouse is to provide and maintain optimal conditions for growing crops

in greenhouse environment; the optimal growth conditions can be automatically adjusted with help of a number of sensors and actuators.

Action Line C7: E – Environment



Related to SDGs: SGD 9 (9.4), SDG 11 (11.6, 11.b), SDG 13 (13.1, 13.3, 13.b), SDG 14, SDG 15



276. The Action line C7 E Environment Facilitation meeting was held on Monday, 8 April 2019 as an integral component of the WSIS Forum 2019. It was co-organized by WMO and ITU. The topic of the meeting was “Weather, Climate and Environmental risk management: every life counts, every digit helps”. The session informed on the current progress made in Multi-hazard Early Warning



Systems (MHEWS), Disaster Risk reduction and the use of ICT for gathering, analyzing and communicating information on extreme and high-impact weather, climate and environmental events. The raised priority is that Early-warning messages about impending hazards that could or may cause disasters must reach all citizens including emergency response organizations, communities-at-risk, public safety organization, and others. Information and Communication Technologies (ICTs) are an important and integral component of Multi-Hazard Early Warning Systems, that manage and deliver alerting messages to those in affected areas and wider at national or international level which allows them to take action to mitigate the impacts of the hazard. In order to ensure availability of infrastructures to manage early-warning and alerting, create and to effectively disseminate early-warning messages and alerts about different types of hazards over diverse communication networks and platforms the international community has developed and periodically updates a set of requirements that are organized into a checklist document about the components and establishment of MHEWS. This session discussed the following:

- Launch of the MHEWS Checklist: Going Forward – Relevance and Importance.
- Importance of Digital Radio in the dissemination of early warning messages to the last mile
- Highlight in the new developments in the area of IoT, Big Data and Artificial Intelligence.
- Importance of working together to create ecosystems of solutions and provide more compelling solutions at better costs.

- Continued improvement of international processes delivers better results on the ground.
- Two main outcomes were highlighted at the end of the meeting. First there should be a harmony among technology considerations, operating procedures/processes and capacity building. Secondly we need to bring resources together, as together we can do more in the implementation of WSIS Action Lines. More details on this session [here](#).

277. This session was mainly linked to the following SDGs: SDG 11, 12 and 13. Also, the meeting identified several Emerging Trends related to WSIS Action Lines:

- High competition in the area of satellite communications on broadband service is driving cost decrease satellite services.
- Terrestrial communications remain key to continued sustainable development.
- Human and institutional capacity in the area of policy, legislation and management is key to ensure that acquired innovative technologies and services bring value to national challenges and further fuel sustainable development.

A suggestion for Thematic Aspects that might be included in the WSIS Forum 2019 also emerged: “Environmental monitoring: technological Accidents and Development”.

278. The WSIS Prizes 2019 Winner for the Action Line C7 on E-Environment is the Sigfox Foundation in France. The winning project was named “A less intrusive rhinos conservation, a hope for endangered species”. A lot of solutions have been deployed to help endangered species. But looking closely to these devices (collars, tags) all are very intrusive, very expensive and consume a lot of energy. It’s not adapted to wildlife which needs as little human or technical intervention as possible.



The project “Now Rhinos Speak” specifically illustrates the shared responsibility we take as we believe the species threatened by extinction are part of a common heritage that we need to protect altogether. Enabling conservationists to monitor rhinos in real time every day is a game changer for the conservation community and gives them the information they

need to undertake the actions to protect the animals and fight against extinction. Sigfox Foundation is supported by the Sigfox wider ecosystem of devices and solution makers. We have made a call for contribution to the Internet of things ecosystem to collect devices that can help providing valuable insight when it comes to localizing assets (the people looking after the endangered animals, the vehicles to go on the site, the radios...) to ensure the quickest response to a threat and contributing to poaching dissuasion. The other World Forum Information Society value we are in line with is the Respect for nature. The rhinos and endangered species more generally are part of a global ecosystem and habitat that need to be protected to be sustainable for the specie reproduction on the long term. We are striving to achieve our mission using Information Communication Technologies as we are convinced that connecting the physical world to the internet is the leading way to provide valuable and vital data. Finally, through our action, we are contributing fighting against animal body parts trafficking thereby fighting against parallel and unlawful economy. This project is mainly linked to the SDG 7, 9, 15, 17. More details can be found [here](#).

279. The Development sector of the ITU has undertaken several activities falling under the action line c7 e- environment, in particular Emergency Telecommunications, E-waste, Climate change, Disaster risk management and so on:

1) Emergency Telecommunications:

- a. BDT deployed emergency telecommunications equipment to the following countries: Haiti and Zimbabwe. The equipment included satellite mobile phones, broadband global area network (BGAN) terminals, laptops, and solar panels for charging the equipment. Training on the use of the equipment was also provided to staff designated by the respective governments.
- b. Early warning systems (EWS): Final implementation of the EWS for Zambia
- c. Movable and Deployable Units Project is ongoing.
- d. A new Cooperation Agreement was signed between ITU and Ultisat pertaining the donation of Two (2) complete fixed VSAT systems including free satellite connectivity for 6 months after installation as well as end-to-end managed services.
- e. Ongoing implementation of the ITU Big Data Project for mitigating epidemics. This project involves three countries, Sierra Leone, Guinea and Liberia.
- f. Development of the Second Multi-stakeholder Forum on the Role of Telecommunication/ICTs for Disaster Management for the Americas Region, that took place in Bogotá, Colombia from 29 to 31 August 2017. This event builds on the first Forum that took place in Bogotá, Colombia in July 2012. The 2017 event was attended by over 300 participants from different countries in the Region as well as different UN organizations, private sector entities, NGO's, academia and other humanitarian organizations.
- g. Development of the ITU-GSMA Regional Training Workshop on ICTs for Disasters Management for Arab States; Khartoum, Sudan 28-29 August 2017.
- h. In the 2017-2021 study period this topic is addressed by ITU-D Study Group 2 Question 5/2: Utilizing telecommunications/ICTs for disaster risk reduction and management. Related topical reports are available in the six official languages, with the most recent one being the final report from the 2014-2017 study period on "Utilization of telecommunications/ICTs for disaster preparedness, mitigation and response" available at the following link.

2) E-waste:

- a. The e-waste management policy and regulatory framework for Saint Lucia was finalized.
 - b. The project for the establishment of an e-waste plant to assist Argentina at the University of La Plata is under closing.
 - c. A handbook on e-waste policies and legislative frameworks for ICT generated e-waste was published in 2018.
 - d. During the WSIS Forum 2017, BDT organized a session on ‘Addressing the Global e-waste Challenge’, to highlight current challenges in the area of e-waste, discuss measurement issues and to introduce the Global E-waste Statistics Partnership.
 - e. In 2017, ITU, in cooperation with the United Nations University (UNU) and the Solid Waste Association (ISWA), launched the Global E-waste Statistics Partnership (GESP). Its main objectives are to improve and collect worldwide e-waste statistics, and to publish these in the Global and Regional E-waste Monitors. The Partnership raises visibility about the importance of tracking e-waste and delivers capacity building workshops.
 - f. In the 2017-2021 study period this topic is addressed by ITU-D Study Group 2 Question 6/2: ICTs and the environment. The final report from the 2014-2017 study period on “Strategies and policies for the proper disposal or reuse of telecommunication/ICT waste material” was finalised and published.
 - g. At WSIS 2018, ITU and the UN E-waste Coalition organised a high-level dialogue on “An End to Electronic Waste” where a Letter of Intent (LoI) was signed by seven UN entities.
 - h. In 2019, the UN E-waste Coalition and the World Economic Forum launched a report *A New Circular Vision for Electronics* which makes the case for circularity in the electronics sector.
 - i. The LoI which sees the UN strengthening its commitment towards UN system-wide collaboration on tackling e-waste was signed by a further three UN entities at WSIS 2019.
 - j. In 2019, ITU and its GESP partners launched the open-source globalewaste.org website which stores the world’s data and statistics on e-waste.
 - k. In collaboration with its GESP partners, ITU has been delivering regional e-waste statistics workshops both through its headquarters and its regional offices.
 - l. ITU has begun providing concentrated assistance to its member states, in the development of national e-waste management policies and bringing various line ministries together on this.
- 3) Climate Change:
- a. Within the ITU Academy, BDT is finalizing standardized training materials for a full training program on ICTs and Climate Change. Capacity Building efforts will be based on this material. Contributions by relevant experts in ITU-T have enriched the preparation of these modules. A number of academic institutions are also contributed and supported the editing of materials developed. ITU Centres of Excellence and other partners will also benefit from these materials.
 - b. gathering and reporting much needed for both climate change adaptation and mitigation.
 - c. BDT participated and contributed to the organization of the International Conference on Early Warning Systems that was held in Cancun, Mexico, in May 2017. The following organizations were also part of organizers of : WMO, UNISDR, UNICEF, UNOCHA, among others.

d. In the 2017-2021 study period this topic is addressed by ITU-D Study Group 2 Question 6/2: ICTs and the environment. The final report from the 2014-2017 study period on “ICT and climate change” is available at the following link.

280. The Standardization sector of the ITU has undertaken several activities falling under the **action** line c7 e- environment, in particular Smart Sustainable Cities and Climate Change, Internet of Things, Energy Efficiency and E-waste, E-waste and EMF, and have developed important standards and recommendations in the area, please see the activities in detail below,

281. Smart Sustainable Cities and Climate Change (Past Events)

- The [9th Green Standards Week](#) will be held from 1 to 4 October 2019 in Valencia, Spain. This year the GSW is dedicated to the theme “Connecting Smart Sustainable Cities with the Sustainable Development Goals” and is coordinated with more than 20 partners. It has the following structure:
 - **Day 1 - Tuesday, 1 October 2019**
 - [Leadership Panel on "Connecting Smart Sustainable Cities with the Sustainable Development Goals"](#)
 - [U4SSC Award Ceremony & Photo Session](#)
 - [Forum on "Frontier Technologies to Tackle Climate Change and Achieve a Circular Economy"](#)
 - **Day 2 - Wednesday, 2 October 2019**
 - [Forum on "Smart Governance in Cities"](#)
 - [Valencia: Smart City](#)
 - **Day 3 - Thursday, 3 October 2019**
 - [4th meeting of the United for Smart Sustainable Cities Initiative \(U4SSC\)](#)
 - Meeting of the Spanish Expert Committee on Smart Sustainable Cities - *by invitation only*
 - **Day 4 - Friday, 4 October 2019**
 - [Training on Building Smarter and More Sustainable Cities](#)
- The [first Digital African Week](#) will be held from 27 to 30 August 2019 in Abuja, Nigeria. The structure of the 1st Digital African Week is as follows:
 - Bridging the Standardization Gap Training on "How to draft international standards", 27 August 2019 (morning only)
 - [ITU-T Study Group 20 Regional Group for Africa \(ITU-T SG20RG-AFR\) meeting](#), 27-29 August 2019
 - [Training on "Smart Sustainable Cities, Products and Services"](#), 27 August 2019
 - [ITU Forum on "Smart Sustainable Africa"](#), 28 August 2019
 - [ITU-T Study Group 5 Regional Group for Africa \(ITU-T SG5RG-AFR\) meeting](#), 29-30 August 2019
 - [Forum on "Human Exposure to Electromagnetic Fields \(EMFs\) in Africa"](#), 29 August 2019 (afternoon only)
 - [ITU Training on "E-waste Management and Circular Economy"](#), 30 August 2019 (morning only).
- The [Thematic Workshop on En-gendering the smart city](#) was held on 11 April 2019 in Geneva, Switzerland;

- The [Thematic Workshop on United for Smart Sustainable Cities: Blockchain for Cities](#) took place on 11 April 2019 in Geneva, Switzerland;
- [A Session on Connecting Smart Sustainable Cities with the Sustainable Development Goals](#) took place on 12 March 2019 in Vienna, Austria during the Vienna Cybersecurity Week.
- [ITU-UN-Habitat-UNDP Forum on Smart sustainable cities: technological trends, success stories and future prospects](#) took place on 26-27 February 2019 and an [ITU Training on Key performance indicators for smart sustainable cities to achieve the SDGs](#) was held on 27 February 2019 in Minsk, Belarus.
- [An ITU Forum on Artificial Intelligence, Internet of Things and Smart Cities](#) took place on 3 December 2018 in Wuxi, China.
- [The World Smart City Forum](#) was held on 29 November 2018 in Santa Fe, Argentina and was co-organized together with ISO and IEC.
- A [Global Portal on IoT, Smart Cities & Communities](#) is being maintained and provides references to external resources on these issues.

282. International Standards

- [ITU-T Study Group 5 on Environment, Climate Change and Circular Economy](#) is responsible for studying ICT environmental aspects of electromagnetic phenomena and climate change. SG5 also studies issues related to resistibility, human exposure to electromagnetic fields, circular economy, energy efficiency and climate change adaptation and mitigation. Under its environmental mandate SG5 is also responsible for studying design methodologies to reduce ICTs and e-waste's adverse environmental effects, for example, through recycling of ICT facilities and equipment. ITU-T SG5 is the lead study group on electromagnetic compatibility, lightning protection and electromagnetic effects; ICTs related to the environment, climate change, energy efficiency and clean energy and circular economy, including e waste.
- ITU's 'green ICT' standards are contributing to the reduction of the ICT sector's environmental footprint as well as those of other industry sectors. A number of new green ICT standards in the ITU-T L.1000, 1100, 1200 and 1300 series of Recommendations enable energy efficient ICT/telecommunication solutions. For example:
 - ITU-T Study Group 5 on Environment and Climate is responsible for studies on methodologies for evaluating ICT effects on climate change and publishing guidelines for using ICTs in an eco-friendly way. Under its environmental mandate SG5 is also responsible for studying design methodologies to reduce ICTs and e-waste's adverse environmental effects, for example, through recycling of ICT facilities and equipment.
- ITU's 'green ICT' standards are contributing to the reduction of the ICT sector's environmental footprint as well as those of other industry sectors. A number of new green ICT standards in the ITU-T L.1300 series of Recommendations enable energy efficient ICT/telecommunication solutions.
- The following Recommendations and Supplements have been approved:
 - **Recommendation ITU-T L.1000 (revised) “Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices”** provides high

level requirements for a universal power adapter and charger solution that will reduce the number of power adapters and chargers produced and recycled by widening their application to more devices and increasing their lifetime. The solution also aims to reduce energy consumption. The longer life cycle and possibility of avoiding device duplication reduces the demand on raw materials and waste. The universal power adapter and charger solution is designed to serve the vast majority of mobile terminals and other ICT devices.

- **Recommendation ITU-T L.1015 “Criteria for evaluation of the environmental impact of mobile phones”** focuses on the criteria to be used for evaluation of the environmental impact of mobile phones. It considers all life cycle stages of mobile phones such as the design, production, use and end of life management. The Recommendation also defines a minimum level of environmental performance. Within the constraints of technology and affordability, sustainability should be considered for: materials; energy use; durability, upgrade and repair operations; end of life management; packaging, corporate practice; manufacturing and operations.
- **Recommendation ITU-T L.1507 “Use of ICT sites to support environmental sensing”** presents a set of rules for installing the environmental sensing system on ICT sites in order to utilize the ICT sites as environmental sensing stations.
- **Recommendation ITU-T L.1022 “Circular Economy: Definitions and concepts for material efficiency for Information and Communication Technology”** (under approval) contains a guide to circular economy (CE) aspects, parameters, metrics, indicators for information and communication technology (ICT) based on current approaches, concepts and metrics of the CE as defined in existing standards, while considering their applicability for ICT. In this Recommendation ICT is defined as based on OECD [b-ISIC]. This Recommendation discusses the special considerations and challenges in a broader and more in depth context for all ICT defining parameters, metrics, and indicators with the intention to guide the vertical standardization of the material efficiency for ICT. The guideline aims to examine the kinds of standards that are available and to assess their relevance for ICT product groups citing examples of interrelated relevance throughout the text of the Recommendation. As such, this Recommendation precedes potential product specific standardization of specific ICT product groups and intends to help guide such standardization.
- **Recommendation ITU-T L.1032 “Guidelines and certification schemes for e-waste recyclers”** (under approval) is part of a series of Recommendations that considers requirements for recyclers of waste information and communication technology (ICT). It addresses in particular the informal sector that is involved in waste electrical and electronic equipment (WEEE) collection and dismantling.
- **Recommendation ITU-T L.1362 “Interface for power management in network function virtualization environments –Green abstraction layer version 2”** (under approval) specifies a data model for energy discrete states within virtualized networks, and operations to interact on this model. In virtualized networks, establishing a mapping between the energy discrete states of logical entities (e.g. virtualized network functions) and the energy consumption of the hardware

hosting the virtual machines that execute these logical entities is a challenging task. Recommendation ITU-T L.1362 adapts the green abstraction layer specification (GALv1) to virtualized networks.

- Taking into consideration the development of 5G systems, ITU-T SG5 is developing a series of international standards (ITU-T Recommendations, Supplements and Technical Reports) that will study the following environmental aspects of 5G: electromagnetic compatibility (EMC); electromagnetic fields (EMF); energy feeding and efficiency; and resistibility. The following Recommendations and Supplements have been approved:
 - [Recommendation ITU-T L.1220 on "Innovative energy storage technology for stationary use - Part 1: Overview of energy storage"](#)
 - [Recommendation ITU-T L.1221 on "Innovative energy storage technology for stationary use - Part 2: Battery"](#)
 - [Recommendation ITU-T L.1222 on "Innovative energy storage technology for stationary use - Part 3: Supercapacitor technology"](#)
 - [ITU-T K.Suppl.4 on "Electromagnetic field considerations in smart sustainable cities"](#)
 - [ITU-T K.Suppl.8 on "Resistibility analysis of 5G systems"](#)
 - [ITU-T K.Suppl.9 on "5G technology and human exposure to RF EMF"](#)
 - [ITU-T K.Suppl.10 on "Analysis of electromagnetic compatibility aspects and definition of requirements for 5G systems"](#)
 - [ITU-T K.Suppl.14 on "The impact of RF-EMF exposure limits stricter than the ICNIRP or IEEE guidelines on 4G and 5G mobile network deployment"](#)
 - [ITU-T K.Suppl.16 on "Electromagnetic field \(EMF\) compliance assessments for 5G wireless networks"](#)
 - [ITU-T L.Suppl.36 to ITU-T L.1310 on "Study on methods and metrics to evaluate energy efficiency for future 5G systems"](#)
- For example: ITU standards to assist in the responsible management of electromagnetic fields include measuring techniques, procedures and numerical models for evaluating the electromagnetic fields stemming from telecommunication systems and radio terminals. Several new and revised standards in the ITU-T K-series of Recommendations provide EMC resistibility and safety limits of ICT equipment and infrastructure, and thereby contribute to the SDG goal 9.
 - **Recommendation ITU-T K.20 (revised) "Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents"** specifies resistibility requirements and test procedures for telecommunication equipment that is attached to or installed within a telecommunication centre. Overvoltages and overcurrents covered by this Recommendation include surges due to lightning on or near the line plant, short term induction from adjacent a.c. power lines or railway systems, earth potential rise due to power faults, direct contact between telecommunication lines and power lines, and electrostatic discharges (ESDs). The sources for overvoltages in internal lines, between equipment or racks, are mainly inductive coupling caused by lightning currents being conducted in nearby lightning strikes or lightning currents being conducted in nearby conductors.

- **Recommendation ITU-T K.21 (revised) “Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents”** specifies resistibility requirements and test procedures for telecommunication equipment that is attached to or installed within a customer's premises. Overvoltages or overcurrents covered by this Recommendation include surges due to lightning on or near the line plant, short-term induction from adjacent alternating current (a.c.) power lines or railway systems, earth potential rise due to power faults, direct contact between telecommunication lines and power lines, and electrostatic discharges (ESDs). The sources for overvoltages in internal lines are mainly inductive coupling caused by lightning currents being conducted in nearby lightning strikes or lightning currents being conducted by nearby conductors.
- **Recommendation ITU-T K.44 (revised) “Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic Recommendation”** (under approval) seeks to establish fundamental test methods and criteria for the resistibility of telecommunication equipment to overvoltages and overcurrents. Overvoltages or overcurrents covered by this Recommendation include surges due to lightning on or near the line plant, short-term induction of alternating voltages from adjacent electric power lines or electrified railway systems, earth potential rise due to power faults and direct contacts between telecommunication lines and power lines.
- **Recommendation ITU-T K.45 (revised) “Resistibility of telecommunication equipment installed in the access and trunk networks to overvoltages and overcurrents”** (under approval) specifies resistibility requirements and test procedures for telecommunication equipment installed between telecommunication centres and between a telecommunication centre and the customer's premises. Overvoltages or overcurrents covered by this Recommendation include surges due to lightning on or near the line plant, short-term induction from adjacent AC power lines or railway systems, earth potential rise due to power faults, direct contact between telecommunication lines and power lines and electrostatic discharges.
- **Recommendation ITU-T K.77 (revised) “Characteristics of metal oxide varistors for the protection of telecommunication installations”** gives the basic requirements to be met by metal oxide varistors (MOVs) for the protection of power circuits and signal circuits of telecommunication installations from surges. The purpose of this Recommendation is to provide technical guidelines for purchasers and manufacturers of MOVs to ensure their satisfactory operation in the applications for which they are intended. This Recommendation is intended to be used for the harmonization of existing or future specifications issued by MOV manufactures, telecommunication equipment manufactures, administrations or network operators.
- **Recommendation ITU-T K.90 Appendix II “Evaluation techniques and working procedures for compliance with exposure limits of network operator personnel to power-frequency electromagnetic fields. Description of the program EMFACDC”**. The software "EMFACDC" in Appendix II of Recommendation ITU-T K.90 was developed in 2012. As the software environment is under constantly

development, there was a requirement for software adjustments. These updates were done in the new version v 2.0.

- **Recommendation ITU-T K.91 Appendix IX “Manhole type base station”** presents the measurement results of radio frequency exposure from manhole-type base stations installed underground using the measurement methods introduced in this guideline, in order to evaluate the exposure from these base stations.
- **Recommendation ITU-T K.100 (revised) “Measurement of radio frequency electromagnetic fields to determine compliance with human exposure limits when a base station is put into service”** provides information on measurement techniques and procedures for assessing compliance with the general public electromagnetic fields (EMFs) exposure limits when a new base station (BS) is put into service, taking into account effects of the environment and other relevant radio frequency sources present in its surrounding.
- **Recommendation ITU-T K.112 (revised) “Lightning protection, earthing and bonding: Practical procedures for radio base stations”** provides a set of practical procedures related to the lightning protection, earthing and bonding of a radio base station (RBS). It considers two types of RBS: those that are stand-alone installations, comprising a tower and the associated equipment and those that are installed on the roof of a building. In both cases, this Recommendation provides the procedures for the design and installation of the lightning air-termination system, down-conductors, earthing network, bonding conductors and surge protective devices (SPDs). This includes the specification of the materials, anti corrosion protection and special treatment for rocky areas. Particular attention is directed to the protection of the navigation light systems and of the electric power conductors that feed the RBS, especially in the case where the RBS is installed on the roof of a building. Annex A presents practical examples of earthing network design, whereas Annex B presents an overview of the techniques for measuring the earthing resistance and the earth resistivity.
- **Recommendation ITU-T K.116 (revised) “Electromagnetic compatibility requirements and test methods for radio telecommunication terminal equipment”** establishes the essential electromagnetic compatibility (EMC) requirements for radio telecommunication terminal equipment and ancillary accessories. This Recommendation specifies the emission and immunity requirements for radio telecommunication terminal equipment and ancillary equipment including 5G terminal equipment. It also describes test conditions for emission and immunity testing. Performance assessment and criteria for immunity tests are also specified.
- **Recommendation ITU-T K.123 (revised) “Electromagnetic compatibility requirements for electrical equipment in telecommunication facilities”** describes the requirements for radiated and conducted emissions from electrical systems installed in telecommunication facilities. Electrical systems in the scope of this Recommendation include rectifiers that supply direct current (DC) voltages of up to 400 V, power conditioning systems (PCSs) including grid connected power converters (GCPCs), uninterruptible power supplies (UPSs) and inverter driven electrical equipment including the air conditioners needed for the operation of

telecommunication systems. Their electrical systems include power conversion devices and may generate conducted and radiated electromagnetic disturbances and cause degradation of the performance of telecommunication systems.

- **Recommendation ITU-T K.140 “Surge protective component application guide – Fuses”** considers fuse and fusible component types, the electrical stress levels pre- and post-operation and gives circuit examples.
 - **Recommendation ITU-T K.141 “Electromagnetic compatibility requirements for Information Perception Equipment”** gives the general EMC requirements for information perception equipment used in perception layer on the basis of internet of things (IoT), combined with wireless and wired access, broadband and narrowband application, as well as various intelligent applications.
 - **Supplement ITU-T K.Suppl.9 (revised) “5G technology and human exposure to RF EMF”** contains an analysis of the impact of the implementation of 5G mobile systems with respect to the exposure level of electromagnetic fields (EMF) around radiocommunication infrastructure.
 - **Supplement ITU-T K.Suppl.16 (revised) “Electromagnetic field compliance assessments for 5G wireless networks”** provides guidance on the radio frequency-electromagnetic field (RF-EMF) compliance assessment considerations for IMT-2020 wireless networks also known as 5G. Given that the 5G technical standards have just been finalised and commercial 5G networks are not due to be launched before 2019-2020, the first version of this Supplement is to mainly address the computational assessment options and the assessments of trial networks.
 - **Supplement ITU-T K.Suppl.17 to ITU-T K.44 “Test conditions and methods information”** provides background information that explains how the various lightning and power faults test configurations and electrical values in Recommendation ITU-T K.44 were derived. Examples show how test procedures can be minimised by knowing how the surge and power fault test conditions can vary with time and voltage. How ITU-T Recommendation K.44 relates to its dependent Recommendations is explained.
 - **Supplement ITU-T K.Suppl.18 to ITU-T K.44 “Causes of telecommunication system overvoltage and overcurrent conditions and their expected levels”** discusses how surge and power fault overvoltages and overcurrents are coupled into telecommunication systems, the likely disturbance levels and mitigation measures.
- ITU-T Study Group 5 created the [Focus Group on "Environmental Efficiency for Artificial Intelligence and other Emerging Technologies" \(FG-AI4EE\)](#). The FG-AI4EE will identify the standardization gaps related to the environmental performance of AI and other emerging technologies including automation, augmented reality, virtual reality, extended reality, smart manufacturing, industry 5.0, cloud/edge computing, nanotechnology, 5G, among others. The focus group will develop technical reports and technical specifications to address the environmental efficiency, as well as water and energy consumption of emerging technologies.

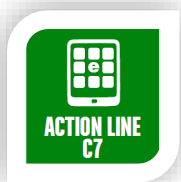
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- [A Global Portal on ICTs, Environment, Climate Change and Circular Economy](#) is being maintained and provides references to external resources on these issues.
 - [ITU-T Study Group 20 on Internet of Things \(IoT\) and smart cities and communities \(SC&C\)](#) is responsible for studies relating to Internet of things (IoT) and its applications, and smart cities and communities (SC&C). This includes studies relating to big data aspects of IoT and SC&C, e-services and smart services for SC&C. ITU-T SG20 is the lead study group on Internet of things (IoT) and its applications, smart cities and communities, including its e-services and smart services and for Internet of things identification.
 - ITU standards supporting the wide range of technologies under the banner of the Internet of Things will assist both developed and developing countries in transforming city infrastructure, benefiting from the efficiencies of intelligent buildings and transportation systems; smart energy and water networks; and innovation in the field of e-health. The [IoT and Smart Cities and Communities Standards Roadmap](#) is being maintained by JCA-IoT and SC&C.
 - ITU technical work to **combat ICT counterfeiting** continues to gain momentum with new standards under development, supported by ongoing studies into the scale and dynamics of the counterfeiting challenge. ITU-T SG11 developed plans for implementation of WTSA-16 Resolution 96 “ITU Telecommunication Standardization Sector studies for combating counterfeit telecommunication/ information and communication technology devices” and Resolution 97 “Combating mobile telecommunication device theft” where new work was started to develop a framework for combating the use of stolen mobile ICT devices, and supporting information on a framework for solution to combat counterfeit ICT devices; along with guidelines on best practice and solutions. Among latest results achieved in March 2019 are:
 - ITU-T SG11 approved a first Recommendation ITU-T on combating counterfeiting – ITU-T Q.5050 “Framework for solution to combat counterfeit ICT devices” which defines the reference framework and requirements to be considered when deploying solutions to combat the circulation and use of counterfeit ICT devices.
 - Following the decision of Council-18, ITU-T SG11 started a new work item TR-RLB-IMEI “Reliability of IMEI identifier” which contains a study about key vulnerabilities on IMEI reprogramming on mobile devices and proposals to improve IMEI reliability.
 - ITU-T SG11 started a new work item “Technical Report TR-CF-QoS: Impact of Counterfeit Mobile devices on Quality of Service” that aims to study the negative effects and impact of counterfeit mobile devices on network's quality of service along with the negative effects and service degradation experienced by the mobile subscribers.
 - ITU-T SG5 is working on draft Recommendation ITU-T L.Counterfeit “Adequate Assessment and Sensitisation on Counterfeit ICT Products and their Environmental Impact”.

283. Working Together with the UN System

- E-waste:

- TSB represents ITU in the Step Initiative and participate in its meetings. TSB has been actively contributing to the Step publications and project plans. BDT also participate in this initiative.
- TSB represents ITU in the PACE Initiative and participate in its meetings and contributes to its publications. BDT also participate in this initiative.
- ITU together with UNIDO started the implementation of the project "Strengthening of National Initiatives and Enhancement of Regional Cooperation for the Environmentally Sound Management of POPs in Waste of Electronic or Electrical Equipment (WEEE) in Latin-American Countries.
 - Smart Sustainable Cities:
- ITU, UNECE and UN-Habitat provide Secretariat support to the U4SSC initiative which is supported by 13 other UN Agencies and Programmes (please see above for more information).

Action Line C7: E-Science, (also related to the 2030 Agenda for Sustainable Development)



[Related to the SDGs: SDG 1 \(1.5\) , SDG 4 \(4.7\) , SDG 6 \(6.1, 6.a\) , SDG 7 \(7.a\), SDG 13 \(13.1, 13.2, 13.3\), SDG 14 \(14.a\), SDG 15 \(15.9\) , SDG 17 \(17.6, 17.7\)](#)



284.The WSIS Prizes 2019 Winner for the Action Line C7 on E-Science is the Iran National Research and Education Network (SHOA) from Iran (Islamic Republic of) for their SHOA project, which is a Public-private partnership (P.P.P.) project between Private Sector, Government and Academia. SHOA is Iranian National Research and Education Network (NREN), A National Research and Education Network (NREN) is a specialised internet service provider dedicated to supporting the needs of the research and education communities within a country. It is usually distinguished by support for a high-speed backbone network, often offering dedicated channels for individual research projects. NRENs are usually the places where new Internet protocols and architectures are introduced before deployment within the Public Internet.[citation needed]

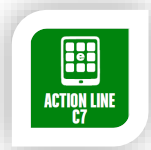


Two examples of these protocols are IPv6 and IP multicast. Two examples of architecture are client/server and Cloud computing. This project mainly focused on the SDG 4, 5, 8, 10. More details are available [here](#).

285. ITU is one of the co-facilitators together with UNESCO, UNDESA and Regional Commissions, ILO, ITC, FAO, UPU, UNEP, WMO, UNCTAD, WHO, etc. for the eight areas of ICT applications that are covered by WSIS Action Line C7. ITU is running the ITU Academy for trainings on ICT related issues. (<https://academy.itu.int/>).

286. Training on Spectrum management (Spectrum Management Training Programme) has been finalized and the first pilot training was delivered https://academy.itu.int/index.php?option=com_content&view=article&id=102&Itemid=641&lang=en
287. Cooperation agreements were signed with the University of Prague and AFRALTI (Kenya) for delivering part or the whole training programme.
288. Quality of Service Training Programme (QoSTP) is under development.

Action Line C7: E-Learning (also related to the 2030 Agenda for Sustainable Development)



Related to the SDGs: SDG 4



289. The WSIS Prizes 2019 Winner for the Action Line C7 on E-Learning is the University of La Punta (ULP) from Argentina. The project is named “**Generative Schools**”. In San Luis, technological innovation is combined with educational innovation: generative schools are an alternative that aims to provide more and better opportunities for children and young people in the province, in the obligation of the state to guarantee the right to education. They are public, free and inclusive schools that take the student as a center, recognizing who they are, how they learn, what their interests are, their weaknesses and strengths, their cultural and social environments.



As an alternative to total innovation, generative schools are institutions of social management that bet on a new design of physical space and new modes of social interaction and use of time, traversed by a trigger axis that defines the imprint of each institution. To date there are nineteen (19) active urban generative schools with twenty (20) more schools projected for the year 2019, including more than 1.700 students and almost 200 teachers from various points in the province.

A rural variant is added to the urban generative schools to guarantee the right to education of the young people from locations with the implementation of the Generative Secondary Level in 149 rural schools in different locations, reaching more than 1.500 students. Currently, implementation began in thirty (30) rural schools, programming for the next year gradually opening in the remaining ones. Understanding that information and communication technologies contribute to the initiative of guaranteeing universal access to

education, equality in education, the exercise of quality teaching and learning, the professional development of teachers, San Luis assumes the digital challenge in a transversal way on educational policies. Generative schools are a great bet to decrease dropout rates because they are alternatives that seek to accompany students in the construction of their life projects, so that their passage through school is not just a formality derived from compulsory nature. This project contributes to SDGs 4 and 5. Find more about the project [here](#).

290. As the lead agent for all ITU capacity building activities, the ITU Academy continues to produce publications as part of its main deliverables. A mobile publication “Skills Development, Lifelong Learning and Mobile Technology” is due for release soon. This publication explores in-depth the full potential of mobiles for learning outside the formal educational system and structures. The publication has 9 chapters, written by a global team of diverse experts, academics and practitioners, carefully chosen for their acknowledged expertise in particular areas related to mobiles and learning. While discussing the capabilities of mobile devices and opportunities they present in improving access to learning, the 9 chapters of this publication cover among other topics, education aspects of mobile impact, uptake and usage; the basic platform, exploring the growing capabilities and extensibility of mobile devices through applications; as well as challenges and policy options. The summary of the publication will be made available on the ITU Academy website for download, and the chapter conclusions of this publication are prepared for presentation in regional forums and workshops to facilitate discussions in the area of mobile learning.
291. The ITU Academy platform has just undergone an upgrade in 2015. This platform allows for single visibility of all ITU training related activities and delivery of online learning. The new themes in the learner management system (Moodle) and in the content management system (Joomla) are inspired by academic institutions platforms to give the learner a good learning environment experience, There are new and improved features such as online payment using debits and credit cards; online registration; smart search engine; smart content repository; personalized learner access, and improved course design and delivery, among others. Guidelines have been prepared to assist users, -mainly Centres of Excellence- to understand the new platform. A training of ITU staff from all the bureaus on the use of the ITU Academy platform will take place in 2016. Sixteen staff members have enrolled for the training.
292. Capacity of 250 participants including 4 ministers and 2 vice-ministers of ICTs and 2 ministers and 3 vice-ministers of education on how new, more affordable digital devices can help address urgent educational challenges and meet the needs of students, teachers and administrators. Another Joint UNESCO-ITU “Policy Forum on Mobile Learning” was held on 24 March 2017 attracting over 300 participants and stressed on the importance of cross-sectoral collaborations in developing the necessary E-skills.
293. A joint ITU-UNESCO Policy Note on Mobile Learning was published in 3 languages (English, French and Spanish) which made policy recommendations on the way forward. The Policy Note is available at: http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Pages/ITU_UNESCO_MLW_PolicyForum.aspx

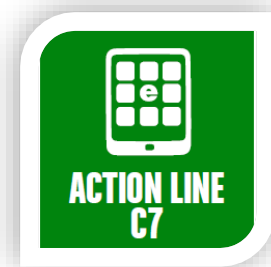
- A joint UNESCO-ITU Policy Review will be conducted in selected countries to review national ICT in education initiatives and produce a detailed report containing both an evaluation against international benchmarks and a set of policy recommendations based on good practices supported by evidence

294. Raised awareness on the opportunities and challenges of smart learning as well as digital transformation in the Arab region through the organization of two forums.

- Built capacities of policy-makers regionally in formulating national strategies for smart learning through the implementation of the signed cooperation agreement with the Telecommunication Regulatory Authority of the United Arab Emirates and the Mohamed Bin Rashid Smart Learning Programme. The first capacity building workshop took place in Dubai from 26-28 February 2017 with the participation of 18 participants from 10 countries.

Action Line C7: E-Employment

295. By April 2019, the Digital Skills for Jobs Campaign (co-lead by ITU and ILO and part of the Global Initiative on Decent Jobs for Youth) has received commitments to train more than 15 million young people in job-ready digital skills by 2030 – more than triple the initial target of 5 million young people. Commitments have been made by a range of stakeholders in partnership (e.g. the private sector, government entities, a development bank, NGOs, and UN agencies) in all geographic regions. All commitments focus on job-ready, transferable digital skills: a combination of technical skills (basic, intermediate and advanced) and complementary soft skills (e.g. problem-solving and project management) that are aligned with local employer demand (e.g. data science, digital marketing, or web and app development). Many of the trainings include work experience (e.g. internships and project-based learning) and job placement services to maximize employment outcomes, and maintain close relationships with employers.



296. During WSIS 2019, ITU organized a thematic workshop with ILO and UNIDO on “[Boosting Youth Employment and Entrepreneurship in the Digital Economy](#),” which brought together young tech leaders and experts on digital skills development and youth employment and entrepreneurship to highlight best practices, take stock of on-going efforts, and consider ways to amplify successes of digital skills development as a way to boost youth employment and entrepreneurship. Panelists included representatives from ITU, ILO, UNIDO, UN DESA, a2i Bangladesh and a young tech entrepreneur. The case was made for investing in digital skills development for young people as a win-win strategy: making youth more employable and likely to succeed as digital entrepreneurs, while connecting employers to the talent they need and sparking innovation across sectors. Links were made to the [Digital Skills for Jobs Campaign](#) (part of the [Global Initiative on Decent Jobs for Youth](#)) and related initiatives as a demonstration of the success of this strategy.

297. The WSIS Prizes 2019 Winner in category e-Employment is The Rockefeller Foundation from the United States of America for the project Digital Jobs Africa. The aim of this initiative is to Connect Africa's rapidly growing youth population with sustainable employment opportunities. The Digital Jobs Africa initiative launched in 2013, and has successfully led to the establishment of an inclusive hiring practice known as impact

sourcing, and helped scale demand-driven skills training approaches for youth. These will be advanced through the two legacy pieces—namely the Global Impact Sourcing Coalition and the Demand Driven Training Toolkit, which showcases best practices in approaches in youth skills development. Sustainable development goals related to this project

- Goal 1: No poverty
- Goal 8: Decent work and economic growth
- Goal 10: Reduced inequalities



Action Line C7: E-Business



Related to the SDGs: SDG 1 (1.4), SDG 2 (2.3), SDG 5 (5.b), SDG 8 (8.3, 8.9, 8.10), SDG 9 (9.3), SDG 17 (17.11)



298. The Action line C7 E Business Facilitation meeting was held on Thursday, 11 April 2019 as an integral component of the WSIS Forum 2019. The topic of the meeting was “Going digital, getting formal: how e-Business supports greater formalization of business in developing and least developed countries”. It was held in cooperation with the UNCTAD (United Nations Conference on Trade and Development), the ICT (International Trade Centre) and the Universal Postal Union (UPU).



This session examined how e-business and business formalization are necessarily related, and how digitalization and e-Commerce can support the objectives of government and of entrepreneurs. For more details on this meeting please see [here](#).

299. The session showed that ICT can be valuable tools for business facilitation and MSME formalization. For governments, formalization increases its taxation base and the ability to measure and develop the private sector. For MSMEs, formalization increases their visibility, access to markets and social protection. To ensure that formalization is a win-win step in developing countries, governments must minimize the administrative and fiscal burdens to registered MSMEs, and ensure an enabling environment for the digital economy, including through measures to increase trust.

300. An Emerging Trend related to WSIS Action Line was identified during this meeting. It states that cooperatives are emerging as the most suitable collaborative business model to African MSMEs to cross-border e-commerce. Diaspora crowd-sourcing is opening avenues for financing an underserved market of African tech entrepreneurs, mostly in the services sector, that are starting small but dreaming big. The WSIS Prizes 2019 Winner for the Action Line C7 on E-Business is the BnC Bot (Bot Bán Hàng) from Vietnam for the project “**Buy & Connect Bot**”. Chatbot Vietnam JSC is positioned as the leading chatbot platform in Vietnam. The aim of Chatbot Vietnam is to deliver greatest values of the fourth industrial revolution to the society, in particular bringing the prosperity to online businesses and promoting e-commerce on mobile. Our platform is to promote e-commerce via messaging platforms and omni-channels, bringing a convenient way for customers to shop online as well as a tool for sales automation. In spite of the boom of e-commerce, particularly m-commerce and the emergence of Industry 4.0 technology, there are a lack of tools making use of these technologies for direct order via messaging applications, customer relationship management and data synchronization for omni-channel businesses. This is why in November 2017, we built Bot Ban Hang (branded as Bot Bán Hàng in Vietnam), an AI-powered platform for sales and marketing on messaging platforms such as Messenger, Whatsapp or Telegram that saves time, money and labor for both online shoppers and businesses of all sizes and fields.



Regarding product innovation and quality as our most competitive advantage, we prioritize product research and development. Bot Ban Hang’s fundamental features are to turn each fanpage into a truly online shop where customers can conveniently choose products, place orders, make payments and track their order status right on Messenger through call-to-action buttons put on messages. It is also a platform providing a tool for customer

relationship management and free remarketing, which helps reach thousands of customers by enabling broadcast via Messenger, providing more personalized advertisement and create different customer service plans for specific customer groups. Due to a pool of data collected from omni-channel customers and stocks, we build a research team including most excellent AI-specialists in Vietnam for data analysis for business optimization in terms of social listening, better customer understanding, customer classification, optimal price suggestions and product trend prediction. This project is related to the SDGs 8, 9 and 17. More information [here](#).

301. The international community is looking to ITU's unique, globally representative public-private for a neutral platform to strengthen the ties between technical innovation, business needs and economic and policy requirements. ITU members at WTSA-16 approved new standards addressing Universal Service, charging and accounting principles for NGNs, developed an approach to reducing international roaming rates, and put forward principles and guidelines to assist countries in defining and identifying of operators with significant market power.

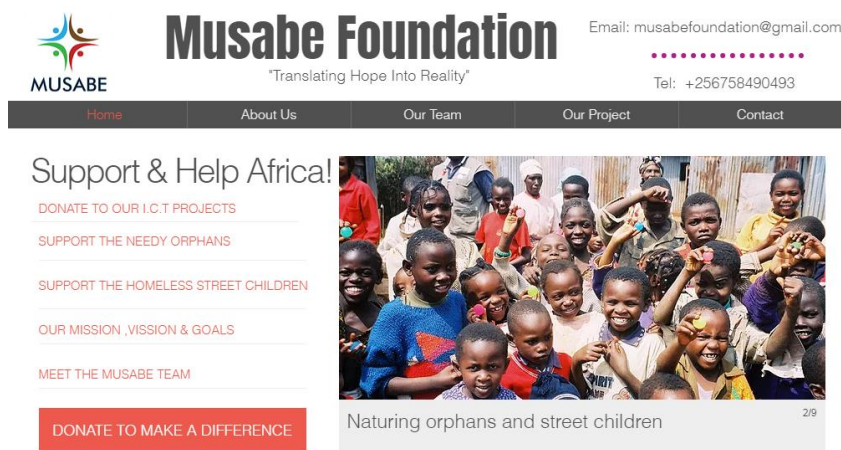
Action Line C8: Cultural diversity and identity, linguistic diversity and local content



Related to SDGs: SDG 2, SDG 4 (4.7), SDG 6 (6.b), SDG 8 (8.3, 8.9), SDG 11 (11.4), SDG 12 (12.b)



302. The WSIS Prizes 2019 Winner for the Action Line C8 is the civil society entity Musabe Foundation from Uganda. The project was named "Uganda Computer Aid", an active in the field of Information & Communication Technology in the remote, disadvantageous region of the Rwenzori



Mountains bordering the Rain forests of Democratic Republic of Congo. Uganda being one of the world's developing countries, it has limited technology, a high rate of digital illiteracy, Gender Technology Inequality, Technology discrimination of disabled children (Blind and Deaf). Uganda Computer Aid saw the need to impart (I.C.T) modern technology skills into all the Ugandans, the major target groups of this project were girls, women , disabled people and children with disabilities(the blind and the deaf) in the remote, disadvantageous region of the Rwenzori Mountains bordering the Rain forests of Democratic Republic of Congo.

Musabe Foundation is a Non Profit Organisation founded by Benson Musabe. It was launched by Musabe in 2016 when he was a teenager at the age of 18 with a humanitarian inspiration from Malala Yousafzai the Founder of Malala Fund. It was established with core primary goals of expanding access to information technology for all, reducing extreme poverty and expanding better quality educational opportunities in the remote deep rural disadvantageous communities of Uganda. Musabe Foundation was formed with a belief that (I.C.T) modern technology skills can positively affect the development of communities, learning experience and business expansion. Technology can be a tool to empower vulnerable communities in unreachable deep rural remote regions of Uganda. Since its formation in 2016, Musabe Foundation has played a great role in expanding access to information technology for all including girls, boys and the disabled children in the deep remote rural disadvantageous communities in the Rwenzori mountains bordering Democratic Republic of Congo. The project is linked to the SDGs 1, 4 and 16. More information to read [here](#).

303. ITU actively facilitates access to and use of ICTs by Indigenous Peoples to contribute to their digital inclusion, social and economic development and preservation of their heritage and cultural legacy through the use of ICTs. In line with Plenipotentiary Resolution 184 (Guadalajara, 2010) and Output 4.3 of the WTDC-17 Buenos Aires Action Plan and WTDC-17 Resolution 46, BDT supports Member States in addressing specific needs of Indigenous People as regards to equitable access, use and knowledge of information communication technology (ICT's). To achieve this goal, BDT continues to initiate and implement various activities. For instance, an on-line indigenous training course was organized for the benefit of over 150 indigenous people from 16 countries of the Americas region (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, Uruguay, United States and Venezuela). This training focused on innovation through the design and implementation of pilot projects that allow the implementation of communication networks managed and operated by indigenous peoples. The training helped to broaden the knowledge of participants on the use of ICTs for information and communication tools, digital content, virtual education development and e-commerce. For more information on this and other activities, please refer to <http://www.itu.int/en/ITU-D/Digital-Inclusion/Indigenous-Peoples>.
304. In the period 2014-2017 the training programme, which is provided yearly through the ITU Academy, consists of three online training courses on digital tools for the social and economic development of indigenous communities, as well as related web tools for the development, management and operation of local network radio stations. In 2017, the following courses were organized: "Access, development and use of web tools and digital content of interest of indigenous communities" (17 April-24 June), "Training education in entrepreneurship" (3 July-26 August), and "Development of Indigenous local communication networks (how to develop, manage and operate a network of Indigenous news radio) (11 September-3 November). Awareness of various tools was raised among members of indigenous communities through the BDT Indigenous Peoples website, which enjoyed between 15,000 and 17, 000 views yearly.
305. The 2017 curriculum of the online training course on "Indigenous Radio/Networks – Communication Innovative Tools for the strengthening of Indigenous Communities of the Americas Region" was revised in 2018 to update the content with more recent technologies

and ensure an overall knowledge of the topic. This revised online training course on “Innovative Communication Tools for the Strengthening of Indigenous Communities with a special focus on how to develop, manage and operate an Indigenous Radio Network” received over 600 registrations in 2018 (far beyond the maximum capacity of 100). ITU accepted 150 in each class and delivered two classes in 2018. The first class was from July to October and the second class was held from September to December. See more at (<https://www.itu.int/en/ITU-D/Digital-Inclusion/Indigenous-Peoples/Pages/default-bis.aspx>).

306. From February to May 2019 the online training programme on “Innovative Communication Tools for the Strengthening of Indigenous Communities with a special focus on how to develop, manage and operate an Indigenous Radio Network” was again run by BDT. 75 participants from 14 countries in Latin America enrolled to benefit from this ITU initiative, which provides capacity-building trainings tailored to the specific needs of indigenous communities. 50 participants were awarded and received ITU certification in the topic, 54% of which were women and 46% were men. This training programme, conducted in collaboration with FILAC, focused on building the ICT-related technical capacities of Indigenous Peoples to run local communication networks in a self-sustaining manner. The acquired skills expanded the participants’ knowledge on the use of ICTs in digital content creation, web design and network development, and on the development of emergency alert systems, thus empowering participants and their communities.
307. In order to ensure the self-sustainability of the Indigenous communities’ networks for which they have been trained, in 2019 ITU developed an additional course “Training Programme for Technical Promoters in Indigenous Communities for the Generation, Development and Maintenance of Communication and Broadcasting Network Technologies (2019)” to train technicians who will be able to provide the technical support to ensure the maintenance of these radio networks. It is a blended training programme that incorporates 5 online courses with hands-on training to transfer concrete knowledge and ends with 1 face-to-face training camp for validation of knowledge. The first online course on ‘Community Media and Technologies’ (May 6 to June 14, 2019) was successfully completed. The second online course is currently ongoing. 83 participants from 14 countries in Latin America enrolled to benefit from this ITU training programme. 50 were awarded and received ITU certification in the first online course, 54% of which were men and 46% were women.
308. ITU-T Study Group 16 approved **Recommendation ITU-T F.746.5 “Framework for language learning system based on speech/NLP technology”** which describes functional requirements and detailed functions for framework for language learning system based on speech/NLP technology. It provides a framework for language learning system that will serve as a reference framework for language learning systems to be developed and used as low cost tools in many educational situations.

Action Line C9: Media (also related to the 2030 Agenda for Sustainable Development)



Related to the SDGs: SDG 5 (5.b), SDG 9 (9.c), SDG 12 (12.8), SDG 16 (16.10)



309. The Action line C9 facilitation meeting was held on Thursday, 11 April 2019, as an integral component of the WSIS Forum 2019. This year meeting named “Harnessing Artificial Intelligence to Strengthen Journalism and Media Meeting Action Line C9 : Development in line with UNESCO’s



Internet Universality ROAM principles” was held by UNESCO at the ITU. The session aimed to trigger open dialogue on major trends in freedom of expression and media development online and offline around the world. The meeting also aspired to provide a platform for discussion of these issues, building on the findings of the 2017/2018 report of UNESCO’s flagship series on World Trends in Freedom of Expression and Media Development. The World Trends Report explores recent developments at the global and regional levels in media freedom, pluralism, independence, and safety, each examined through a gender-sensitive lens and with special attention given to transnational and digital media. The focus of the session was on emerging digital trends, such as the rise in internet shutdowns, the impact of algorithms on diversity of content, ‘fake news’ as well as the rising challenges of big data and AI on journalism and freedom of expression. More details on the session [here](#).

310. Numerous main outcomes were highlighted:

- The development of ICT skills is critical to support innovation and entrepreneurship.
- An overhaul of education policies is needed to include ICT and entrepreneurial training in school curriculum from primary school level.
- Education processes have to be re-organized with the role of peer-to-peer training emphasized.
- Access to the Internet and social media is critical to the success of small enterprises today, therefore accessibility costs have to be reduced as much as possible and quality ensured.
- For social enterprises to thrive, they need employees with both technical and soft skills.
- The use of technical solutions that are adapted and aimed at addressing local needs of communities improves uptake and learning.
- Introducing technical skills, such as programming and coding, to girls at an early age increases chances of them innovating ICT solutions in the future and establishing

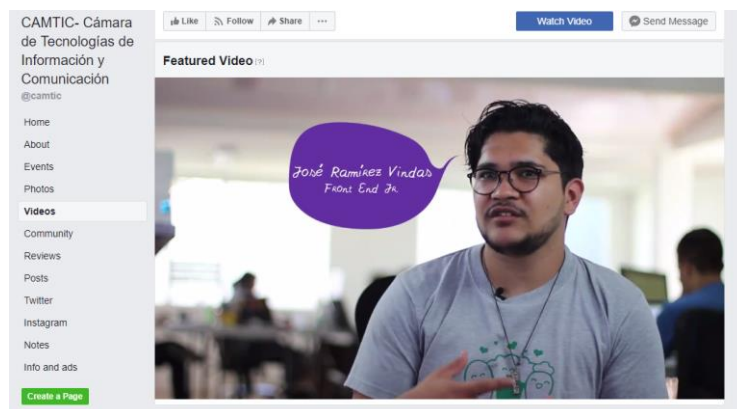
new enterprises, reducing the gap between the number of women and men in ICT-related occupations or businesses.

311. This meeting was linked to the following SDGs: SDG 1, SDG 5, SDG 10, and SDG 16. Indeed, as a fundamental freedom, the universal human right to freedom of expression is foundational to target 10 on “public access to information and fundamental freedoms”. This in turn has been recognized as essential for building peaceful, just and inclusive societies (Goal 16 of the 2030 Agenda for Sustainable Development). In addition to that, two Emerging Trends related to WSIS Action Lines identified during the meeting:

- The need to take technology to those who need it, and teach them how to use it continues to be a priority in many parts of the world Social enterprises have a unique value proposition that should be leveraged on.
- To build skills while addressing social problems approaches to skills development should be diversified to respond to identified needs.

312. The WSIS Prizes Winner for the Action Line C9 is the Chamber of Information and Communication Technologies (Cámara de Tecnologías de Información y Comunicación) (CAMTIC) from Costa Rica for the project “Working in ICT is cool”. This is a six-episode web series (80 seconds long each) called "Working in ICT is cool" (translated) for our Facebook audience, initially, that present young talents who are currently working in information and communications technologies positions, they explain why they think their job and the whole industry is "cool", presenting a different reason or topic in each chapter: loosen dresscodes, geographical diversity, working from home, arte in technology, alternative routines and diversion and relaxation at work. Four chapters present both women and men, to enforce gender inclusion. Two chapter are one-voice only (one a man, and one a woman).

Our initial audience was Facebook young followers, and it was also posted on YouTube. On a parallel campaign, we developed a written series directed to recruiters and managers explaining why and how these trends are happening in the industry along with statistics and reactions from different actors within our



sector. Now, organizations such as the Organization of Ibero-American States, the committee for industrial arts development in the Ministry of Public Education, NGOs, college and high school professors and several private companies have shown interest in using these videos to promote the ICT sector as a professional path for young talents and to promote gender equality and inclusion into their companies and careers. The most recently created Women Chapter in CAMTIC also showed interest in utilizing the platform created by this series to present other ICT-related entrepreneurial and professional growth success cases of women in Costa Rica. The project is linked to the SDGs 3 and 8. More details [here](#).

313. A number of recommendations relevant to providing access to ICTs through terrestrial and satellite radiocommunication and broadcasting infrastructures have been established, and are under study currently, broadcasting infrastructures are particularly relevant in developing countries and/or underserved areas such as remote and sparsely populated areas.
314. Moreover, ITU carried out various studies for Internet Protocol TV (IPTV) that will enable enhanced, media rich delivery of content to users around the world, as well as Next Generation Networks (NGN) to reduce international imbalances affecting the media, particularly as regards infrastructure and technical resources. ITU-T is also working to enhance accessibility features of audio-visual media through the IRG AVA, and has organized three [IPTV Application Challenges](#) to promote innovative IPTV applications, and motivate experts across the broad IPTV ecosystem to develop original and creative IPTV applications based on ITU's suite of IPTV Recommendations.
315. ITU-T Study Group 16 approved the following standards:
- **Recommendation ITU-T H.230 (revised) “Frame-synchronous control and indication signals for audiovisual systems”**: Digital audiovisual services are provided by a transmission system in which the relevant signals are multiplexed onto a digital path using the frame structure defined in Recommendation ITU-T H.221. In addition to the audio, video, user data and telematic information, these signals include information for the proper functioning of the system. The additional information has been named control and indication (C&I) to reflect the fact that while some bits are genuinely for "control", causing a state change somewhere else in the system, others provide for indications to the users as to the functioning of the system. Recommendation ITU-T H.230 concerns only those C&I which must be transmission frame synchronous, or otherwise requiring rapid response. This Recommendation details the C&I related to video and audio; means of transmitting numbers and characters; C&I for maintenance purposes; for simple multipoint conferences not using protocol in the MLP channel; for channel aggregation; and for the transfer of network addresses. The codepoint tables also indicate the circumstances under which the various functions may be mandatory or optional. This revised version of Recommendation ITU-T H.230 introduces a number of clarifications and corrections to the previous version. Those corrections were listed in the Q11/16 and previous study period Q1/16 living lists. They mainly concern the definitions of C&I symbols. ITU-T H.243 (revised) “Procedures for establishing communication between three or more audiovisual terminals using digital channels up to 1920 kbit/s” introduces a clarification to the contention resolution principle random number description. This clarification previously appeared in the Q1/16 living list and it is associated with the corrections and clarifications added to a revised version of H.230. This version also introduces some editorial corrections.
 - **Recommendation ITU-T H.264 (V13) (revised) “Advanced video coding for generic audiovisual services”** contains the draft text for changes to the Advanced Video Coding (AVC) standard (Rec. ITU-T H.264 | ISO/IEC 14496-10) to specify additional supplemental enhancement information (SEI) messages for ambient viewing environment, content light level information, content colour volume, equirectangular projection, cubemap projection, sphere rotation, region-wise packing, omnidirectional viewport, SEI manifest, and SEI prefix, along with some corrections to the existing specification text. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 11 (MPEG), and Rec. ITU-T H.264 is

maintained as technically aligned twin text with ISO/IEC 14496-10. The technical changes in this edition were developed in a joint collaborative team with MPEG in technical alignment with the ninth (not yet published) edition of ISO/IEC 14496-10. ITU-T T.800 V3 (revised) (T.800 (2015) Cor1 & Amd1) “Information technology - JPEG 2000 image coding system: Core coding system” defines a set of lossless (bit-preserving) and lossy compression methods for coding bi-level, continuous-tone grey-scale, palletized colour, or continuous-tone colour digital still images. This edition adds a profile marker segment, extended capabilities marker segment, and valid profile number values, and includes additional improvements of the basis text. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and Rec. ITU-T T.800 is maintained as common text with ISO/IEC 15444-1. This edition corresponds to the fourth edition of ISO/IEC 15444-1. (Since this specification was published as common text only after the first edition had been approved by ISO/IEC JTC 1 in 2000, edition numbers in the ITU and ISO/IEC versions are offset by one.)

- **Recommendation ITU-T H.265 (V6) (revised) “High efficiency video coding”** includes the specification of additional Supplemental Enhancement Information (SEI) messages for SEI manifest and SEI prefix information, along with some corrections to the existing specification text. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 11 (MPEG), and Rec. ITU-T H.265 is maintained as technically aligned twin text with ISO/IEC 23008-2. The technical changes in this edition were developed in a joint collaborative team with MPEG in technical alignment with the fourth (not yet published) edition of ISO/IEC 23008-2.
- **Recommendation ITU-T T.814 “Information technology - JPEG 2000 image coding system: High-throughput JPEG 2000”** specifies a High-Throughput (HT) block coding algorithm that can be used in place of the block coding algorithm of Rec. ITU-T T.800 | ISO/IEC 15444-1. The HT block coding algorithm increases decoding and encoding throughput and allows mathematically lossless transcoding to and from the block coding algorithm of Rec. ITU-T T.800 | ISO/IEC 15444-1. This is achieved at the expense of some loss in coding efficiency and substantial elimination of quality scalability. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and corresponds as common text with ISO/IEC 15444-15.
- **Recommendation ITU-T T.815 “Information technology - JPEG 2000 image coding system: Encapsulation of JPEG 2000 images into ISO/IEC 23008-12”**: To simplify the use of the JPEG 2000 family of image formats (Rec. ITU-T T.8xx series | ISO/IEC 15444) in applications that use the ISO base media file format, this Recommendation | International Standard specifies the encapsulation of these image formats in the framework defined in ISO/IEC 23008-12. ISO/IEC 23008-12 specifies a framework for the interchange of images and image sequences using tools defined in the ISO base media file format (ISO/IEC 14496-12), which is in wide use worldwide. This framework is defined independently of the formats of the images and image sequences, allowing a wide range of such formats to be used in combination with ISO/IEC 23008-12. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and corresponds as common text with ISO/IEC 15444-16.
- **Recommendation ITU-T T.832 (V4) (revised) “Information technology - JPEG XR image coding system - Image coding specification”** adds the specification of support for additional colour formats (particularly including those specified by Rec. ITU-R BT.2020 and Rec. ITU-R BT.2100) and support for JPEG XR image coding in the ISO/IEC 23008-12 file format. This

Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and Rec. ITU-T T.832 is maintained as technically aligned twin text with ISO/IEC 29199-2. The technical changes in this edition were developed in a joint collaborative team with JPEG in technical alignment with the fourth (not yet published) edition of ISO/IEC 29199-2.

- **Recommendation ITU-T T.873 “Information technology - Digital compression and coding of continuous-tone still images: Reference Software”**: The ISO/IEC 10918 series defines guidelines and requirements for coding of continuous-tone still images. Recommendation ITU-T T.81 | ISO/IEC 10918-1, also known under the name JPEG, specifies the codestream format and the decoding process. It is designed primarily for compression of continuous-tone photographic content. This document provides reference software for Recommendation ITU-T T.81 | ISO/IEC 10918-1. The software has been successfully compiled and tested on Linux and Windows operating systems and conforms to the decoder requirements set forth in Recommendation ITU-T T.83 | ISO/IEC 10918 2. It has also been tested for conformance to Recommendation ITU-T T.86 | ISO/IEC 10918 4 and ISO/IEC 18477-4. An electronic attachment to the Specification contains two source code packages for ITU-T T.81 | ISO/IEC 10918-1.
 - **Recommendation ITU-T H.626.5 “Architecture for intelligent visual surveillance systems”** defines an architecture of intelligent visual surveillance systems, including the functional architecture, entities, service flows and reference points. The intelligent visual surveillance system provides intelligent analysis capabilities and services for users based on the images and video streams from surveillance cameras through network. This Recommendation is based on ITU-T Recommendation F.743.1 “Requirements for intelligent visual surveillance”.
 - **Recommendation ITU-T H.783 (V2) (revised) “Digital signage: Audience measurement services”** specifies functional requirements, configuration and operations, and metadata for audience measurement services in digital signage. The configuration and operations are processed between audience measurement client and audience measurement aggregation. The metadata describes the detail data elements and structures on information used in the configuration and operations. This revision adds the XML schema on the data structures for message delivery. The addition aims to widen applicability of the specifications at the price of easy XML validation.
 - **Recommendation ITU-T H.784 “Digital signage: Display device control interface”** addresses the display device control interface between the display device and the DS client. The Recommendation introduces an overview of the display device control interface and describes the functions and procedures for controlling and configuring the display device through the interface.
316. **Recommendation ITU-T G.191 (V6) (revised) “Software tools for speech and audio coding standardization”** provides source code for speech and audio processing modules for narrowband, wideband and super-wideband telephony applications. The set includes codecs, filters, noise generators, etc. This revision introduces changes to the main body of ITU-T G.191 and to Annex A, which describes the ITU-T Software Tools (STL) containing a high-quality, portable C code library for speech processing applications. Annex B remains unchanged. This new release of the STL, also known as STL2018, incorporates new basic operators to accommodate state-of-the-art processor architectures which supports wide accumulators, SIMD (Single Instruction Multiple Data) and VLIW (Very Long Instruction Word). Thus the new operators provides support for 64-bit accumulator, complex

numbers, enhanced 32-bit operations and additional control code operators. The software package was reworked to make it available as a truly open-source project and is therefore hosted on an open-source collaboration platform. The build toolchain is now using CMake to generate platform-dependent and tool-dependent build scripts as well as to execute regression tests for each module in the STL. ITU-T Study Group 9 approved the following standards:

- **Recommendation ITU-T J.302 (2016) Amd.1 “System specifications of augmented reality smart television service: Amendment 1”** supports real-time comment sharing services.
- **Recommendation ITU-T J.383 “Conversion of type length value (TLV) packet and transport stream for advanced cable transmission systems”** describes the conversion schemes of data structures defined in [ITU-R BO.2098-0] for cable television systems on the basis of [ITU-T J.382]. [ITU-R BO.2098-0] specifies two data structures, MPEG-2 TS and TLV. MPEG-2 TS data packets are directly transmitted while any transmission control signals and service information are transmitted using a descriptor specified in [ETSI TS 102 991]. TLV packets are not directly transmitted in TLV format but converted to GSE [6] packet format specified in [ITU-T J.382]. The EWS control signal specified in [ITU-R BO.2098-0] is also converted into physical layer signalling specified in [ITU-T J382], to wake up the receiver when the Emergency Warning System is activated.
- **Recommendation ITU-T J.1026 “Downloadable Conditional Access System for Unidirectional Network; Requirements”** specifies requirements for one-way downloadable conditional access system (DCAS) for unidirectional network. One-way DCAS protects broadcast content/services and controls consumer entitlements like traditional conditional access (CA) systems, and enables a terminal, such as a set-top-box (STB), to adapt to a new CA system by downloading and installing the new CA system’s client without hardware changing. In particular one-way DCAS can fully work in unidirectional cable TV networks and other unidirectional networks such as satellite TV networks.
- **Recommendation ITU-T J.1027 “Downloadable Conditional Access System for Unidirectional Network; System Architecture”** specifies a system architecture for one-way downloadable conditional access system (DCAS) for unidirectional network. One-way DCAS protects broadcast content/services and controls consumer entitlements like traditional conditional access (CA) systems, and enables a terminal, such as a set-top-box (STB), to adapt to a new CA system by downloading and installing the new CA system’s client without hardware changing. In particular one-way DCAS can fully work in unidirectional cable TV networks and other unidirectional networks such as satellite TV networks.
- **Recommendation ITU-T J.1028 “Downloadable Conditional Access System for Unidirectional Network; Terminal System”** specifies a terminal for one-way downloadable conditional access system (DCAS) for unidirectional network. One-way DCAS protects broadcast content/services and controls consumer entitlements like traditional conditional access (CA) systems, and enables a terminal, such as a set-top-box (STB), to adapt to a new CA system by downloading and installing the new CA system’s client without hardware changing. In particular one-way DCAS can fully work in unidirectional cable TV networks and other unidirectional networks such as satellite TV networks.

317. During WTDC-14 Digital broadcasting has been identified as one of the regional initiatives in several regions, and ITU members have recognized the importance of managing the

transition smoothly. ITU, in cooperation with Korea, Japan, and Australia, has provided assistance on Digital Broadcasting Transition with updating Guidelines for roadmap development for world-wide, and developed roadmaps for Afghanistan, Fiji, Indonesia, Lao PDR, Solomon Islands, Vietnam, Vanuatu, Guyana, Gabon, Democratic Republic of the Congo, Equatorial Guinea, Bangladesh, Pakistan, Micronesia, Samoa, Myanmar, Timor-Leste, Kiribati, Tonga, Bhutan and Nauru.

318. Also, in cooperation with the Latin-American Development Bank (CAF), ITU provided support to 8 countries (Bolivia, Dominican Republic, Venezuela, Costa Rica, Panama, Colombia, Paraguay and Jamaica) in the Americas Region and translated the guidelines into Spanish.
319. In addition, 5 other countries in Latin-America were assisted within the BDT Operational Plan.
320. Within the framework of the ITU-Latin-American Development Bank (CAF), a summary report on the digital broadcasting roadmaps, which includes 12 countries, has been prepared.
321. Case studies on the experiences in digital terrestrial television broadcasting transition for Thailand, Japan and Australia have been prepared. Also a report was prepared on the Interactive Multimedia Services and Pay TV in ASP.
322. Several workshops were delivered on the subject together the BDT and the BR all around the world. On 17 June 2015, on the date of the analogue switch-off in UHF bands in Region 1, ITU organized a Symposium on the Digital Broadcasting Transition.
323. ITU participated in the EBU (2016 June) and ABU (2015 October) Technical Assembly meetings.
324. ITU-ABU organized Pacific Media Partnership Conference 2015: Partnering for Broadcasting, Apia Samoa, 25-27 August 2015, Apia, Samoa (50 participants from 20 countries)
325. Regional Seminar for Europe and CIS on "Spectrum Management and Broadcasting was held with around 70 participants" in Rome on 29-31 May 2017. In 9 sessions, 45 presentations were delivered on, among others, the Future of digital terrestrial television broadcasting, Digital dividend utilisation, IMT 2020 (5G), Spectrum needs of IoT, etc.
326. ITU developed and is maintaining a database for following the transition from analogue to digital terrestrial television broadcasting:

<http://www.itu.int/en/ITU-D/Spectrum-Broadcasting/Pages/DSO/Default.aspx>

327. ITU Membership outreach:
328. ITU-R Outreach activities include the information and assistance to membership, the publication of ITU-R outputs and their dissemination, the organization of, and the participation in, seminars and workshops, and the development and maintenance of communication and promotion tools. The purpose of these activities is to ensure that the outputs produced by the ITU-R Sector (regulations, recommendations, reports and

handbooks) are disseminated worldwide and familiar to the ITU membership and to stakeholders of spectrum, and that they form the basis for the formulation of spectrum management policies and decisions and for the use of radiocommunications in general. To carry out these activities, the BR relies on close cooperation with the other Bureaux and Sectors, the ITU regional and area offices and the relevant international organisations and national authorities.

329. Member States of ITU and Sector Members participate actively in the work of the Radiocommunication Sector. Since its opening to the private sector, the ITU membership represents a cross-section of the industry, from the world's largest manufacturers, carriers, operators and system integrators to small, innovative players of the new information and communication technology field.

Current members include:

- 193 ITU Member States, which constitute the Union, set its mandate and contribute to the work of ITU as a whole;
- Around 850 ITU Sector Members, Associates and Academia bers (which participate in the work of a defined Sector (R, T or D)) and ITU Associates (which work within the framework of a specific Study Group). These include operating agencies, scientific or industrial organizations, financial and developmental institutions, other entities dealing with telecommunication matters, regional and other international telecommunication, standardization, financial or developmental organizations;
- More than 100 academia members.

330. In its efforts to ensure the widest participation in the enhancement of worldwide communications and that the interests of all stakeholders are taken into consideration, ITU encourages new entities and organizations to join the Union as Sector Members or Associates. In addition, ITU seeks to further develop intellectual cooperation with educational institutions and universities.

Action Line C10: Ethical dimensions of the Information Society



Related to the SDGs: SDG 1, SDG 2, SDG 3, SDG 4, SDG 5, SDG 8, SDG 9, SDG 10, SDG 11, SDG 12, SDG 13, SDG 16, SDG 17.



331. The WSIS Prizes 2019 Winner for the Action Line 11 International and Regional Cooperation is UAE Space Agency (UAESA) for the project UAE Space Agency Global Efforts in Partnership Sustainable Development. The United Arab Emirates has been an ardent supporter in the field of International Space collaboration and Regional among the Gulf Cooperation Council (GCC) and Arab countries. These International & Regional collaboration initiatives have helped UAE to gain international recognition in the last decade in the space arena. These collaborations goes beyond the steering of policy matters and chairing conferences and meetings, the UAE has had the honour of developing high national building capacity space programs by the successful partnership with potential and leading Administrations in the space sector.

UAE MARS PROJECT (2117)

Phase One: Mars Science City

Focus of the City:

- Education
- Science of Food, Water, & Energy
- Laboratories
- Museum / Entertainment

SIMILARITIES	MARS	UAE
Water	✓	✓
Food	✓	✓
Energy	✓	✓
Climate	✓	✓



Location: Dubai
 Area: 1.9mft2
 Opening: 2021



1

Furthermore, UAE has assisted the international space capacity building efforts of International Specialized Space Organization like United Nation Office of space Affairs, the UAE in a very short space of time has successfully partnered and build strong ties with more than 25 potential Global Members and International and Regional Organizations to find and set up regional capacity building initiatives in the Region.

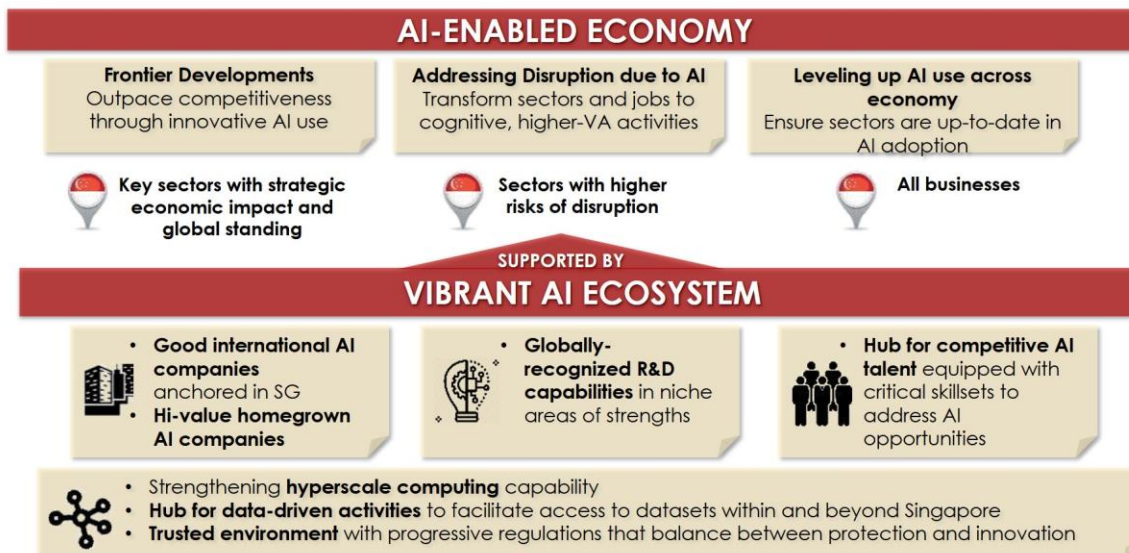
A successful sustainable development agenda requires partnerships between governments, the private sector and civil society. These inclusive partnerships built upon principles and values, a shared vision, and shared goals that place people and the planet at the center, are needed at the global, regional, national and local level.

Urgent action is needed to mobilize, redirect and unlock the transformative power of trillions of dollars of private resources to deliver on sustainable development objectives. Long-term investments, including foreign direct investment, are needed in critical sectors, especially in developing countries. These include sustainable energy, infrastructure and transport, information and communications technologies as well as space industry. The public sector will need to set a clear direction. Review and monitoring frameworks, regulations and incentive structures that enable such investments must be retooled to attract investments and reinforce sustainable development. National oversight mechanisms such as supreme audit institutions and oversight functions by legislatures should be strengthened. This project contributes to all SDGs but 1, 3, 10, 11. Find more details [here](#).

332. The WSIS Prizes 2019 Winner for the Action Line C10 is Personal Data Protection Commission, Infocomm Media Development Authority (PDPC, IMDA) from Singapore for the project "Artificial Intelligence (AI) Governance and Ethics Initiatives in Singapore". The objectives of the AI Governance and Ethics Initiatives are to (i) setup AI governance structures and frameworks that balance the need for business and technology innovation and consumer trust and confidence in adopting AI; and (ii) develop international thought leadership in AI governance and ethics. To date, Singapore has (i) published a draft AI governance framework that is non

sector-specific, (ii) formed an Advisory Council on the Ethical Use of AI and Data to provide guidance to industry on responsible development and deployment of AI, and (iii) set up a Research Programme on Governance of AI and Data Use to develop a body of knowledge in AI ethics and governance and a pool of experts in these areas.

SINGAPORE'S APPROACH TO AI



Singapore aims to be an Artificial Intelligence (AI)-enabled economy as AI can transform industries, boost productivity, improve competitiveness and enhance quality of life. To achieve this ambition, pervasive adoption of AI by organisations and individuals is key, and public trust in the use of AI is critical. As with any new technologies, AI introduces new ethical, legal and governance challenges such as unintended discrimination, accountability and liability in autonomous decision-making, unequal access to AI, wrongful use of AI, etc. These challenges, if ignored, can undermine public trust in AI. This project is linked to SDGoal 9: Industry, innovation and infrastructure. More details can be found [here](#).

(d) WSIS Regional Reviews

333. In the outcomes of the UN General Assembly overall review on the implementation of the World Summit on the Information Society (WSIS) (GA Resolution A/70/125), regional commissions are invited to coordinate the implementation of the WSIS at the regional level.
334. UN Regional Commissions are working towards Regional WSIS Implementation and Review at the Regional Level.

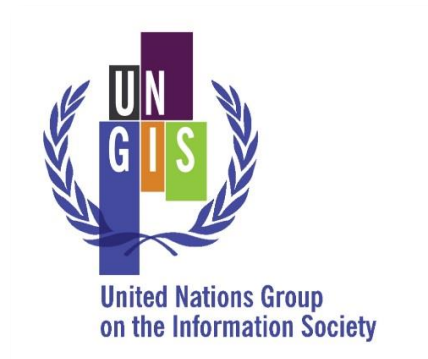
335. ESCAP adopted its resolution 72/10, mandating the ESCAP secretariat to support the member States and relevant stakeholders in the implementation of the WSIS action lines, and in particular, to hold a regional review of the implementation of the Summit action lines as part of the session of the Committee on Information and



and Communications Technology, Science, Technology and Innovation; and coordinate United Nations agencies and partners in the regional review and follow-up towards harmonized approaches in the implementation of the Summit.

(e) United Nations Group on the Information Society (UNGIS)

336. UNGIS was endorsed by the CEB in April 2006 and it serves as an interagency mechanism to coordinate substantive policy issues facing the United Nations system's implementation of the Geneva Plan of Action and Tunis Agenda for the Information Society adopted by the World Summit on the Information Society, thereby contributing to improving policy coherence in the UN system, as requested by the 2005 World Summit.



337. ITU took over the Chairmanship of UNGIS in 2017.

338. At its annual gathering at the WSIS Forum 2019, the United Nations Group on the Information Society (UNGIS) held its 16th High-level and Working-Level meetings. UNGIS also organized the UNGIS Leaders High-Level Breakfast Meeting.

339. One of the items for the work-plan follow up is para 12 of Outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the outcomes of the World Summit on the Information Society, adopted on 16 December 2015. It reads:

340. The Sixteenth UNGIS meeting provided an opportunity to advance the Group's objectives of coordination of substantive and policy issues facing the United Nation system in the implementation of the outcome of the World Summit on the Information Society (WSIS). Particular focus was directed towards the development of a Work Plan.

341. A calendar of UNGIS member's events and a joint contribution to the HLPF 2018 are some of the tasks ITU is leading as the chairman of UNGIS.

342. ITU continues to provide secretariat support to UNGIS and maintains the official UNGIS webpage www.ungis.org.

(f) Measuring the Information Society (Para113-119 of TAIS)

343. **In 2018-2019, more than 180 statistical indicators from over 200 economies worldwide were collected through five annual questionnaires.** The data were disseminated through the ITU website, online portal, electronic download and USB-key and printed publications such as the **44th edition of the Yearbook of Statistics**, and the **24th (July 2019) edition of the World Telecommunication/ICT Indicators database (WTID)**, available for both Windows and Mac users.
344. ITU is an active member of the Partnership on Measuring ICT for Development¹⁶ and one of the three members of its Steering Committee, together with UNCTAD and UIS. The Partnership has been very active in tracking the progress of the WSIS Targets, has made a concerted effort to highlight the role that ICTs will play in achieving the SDGs and has taken a lead role in increasing awareness about the importance of ICT for development and in international ICT monitoring. The Partnership has developed a core list of ICT indicators as well as associated statistical standards and methodologies, in close consultation with experts from National Statistical Systems. The core list, which has been endorsed by the United Nations Statistical Commission, provides the basis for the production of ICT statistics in countries all over the world.
- 
**PARTNERSHIP ON
MEASURING ICT
FOR DEVELOPMENT**
345. The Partnership is actively engaged in monitoring the Sustainable Development Goals. The 2030 Agenda for Sustainable Development recognizes that “the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies”. Several SDG targets refer to ICTs and technology, highlighting the need to include specific ICT indicators in the monitoring framework. Nevertheless, in the global SDG indicator framework, which helps to monitor progress, identify challenges, and guide policy makers, out of 231 only 7 ICT indicators are included, covering 6 targets under Goals 4, 5, 9, and 17. Five of the seven indicators are collected and disseminated by the ITU.
346. During the 2019 WSIS Forum, the Partnership organised a session on “Measurement of Progress towards the SDGs through ICT Indicators”, which discussed progress made by a Partnership Task Group. The main objective of this Task Group on ICT for the SDGs is to propose a thematic list of ICT indicators that could be used to measure ICT availability and use in sectors relevant to the SDGs that are not covered in the global SDG indicators framework. The TG further aims at improving availability of disaggregated data, for the

¹⁶ The Partnership on Measuring ICT for Development is an international, multi-stakeholder initiative that was launched in 2004 to improve the availability and quality of ICT data and indicators, particularly in developing countries. The Partnership has guided policy makers in producing ICT statistics that are crucial to informed decision-making, including through the identification of a core list of ICT indicators and methodologies to collect these indicators. The Partnership helps developing countries collect ICT statistics, particularly through capacity-building and hands-on training for national statistical offices, and collects and disseminates information society statistics. Its membership has grown from originally 11, to today 14 regional and international organisations: ITU, UNCTAD, UNDESA, UNESCO Institute for Statistics (UIS), ILO, UNEP-SBC, UNU-ViE SCYCLE, World Bank, UNECA, UNECLAC, UNESCAP, UNESCWA, EUROSTAT and OECD.

indicators that are defined in the thematic list, in addition to the ICT indicators included in the SDG measurement framework.

347. The Partnership Task Group on ICT for SDGs presented the final draft of a thematic list of ICT indicators, which can be used by countries to measure ICT availability and use in sectors relevant to the SDGs that are not covered in the global SDG indicators framework. The indicator list has been open to feedback from the WSIS stakeholders, during and after the WSIS Forum 2019, after which the list has been finalised.
348. The **10th Meeting of the Expert Group on Telecommunication/ICT Indicators (EGTI)** and the **7th Meeting of the Expert Group on ICT Household Indicators (EGH)** will take place back-to-back in Geneva, from 17 to 20 September 2019. More than 120 participants from national statistical offices, ministries, regulators, international and regional organizations, and the private sector are expected to attend these meetings. The EGH meeting will discuss the following: the measurement of ICT skills, Internet users, cybersecurity, e-waste, child online protection, IoT, and community connectivity indicators. A draft of the revised *ITU Manual for Measuring ICT Access and Use by Households and Individuals* will be presented for feedback by the experts. Countries will also showcase their experiences in planning, designing, and implementing household surveys. Key discussion topics for the EGTI meeting will be the following: the measurement of the Internet of Things (IoT) and 5G-related indicators, fixed-mobile bundles, fixed-broadband Internet traffic quality of service, and international roaming indicators. Furthermore, a draft of the revised *ITU Handbook for the collection of Administrative Data on Telecommunications/ICT* will be presented for feedback by the experts.
349. The **16th World Telecommunication/ICT Indicators Symposium (WTIS)** took place in Geneva, Switzerland from 10 to 12 December 2018. WTIS-18 featured high-level debates on the impact of telecommunications/ICTs and emerging technologies on social and economic development. Other sessions of WTIS-18 focused on measurement in an environment of artificial intelligence, big data, robotics and the Internet of Things. The work of the Expert Group on Telecommunication/ICT Indicators (EGTI) and the Expert Group on Household Indicators (EGH) was presented for adoption by WTIS-18. The Symposium also looked at how to measure ICT skills and how progress can be measured on implementing the Sustainable Development Goals (SDGs).



- (i) The **2018 edition of the Measuring the Information Society Report (MISR)** was launched during



the 16th World Telecommunication/ICT Indicators Symposium (WTIS) in Geneva. The 10th edition of the *Measuring the Information Society Report*, an annual report published by ITU since 2009, features key ICT data to measure the information society. The report presents a quantitative analysis of the information society and highlights new and emerging trends and measurement issues. The report starts with a presentation of the current state of ICTs, using data collected by ITU from its Member States. Three analytical chapter complete Volume 1 of the Report. Chapter 2 highlights the increasing importance of ICT skills in light of emerging technologies for future employment. The chapter focuses on the measurement of ICT skills, presents existing results based on ITU household data and other sources, and highlights opportunities for how the measurement of ICT skills can be improved. Chapter 3 has a specific focus on revenue and investment in the telecommunication sector. Chapter 4 presents the different metrics that ITU collects to track and compare the price and affordability of ICT services worldwide. The analytical report is complemented by a series of statistical tables providing country-level data for the indicators included in the ITU ICT Price Basket. Volume 2 presents country profiles, providing a snapshot of the status of the ICT markets in 192 economies, including significant infrastructure developments, government policy and initiatives to improve the access and use of ICTs for households and individuals, and investments made in the ICT sector.

- (g) **Maintaining the WSIS Stocktaking Database (Para 120, Tunis Agenda) and a portal for best practices and success stories (Para 28, Geneva Plan of Action).**



350. The WSIS Stocktaking process has been maintained by ITU since 2004 as requested by the WSIS Outcomes (TAIS, Para 120). This **publicly accessible WSIS Stocktaking database** (www.wsis.org/stocktaking), currently with more than 11,000 entries and a growing community of 350.000 stakeholders, is a unique global tool for collecting information and regular reporting on information and communication technology related initiatives and projects, carried out by governments, international organizations, the private sector, civil society, academia and other entities, in the context of 11 WSIS Action Lines.
351. In 2015, the UN General Assembly within the framework of the ten year review of the WSIS (Res. A/70/125) called for a close alignment between the WSIS process and the 2030 Agenda for Sustainable Development (Res. A/70/1). The WSIS Stocktaking process responded by highlighting the contribution of 11 WSIS Action Lines to the achievement of 17 Sustainable Development Goals (SDGs).

352. The United Nations Economic and Social Council [ECOSOC resolution 2018/28](#) on "Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society" reiterates the importance of sharing best practices at the global level, and, while recognizing excellence in the implementation of the projects and initiatives that further the WSIS goals, encourages all stakeholders to submit ICT-related projects and initiatives to the WSIS Stocktaking platform.
353. ITU is pleased to invite you to update and submit new entries online at www.wsis.org/stocktaking. Submitted activities will be reflected in the **WSIS Stocktaking Report 2020**, which will be released at the WSIS Forum 2020 to be held from 6 to 9 April 2020 at ITU Headquarters, Geneva.

(h) Emergency Telecommunications (Para 91 of TAIS)

BDT Upcoming/ongoing

354. A [Common Alerting Protocol \(CAP\) implementation workshop will be held in Mexico City](#) from 17 to 18 October 2019. ITU is preparing to actively participate at this workshop as CAP is an ITU-T Recommendation X.1303.
355. A regional workshop on the use of ICTs for disaster risk reduction for the Arab Region will be held in Riyadh, Kingdom of Saudi Arabia, from 26 to 28 November 2019. The workshop is being jointly organized by ITU and the Arab Red Crescent and Red Cross Organization.
356. BDT is in the process of setting up an ITU emergency telecommunication roster to respond to the increasing demand for support in delivering emergency telecommunications equipment and services. By joining this roster, ITU staff can receive training, deploy emergency telecommunications equipment and work on the ground. Deployments are expected to last between 5-15 days and will be closely coordinated with other UN and humanitarian organisations. The roster has been open to all ITU staff, at all levels, serving in any of the ITU duty stations. The official launch of the roster will take place during a special session to be held on 16 September 2019 at ITU HQ. All ITU interested staff can participate at the session.
357. BDT, together with the ETC and NetHope, is developing the Disaster Connectivity Map initiative. These maps will provide information on the type, level and quality of connectivity that is available on the ground, following disasters. They will use different data sources, including from mobile network operators, facebook and others and operate in near real time to guide first responders from governments and humanitarian organisations in their relief efforts.
358. BDT is finalizing draft of the Global Guidelines to develop National Emergency Telecommunications Plans, which will help countries to set up policies, regulations, develop standard operating procedures and to operationalize all phases of disaster management. A draft was opened for comments until 30 of April 2019. BDT is in the process of compiling all the comments received by different organization and member states, including the private sector and will develop the final draft that will serve as a guiding document that will enable countries to develop National Emergency Telecommunication Plans based on their own needs and requirements.

359. BDT is in the final phase of the review and development of the National Emergency Telecommunication Plans of Samoa and Vanuatu. These plans have been designed based on each countries needs and are based on the Global Guidelines (see point above). An implementation framework, including standard operating procedures, is also being developed for each one of the countries.
360. BDT is also providing assistance to Solomon Islands, Papua New Guinea and Guatemala to develop their National Emergency Telecommunications Plans. These plans also include the development of regulatory frameworks that will enable the implementation of these plans at a national level.

Past/implemented

361. To support the work and improve coordination with the satellite and the humanitarian community, ITU signed the Crisis Connectivity Charter (CCC) becoming a principal member. The CCC is a mechanism created between the satellite industry and the wider humanitarian community, to make satellite-based communications more readily available to humanitarians and affected communities in times of disaster. The Charter was developed by the EMEA Satellite Operator's Association (ESOA) and the Global VSAT Forum (GVF) and their members, in coordination with the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Emergency Telecommunications Cluster (ETC), led by the World Food Programme (WFP). The signing ceremony took place during a special session held at Telecom World 2019. The ITU Secretary General, the Executive Director of the World Food Programme, and Chief Executive Officers (CEOs) of the satellite industry signed the Addendum through which ITU became a Member of the Charter.
362. During the WMO's Second Multi-Hazard Early Warning Conference (MHEWC-II), International Telecommunication Union (ITU) along with World Meteorological Organization (WMO) and World Food Programme (WFP) organized a session on "The Last Mile". Within the context of leaving no one behind, the session provided an overview of key issues that need to be taken into account for effective EWS and the role that innovations in information and technology can play in ensuring timely delivery of information to all. The session took place on Monday 13 May 2019 at WMO premises.
363. ITU Arab regional office developed a "Model Policy and Regulatory Framework on use of Telecom/ICTs in Emergency and Disaster Management in the Arab Region". The model summarizes data gathered from the Arab Region and sets out a guideline to help Arab states for developing/updating such a policy and regulatory framework for the use of Telecom/ICTs for emergency and disaster management in the Arab region.
364. A Common Alerting Protocol (CAP) side event workshop was also organized between ITU and WMO during the MHEWC-II. The workshop held on Tuesday 14 May 2019 at WMO premises, demonstrated how CAP enables national alerting authorities and other actors in emergency management to enhance public alerting at scales from village or city to province, nation, region, and global. It also shared experiences and lessons learned in leveraging CAP towards the ideal goal of all-hazards and all-media emergency alerting, reaching everyone, enabling all actor to take actions to protect lives and livelihoods.
365. ITU was invited to speak in the session on "Technology for Disaster Risk Reduction" at the Science and Policy Forum organized by the UN Office for Disaster Risk Reduction,

International Science Council (ISC) and Integrated Research for Disaster Risk (IRDR), which took place from 13 to 14 May 2019 at UN HQ. The Forum, which was part of the 2019 Global Platform on DRR, focused on advancing interdisciplinary collaboration and better linkages between the science community and policy-makers to build effective and coherent approaches to risk reduction and resilience building. It will thereby support the transformative change required to achieve the ambitious 2030 Agenda in an increasingly interconnected and cascading risk landscape to ensure nobody is left behind.

366. A regional workshop for Europe and CIS Regions on Using ICTs to save lives took place in Odessa, Ukraine, from 24 to 26 April 2019. The workshop was jointly organized by BDT and the A.S Popov Odessa National Academy of Telecommunications (ONAT) of the Ministry of Education and Science of Ukraine. The event provided cross regional experiences and expertise on the use of ICTs for early warning, telemedicine, disaster management and the use of new technologies such as drones for high resolution mapping in a timely manner. It also provided an opportunity for different stakeholders and experts responsible for emergency telecommunications and disaster response to share information and best practices on using ICTs to save lives. 39 participants from ministries, regulators, telecom operators, universities and general educational institutions, telecommunication equipment manufacturers, research institutes, software developers and other interested stakeholders from Europe and CIS regions attended the event.
367. During the World Summit on the Information Society Forum, held in Geneva, from 8 to 12 April 2019, BDT and WMO jointly organized a session on “Weather, Climate and Environmental risk management: every life counts, every digit helps”. This session provided an overview of different activities and initiatives related to Multi-Hazard Early Warning Systems that organizations such as IFCR, WMO and ITU are developing. This includes the Forecast based Financing and its Early Action Protocol that IFRC uses to provide a faster response in ahead of a predicted disaster. WMO shared the improvements on MHEWS and the checklist, as well as the importance of its implementation at a national level. BDT presented a new study on disruptive technologies and their use in disaster risk reduction and management and highlighted the need to include new technologies when developing EWS.
368. BDT attended and contributed to the Emergency Telecommunication Cluster (ETC) Plenary Meeting that took place from 9 to 10 April, 2019 in Dubai. The Plenary reported on the recent ETC activities, strategic decisions and the review of the 2020 Strategy, and allowed ITU to report on its work in the area of emergency telecommunications and to strengthen its role in the ETC. The meeting, which was attended by about 25 representatives from different international/ humanitarian organizations, NGOs, and the private sector, provided an overview of the recent operations of the ETC and its members. The critical role of ITU in the recent deployment in Mozambique was highlighted several times and ITU featured prominently in a newly released video.
369. The Third Global Forum on Emergency Telecommunications, GET-19 - Innovating together to save lives: using technologies in disaster management, organized by the International Telecommunication Union and hosted by the Information and Communication Technologies Authority of Mauritius (ICTA) took place from 6 to 8 March 2019, in Balaclava, Mauritius. The theme of GET-19 was Innovating together to save lives: using technologies

in disaster management. The Forum highlighted the needs and opportunities of partnerships and cooperation and addressed challenges and opportunities for ICTs in the humanitarian context. GET-19 discussed how humanitarian organizations can leverage technology to prepare and respond more effectively and to help victims of conflict or humanitarian crises. Discussions also focused on disaster risk reduction strategies, national emergency telecommunication planning and policies, resilient infrastructure, and national coordination. The event also highlighted the importance of early-warning and monitoring systems and showcased and demonstrated the role of new technologies such as big data, Internet of Things, robotics, and Artificial Intelligence in detecting, monitoring and predicting disasters as well as their applications in the immediate aftermath of disasters. The event attracted close to 180 participants from 36 Member States, representing public and private organizations including ministries, regulators, universities and research institutions, humanitarian organizations, development banks, regional disaster management organizations, telecommunication operators, ICT companies, and regional and international organizations.

370. A pre-event on Common Alerting Protocol (CAP) workshop took place on 5 March 2019, at the eve of the 3rd Global Forum on Emergency Telecommunications (GET-19). The workshop highlighted the benefits of CAP and shared best practices and lessons learned on how to create an enabling environment for leveraging CAP. It was of particular interest to national regulatory authorities, ICT Ministries, disaster management organisations, meteorological/ hydrological agencies, and other emergency stakeholders interested in the sending or receiving of emergency messages among organisations, or to the public. The workshop showcased and demonstrated that regardless the type of hazard, CAP emergency messages can quickly and efficiently warn people at risk, using all available communication technologies. The workshop was attended by 90 participants.
371. During GET-19, ITU launched a new study on Disruptive Technologies and their use in disaster risk reduction and management. The study discusses the use and opportunities of ICTs and disruptive technologies for disaster risk reduction and management. It responds to requests from ITU Member States to identify relevant technologies and facilitate the sharing of best practices. The document finds that technological advancement and innovation are creating new opportunities for enhancing disaster resiliency and risk reduction. Developments in disruptive technologies – such as artificial intelligence (AI), the Internet of Things (IoT) and Big Data – and innovations in such areas as robotics and drone technology are transforming many fields, including disaster risk reduction and management. The study also identifies important steps that governments, relief agencies, the private sector, the research community and assistance agencies can take to maximize benefits from the opportunities identified in this document, and highlight the importance of regulation, training, scaling and building partnerships.
372. During GET-19, ITU presented the disaster connectivity map initiative which is being developed jointly with the Emergency Telecommunication Cluster (ETC) and NetHope. The objective of this initiative is to build a partnership for the development of a (near) live map that during times of disasters can provide real-time information on the type, level and quality of connectivity that is available on the ground. This map will help first responders, the government and others that are setting up connectivity following disasters, to make

decision on where to deploy scarce human and financial resources. Potential partners include Facebook, GSMA, RIPE and others.

373. During GET-19, ITU and the United States Telecoms Training Institute (USTTI) launched a competition for nationals of developing countries on emergency telecommunications. Successful candidates will be trained in the use of information and communication technologies (ICTs) for disaster risk reduction and management, and the development of their national emergency telecommunications plans. Submissions included an application and an essay in response to three questions on emergency telecommunications. The deadline for submissions was 15 March 2019.
374. BDT deployed satellite telecommunications equipment to Mozambique and Zimbabwe after the severe devastation caused by category 4 Hurricane Idai. The hurricane hit Mozambique, the city of Beira on 14 March 2019, before striking the neighboring countries Zimbabwe and Malawi. The devastating hurricane that hit south-eastern Africa has been the worst ever disaster to strike the southern hemisphere. Hurricane Idai caused devastating floods, killed and injured thousands of people as well as crops, houses and roads among the three countries.
375. A national workshop on the Role of Telecommunications and ICTs for Disaster Management and Risk Reduction took place in Dar Es Salaam from 15 to 16 January 2019. The workshop emphasized on the need to enhance the use of ICTs and new technologies for developing hazard and vulnerability maps, as well as developing monitoring and early warning systems based on their own specific needs and in close collaboration with the meteorological organization in the country. The event also served as a platform to exchange ideas and practices on the work that is being carried out by different humanitarian organizations, such as National Red Cross, Disaster Management Commission, national health authority, among others. Different stakeholders from the private sector had the opportunity to share their progress made in terms of availability and readiness of their networks (mobile and fixed) to be used for disaster management.

(i) International Internet Connectivity (Para27c.ii and 50d of TAIS)

376. ITU-T Study Group 3 continues to study this matter. BDT is providing assistance to East African Community (EAC) and South African Development Community (SADC) countries on the creation of national Internet Exchange Points (IXPs) and achieving efficient and cost effective Regional Internet connectivity.



377. ITU-D Study Group 1 Question 1/1 within its work items for the 2014-2017 study period studied some of the existing resources available, including case studies received, related to the deployment of Internet Exchange Points (IXPs) with an aim to prepare best practice guidelines that may be useful for the Member States. As an example, an empirical study of Kenya and Nigeria assessing the impact of IXPs in these two Sub-Saharan countries has been considered. The Group examined how IXPs can be used to improve connectivity, how they can improve the quality of Internet services provided and potentially save operators money in connectivity fees. Other contributions to the work of the Group looked at the critical cost and performance benefits of IXPs in countries in the

Americas (Argentina, Brazil, Colombia and Ecuador), and how they have been able to advance Internet growth in this region.

(j) World Telecommunication and Information Society Day

378. World Telecommunication Day has been celebrated annually on 17 May since 1969, marking the date of the founding of ITU and the signing of the first International Telegraph Convention in 1865. It was formally instituted by the Plenipotentiary Conference in Malaga Torremolinos in 1973. In recognition of ITU as the lead United Nations agency for telecommunications and information and communication technologies (ICTs), the World Summit on the Information Society (WSIS) in Tunis, November 2005, called on the United Nations General Assembly to proclaim 17 May as World Information Society Day (see paragraph 121 of the Tunis Agenda).
379. On 27 March 2006, the United Nations General Assembly adopted Resolution 60/252, proclaiming 17 May as World Information Society Day to focus global attention annually on bringing the enormous benefits of the digital revolution in ICTs to the world's inhabitants.
380. The ITU Plenipotentiary Conference in November 2006 welcomed the General Assembly's decision and amended Resolution 68 to invite the Council to adopt a specific theme for each World Telecommunication and Information Society Day.
381. The theme for WTISD-18, "Enabling the positive use of Artificial Intelligence for All," focused on the potential of Artificial Intelligence (AI) to accelerate the United Nations' Sustainable Development Goals by 2030. The day was marked by an interactive forum with female astronauts and the first female private space explorer, who have been invited to share their perspectives on existing and potential AI-based technologies in space travel and exploration.
382. While there are tremendous benefits delivered by AI in our lives, the world has to pay attention to the potential challenges posed by the technology. Artificial Intelligence has enormous potential to assist global efforts to address challenges as great as poverty, hunger, health, education, equality and the protection of our environment. Inclusive global dialogue will be fundamental in building the common understandings necessary to guide AI innovation towards the achievement of the UN Sustainable Development Goals.
383. AI is certain to influence many areas of ITU's technical work, with examples found in data management, network orchestration, video coding, intelligent transport systems, and Internet of Things and smart cities.

(k) Bridging the standardization gap (BSG) –

384. The revamped BSG Programme is structured around 5 pillars in line with governing texts, such as PP Resolution 123 (Dubai, 2018) and Resolution 44 (Hammamet, 2016). The five pillars of the BSG programme are as follows: Engagement, Know-how, Community, Awareness, and Partnering. The objective of the BSG programme is to empower participation and informed dialogue in standards-making from all corners of the world. Empowered participation raises the international acceptance and quality of ITU-T standards and ensures their wide implementation.

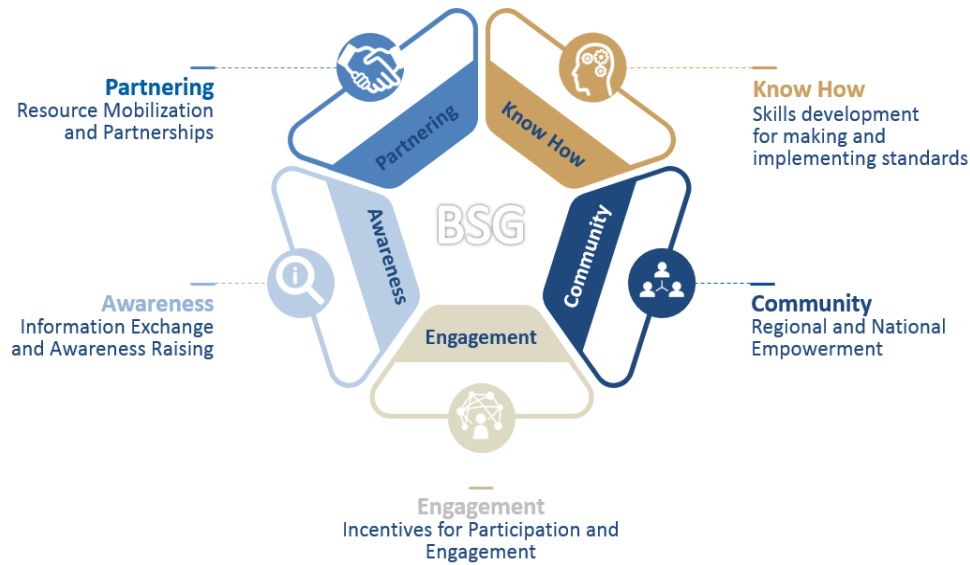


Figure 1: Pillars of the BSG programme

385. **BSG Engagement** is about facilitating participation in standards development. This includes fellowships, mentorship programmes and tools for remote participation.
386. ITU-T Study Group Mentors are very important when it comes to helping newcomers settle in and leave no questions unanswered. The 11 ITU-T Study Groups have already some 20 mentors.
387. Remote participation efforts continue to be enhanced and fellowships are provided to support participation in the work of ITU-T Study Groups and their regional groups.
388. BSG Know-how covers the development of skills and capabilities for standards-making. This includes standards-making effectiveness sessions (BSG hands-on sessions), video primers and e-learning courses.
389. The successful hands-on capacity-building training conducted by ITU T SG3 since early 2014 has been extended to other study groups and their regional groups. These BSG Hands-On sessions are geared towards assisting developing countries in acquiring the right skills and capabilities for international standards-making and to draft contributions for meetings. The sessions focus on the development of practical skills to maximize the effectiveness of developing countries' participation in the ITU-T standardization process, covering topics including strategies for participation in Study Groups, drafting Contributions, presenting proposals, collaborative working methods and means of gaining support and building consensus.

390. Since January 2016, 25 hands-on training sessions were held for delegates of ITU-T SG2, SG5, SG9, SG11, SG12, SG13, SG16, SG17 and SG20. In total, over 500 participants from some 80 countries and 90 different organizations have benefited from these sessions.

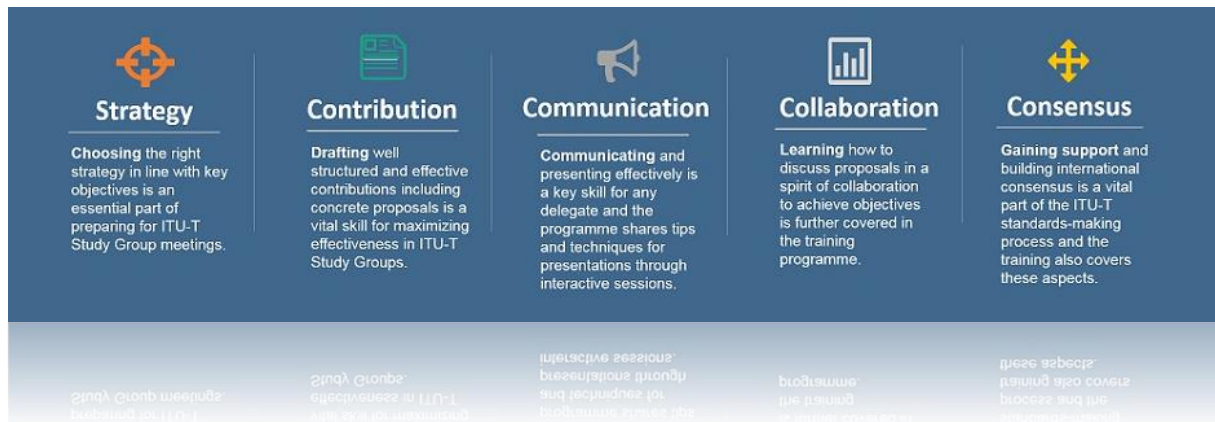


Figure 2: The 5 key features of the BSG Hands-On sessions

391. **BSG Community** is all about empowerment for standardization, both at the regional and national level. A key example under **BSG Community** are the regional groups of ITU-T study groups, which ensure that standards-making is inclusive of the needs of all regions. Celebrations of the 50th anniversary of ITU-T regional groups were held in February 2018 during the SG3RG-AFR meeting. SG3RG-AFR is among the first ITU-T regional groups to be created back in 1968, together with three other regional groups of SG3. Celebrations were also held during the WSIS in March 2018.

392. Activities under the pillar BSG Awareness aim to promote information sharing and exchange, through for instance, ITU-T publications on a wide range of topics and Regional and Inter-regional Standardization Forums.

393. Since 2016, a new strategy was adopted for Standardization Forums. These are now fully in line with the priorities of ITU-T study groups, and are mainly held in coordination with ITU-T regional groups. Raising awareness of standards activities is also made possible through the participation of key decision makers (including prime Ministers, Ministers, Head of Regulators etc...) and good media coverage. The following events were held since November 2018:

- [ITU Regional Standardization Forum on Emerging Economic, Regulatory and Policy Trends in a Fast-Changing Digital World](#); Kuwait City, Kuwait, 17 December 2018.

394. Finally, BSG Partnering is about mobilizing resources and fostering collaboration. In terms of funding, for 2017 and 2018 new funds were kindly provided by MSIT Korea. Cooperation agreements (MoA) were signed with AICTO in the Arab region and ATU in the African region.

395. As per Council Resolution 1343, the Radiocommunication Assembly 2015 (RA-15) was held in Geneva from 26 to 30 October 2015 with 457 participants representing 96 Administrations and 38 Sector Members and Academia.

396. RA-15 approved the work programme and Questions of the Radiocommunication Study Groups (see Resolution ITU-R 5, <http://www.itu.int/pub/R-RES-R.5>) as well as six draft ITU-R Recommendations and a draft ITU-R Question submitted to the Assembly.

In total, 36 new or revised ITU-R Resolutions were approved, including:

Resolution ITU-R 55 - ITU-R studies of disaster prediction, detection, mitigation and relief (<http://www.itu.int/pub/R-RES-R.55>)

Resolution ITU-R 65 - Principles for the process of future development of IMT for 2020 and beyond (<http://www.itu.int/pub/R-RES-R.65>)

Resolution ITU-R 66 - Studies related to wireless systems and applications for the development of the Internet of Things (IoT) (<http://www.itu.int/pub/R-RES-R.66>)

Resolution ITU-R 67 - Telecommunication/ICT accessibility for persons with disabilities and persons with specific needs (<http://www.itu.int/pub/R-RES-R.67>)

Resolution ITU-R 68 - Improving the dissemination of knowledge concerning the applicable regulatory procedures for small satellites, including nanosatellites and picosatellites. (<http://www.itu.int/pub/R-RES-R.68>)

Resolution ITU-R 69 - Development and deployment of international public telecommunications via satellite in developing countries (<http://www.itu.int/pub/R-RES-R.69>).

The decisions of RA-15 of particular relevance to WRC-15 were reported in Document WRC-15/216 (<http://www.itu.int/md/R15-WRC15-C-0216/>). The following Radiocommunication Assembly (RA-19) is scheduled for 21-25 October 2019 in Sharm el Sheikh, Egypt.

397. **Free on-line access to ITU-R Publications for bridging the standardization gap**

The ITU free online access policy continues to provide a very large dissemination of ITU standards to a broader public, especially in developing countries with financial and technical constraints. This wide outreach via free online access is helping to build the visibility of ITU's mission and mandate and reinforce ITU as a global telecommunication authority.

By Decision 12 (Guadalajara, 2010), PP-10 adopted a free online access policy to include, inter alia, ITU-R Recommendations and Reports. This policy was expanded by Council 2012 Decision 571, revised by Council 2013 and 2014, and confirmed by PP-14 revised Decision 12, which provides free online access for the general public, on a permanent basis, to ITU-R, ITU-T and ITU-D Recommendations and Reports; ITU-R handbooks on radio-frequency spectrum management¹⁷; ITU publications concerning the use of telecommunications/ICTs for ensuring disaster preparedness, early warning, rescue, mitigation, relief and response; the International Telecommunication Regulations (ITRs); the Radio Regulations; the Rules of Procedure; the basic texts of the Union (Constitution, Convention, General Rules of conferences, assemblies and meetings of the Union, decisions, resolutions and Recommendations); the final acts of plenipotentiary conferences; the final reports of WTDCs; the ITU Council resolutions and decisions; the final acts of world and regional

¹⁷ These include the ITU-R Handbooks on National Spectrum Management; Computer Aided Techniques for Spectrum Management; and Spectrum Monitoring.

radiocommunication conferences; and the final acts of world conferences on international telecommunications.

ITU-R Recommendations

As a result of the free online access policy, ITU-R Recommendations have been disseminated worldwide, becoming a universal reference, reaching all audiences, regardless their economic situation. In a 36-month period (January 2013 to December 2015), more than ten million downloads of ITU-R Recommendations from ITU web site were recorded. Table 8.1.4.2-1 summarizes their distribution by year and series. At this time there are 1,155 ITU-R Recommendations in force, hence the average number of downloads is 9,300 per Recommendation.

ITU-R Reports

As ITU-R Recommendations, ITU-R Reports have been disseminated worldwide, becoming a universal reference, reaching all audiences, regardless of their economic situation. In a 36-month period (January 2013 to December 2015), more than 4.5 million downloads of ITU-R Recommendations from ITU web site were recorded. Table 8.1.4.3-1 summarizes their distribution by year and series. At present, there are 410 ITU-R Reports in force, with an average download of 8,000 per Report.

Navigation and analysis tools for ITU-R electronic publications:

Radio Regulations tools: the Radiocommunication Bureau developed software tools to facilitate the use and analysis of the Radio Regulations which is available for subscription and download since the first quarter of 2016 - www.itu.int/pub/R-REG-RRX

ITU-R documents database search tool

At its 19th meeting, the RAG invited the BR Director to develop a database, within existing budgetary limitations, that would enable ITU-R Recommendations to be searched and filtered by categories such as the radiocommunication service(s) and applicable frequency band. In collaboration with ITU's IS Department, the search tools for ITU-R Recommendations and ITU-R Questions became operational in October 2015, a search tool for the ITU-R Reports became available as a demonstration version in November 2015, and search tools for the ITU-R Resolutions and the Handbooks are expected to be available during the 2nd quarter of 2016.

(I) Internet Governance Forum (IGF)

398. The 13th annual meeting of the IGF was held in Paris, France, from 12 to 14 November 2018. During the Forum, ITU, UNESCO, UNCTAD, and UNDP jointly organized the *First Physical Meeting of the WSIS Forum Open Consultation Process*, which took place on 12 November 2018. This meeting focused on informing stakeholders and soliciting their suggestions regarding preparations for the 2019 WSIS Forum under the theme of "Information and Communication Technologies for Achieving the Sustainable Development Goals".

(IV) ITU Role in the Overall Review of the Implementation of the Outcomes of the World Summit on the Information Society

(a) UNGA Overall Review of the Implementation of the WSIS Outcomes

399. Paragraph 111 of the Tunis Agenda, endorsed by the General Assembly in resolution 60/252, requested the General Assembly to undertake the overall review of the implementation of the outcomes of the World Summit on the Information Society in 2015. In response, the General Assembly in resolution 68/302, decided that the overall review will be concluded by a two-day high-level meeting of the General Assembly, to be preceded by an intergovernmental process that also takes into account inputs from all relevant stakeholders of the World Summit on the Information Society. Co-Facilitators of the UNGA Overall Review appointed by the President of the UNGA are Ambassador Jānis Mažeiks, Ambassador of Latvia and Ambassador Lana Zaki Nusseibeh, Ambassador of the United Arab Emirates.
400. ITU contributed to the WSIS Review with the 2015 ITU contribution to WSIS Report and organized the following sessions and meetings:
- Strengthening the impact of WSIS Action Lines for sustainable development: showcasing best practices, transferring know-how, fostering partnerships, Monday 14 December 2015, 13:15 - 14:30, UNHQ, Conference Room 11
 - GEM-TECH Awards 2015, Monday 14 December 2015, 18:00 - 20:00, Civic Hall, New York
 - UNGIS Breakfast Meeting, Tuesday 15 December 2015, 08:00 - 08:45, WIPO Conference Room, 25 Floor UN Plaza 2, New York
 - Women's Empowerment in the Digital Age: Implementing WSIS Outcomes and Agenda 2030, Tuesday 15 December 2015, 13:00 - 14:30, UNHQ, Conference Room 6
 - Measuring the Information Society: ICT Data for Policy Making and Evaluation, Tuesday 15 December 2015, 15:00 - 16:45, UNHQ, Conference Room A
 - Enabling a Trusted Connected World, Wednesday 16 December 2015, 13:15 - 14:30, UNHQ, Conference Room 7
401. ITU is part of a special Task Force of Representatives of UN Agencies Represented in NY and Supporting the Preparatory Process. ITU is also an active part of a UN Communication Team for UNGA Overall Review (ITU, UNCTAD, UN DPI, UN OPGA, DESA. ITU facilitated the preparation of the CEB Joint Statement on the WSIS Overall Review (content to be coordinated through the UNGIS mechanism). ITU disseminates information on the process to the WSIS implementation community through the WSIS Flash.

(V) Forums, innovative initiatives and future actions

(a) Forums

WSIS Forum 2019 Event and its outcomes:

402. The WSIS Forum builds upon the outcomes of the UN General Assembly Overall Review of the Implementation of the WSIS Outcomes (UNGA Resolution A/70/125) that recognized the necessity of holding this Forum on an annual basis and called for a close alignment between WSIS and the 2030 Agenda for Sustainable Development. In this context, the WSIS

Forum leverages on the WSIS-SDG Matrix and serves as a key forum for discussing the role of ICTs as a means of implementation of SDGs, with due regard to the global mechanism for follow up and review of the implementation of the 2030 Agenda (UNGA Resolution A/70/1). The WSIS Forum is coordinated by ITU and has been co-organized since 2006 by ITU, UNESCO, UNDP and UNCTAD with the engagement of other United Nations Agencies, including WIPO, UNDESA, FAO, ILO, UNIDO, ITC, UNHCR, UNICEF, UNODC, UNEP, UPU, WMO, WHO, WFP, UN Women, UN Regional Commissions.

403. More than 3,000 information and communication technology (ICT) experts and implementation actors contributed to and participated in the recent World Summit on the Information Society (WSIS) Forum 2019 to foster partnerships, showcase innovation, exchange best practices and announce new tools and initiatives to use ICTs to advance the United Nations' Sustainable Development Goals (SDGs). Thousands followed remotely while more than 500 were engaged by intervening remotely. More than 500 high-level representatives of the wider WSIS Stakeholder community graced the Forum, including ministers and deputies, several ambassadors, CEOs and Civil Society leaders contributing passionately towards the program of the Forum. More than 300 content rich workshops and open space talks clearly aligned with the WSIS Action Lines and SDGs. More than 40 Exhibition Spaces highlighting innovation and projects from the ground. 18 WSIS Prizes winners and 72 WSIS Prizes champions were acknowledged for their excellent work in implementation of the WSIS Action Lines on the ground.



Shadow Also, by Mr. Soumyabrata Roy, India

404. The Chairman of the WSIS Forum 2019 was H.E. Mr. Mustafa Jabbar, Minister, Ministry of Posts, Telecommunications and Information Technology, Bangladesh. His WSIS Forum 2019 interview can be seen [here](#). Policy Statements were delivered during the High-Level Track (9-10 April 2019) of the WSIS Forum 2019 by high-ranking officials of the WSIS Stakeholder community, representing the Government, Private Sector, Civil Society, Academia and International Organizations. The High-Level Track consisted of the opening segment, interactive policy dialogues, ministerial round table, and a High-Level networking program. Policy statement sessions were moderated by 14 High-Level Track facilitators and grouped around different themes identified as important by the WSIS Stakeholders during the open consultation process. Please find more details on the High Level track [here](#).

405. With the objective of strengthening the alignment of WSIS and SDG processes, the overall theme for WSIS Forum 2019 was "Information and Communication Technologies for achieving the Sustainable Development Goals". In particular, in order to highlight the contribution of the WSIS Action Lines in accelerating the achievement of the SDGs, the ITU coordinated, with the UN Action Line Facilitators and all partners, a document that focuses on the impact of the respective Action Lines on the implementation of SDGs. Continuing the [2016](#),



Pinch, Zoom and Swipe, by Mr. Froilan Robas, Philippines

[2017, and 2018](#) efforts towards aligning the two processes, this year document entitled “[WSIS Action Lines Contributing towards Empowering People and Ensuring Inclusiveness and Equality](#)” highlights the linkages of the WSIS Action Lines with the theme for HLPF 2019 i.e. Empowering people and ensuring inclusiveness and equality. It further seeks to encourage and promote effective multi-stakeholder cooperation in implementation of WSIS action lines and the Sustainable Development Goals (SDGs). Each UN agency responsible for facilitating the WSIS Action lines has submitted their input to the report. These documents are very well appreciated by the stakeholders following both, the WSIS and the SDGS process to better understand the role and contribution of ICTs and the work done by the different UN Agencies as WSIS Action Line facilitators in that regard.

406. WSIS Forum 2019 resulted in several concrete outcomes that will enable stakeholders to strengthen implementation of WSIS Action Lines and the alignment of the WSIS and SDG processes. Please see [here](#):

1. WSIS Forum 2019 Outcome Document: direct [link](#).
2. WSIS Forum 2019 High Level Track Outcomes and Executive Brief: direct [link](#).
3. WSIS Forum 2019: WSIS Action Lines— Contributing towards Empowering People and Ensuring Inclusiveness and Equality: direct [link](#).
4. WSIS Stocktaking Report 2019: direct [link](#).
5. WSIS Stocktaking Success Stories 2019: direct [link](#).
6. WSIS Forum 2019 Photo Contest: direct [link](#).
7. WSIS/SDGs Matrix – WSIS Forum 2019 Outcomes Linking WSIS Action Lines with the Sustainable Development Goals: direct [link](#).

– **Photographs:** All ITU’s Albums: direct [link](#).

– **Videos, Interviews and Highlights:** WSIS Forum 2019 Playlist: direct [link](#).

407. **WSIS Forum 2019: Key Achievements (Announcements, Launches, Agreements, Commitments)**

Please find below some key achievements of the WSIS Forum 2019:

- UN Group on the Information Society (UNGIS) reiterated commitment to the WSIS Action Lines implementation and alignment of the WSIS and SDG processes, with a UNGIS Joint Statement to be released during the high-level political forum 2019, at which time UNDP and ITU will become UNGIS co-chairs for the year 2019-2020.
- UN Regional Commissions committed to strengthen regional-level WSIS action through multi-stakeholder platforms and a series of regional face-to-face meetings. It is anticipated that WSIS will be included in the UN Regional Coordination Mechanisms and WSIS4SDG will become one of the pillars of the regional SDG Forums.
- Ministerial Round Table participants emphasized the importance of the WSIS Action Lines framework as a key UN framework for work on the information and knowledge societies, and reiterated that many national digital agendas were built upon it. They applauded the WSIS Forum as an opportunity for all to engage on issues that are almost universal. Issues such as digital security, cybersecurity, accessibility, and innovation were highlighted. The importance of whole government approach was also underlined. Some Ministers on this

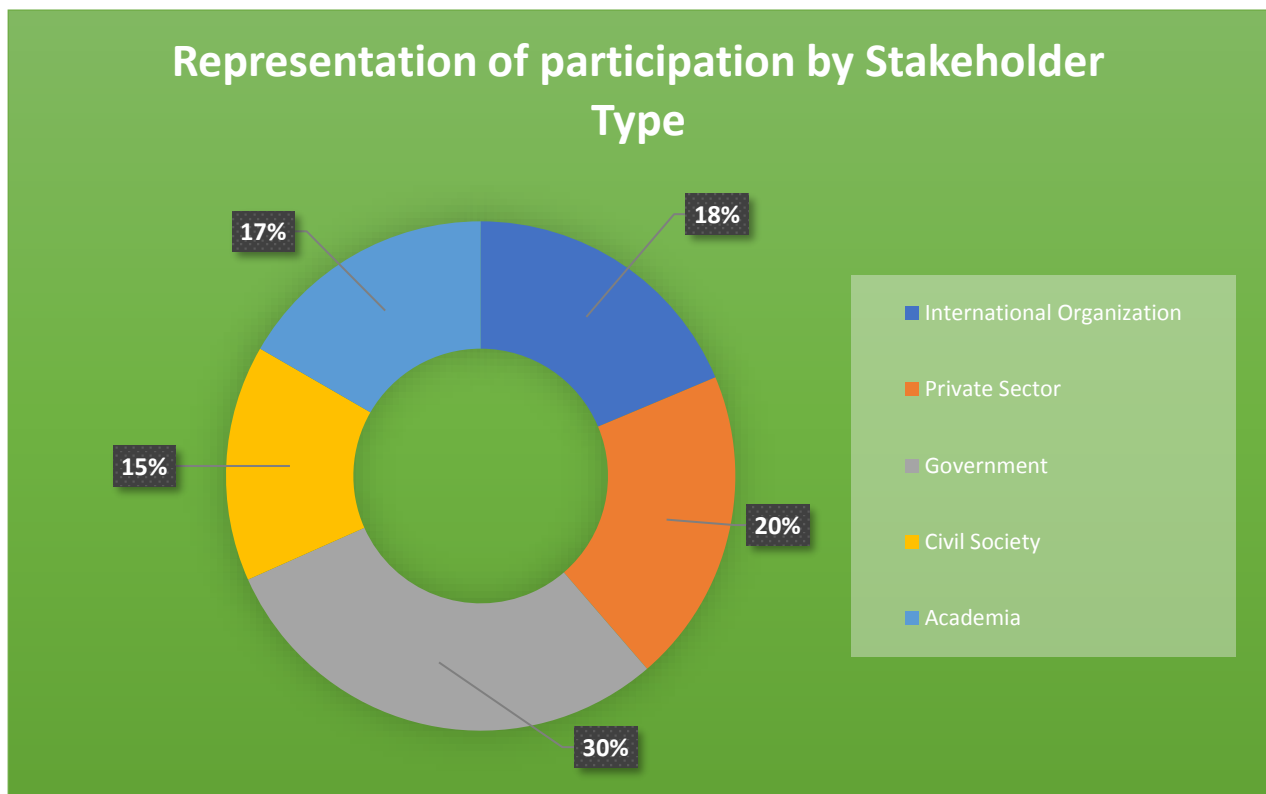
occasion shared their experiences and their success stories highlighting the innovation in technology and policies.

- ITU and UNESCO organized the Hack For Education, which brought together three team from different regions to develop their concrete solutions through a creative and highly collaborative approach for designing and implementing inclusive digital solutions to address challenges around lifelong learning and sustainable livelihoods.
- A workshop organised by Ghana and United Kingdom at the WSIS Forum 2019, resulted to the following key points:
 - Commonwealth countries will renew their coordination on issues at the International Telecommunication Union and on ICTs for SDGs.
 - There will be a Commonwealth Spectrum Management Forum on 19 – 21 June to discuss Commonwealth approaches to the World Radiocommunications Conference (WRC) 2019.
 - 47 Commonwealth countries have benefited from capacity-building activity following the Cyber Declaration of the Commonwealth Heads of Government meeting. 28 countries have so far undertaken a voluntary national cybersecurity capacity review.
 - There will be further Commonwealth meetings at ITU Council, ITU Telecommunications Standardisation Advisory Group and WRC-19.
- Announcement of World Summit Award (WSA) Call for Applications 2019 (<https://www.worldsummitawards.org/contest/>) opened during one of the workshops at the WSIS Forum 2019 and invited all delegates to join the WSA Global Congress – a transformative learning conference – March 9-11 2020, Vienna, Austria.
- Establishment of Numerous Center of Excellences in 20 Developing Countries for ICT outreach has been approved.
- For the first time in the 10 year history of the WSIS Forum, a new track was introduced on sport as an enabler of sustainable development, highlighting the aspects of youth empowerment and innovative technologies.
- During the WSIS Forum, participants were able to celebrate the International Day of Sport for Development and Peace, which is an annual celebration on 6 April, declared by the United Nations General Assembly in 2013, and has been celebrated each year ever since.
- The conversation about sport, development and ICTs has been successfully launched during the WSIS Forum 2019. This was to show that ICTs also enhance sport to be a key enabler to achieve the SDGs.
- Two Massive Open Online Courses (MOOCs) relevant on e-wastes and SDGs will be soon be re-launched on:

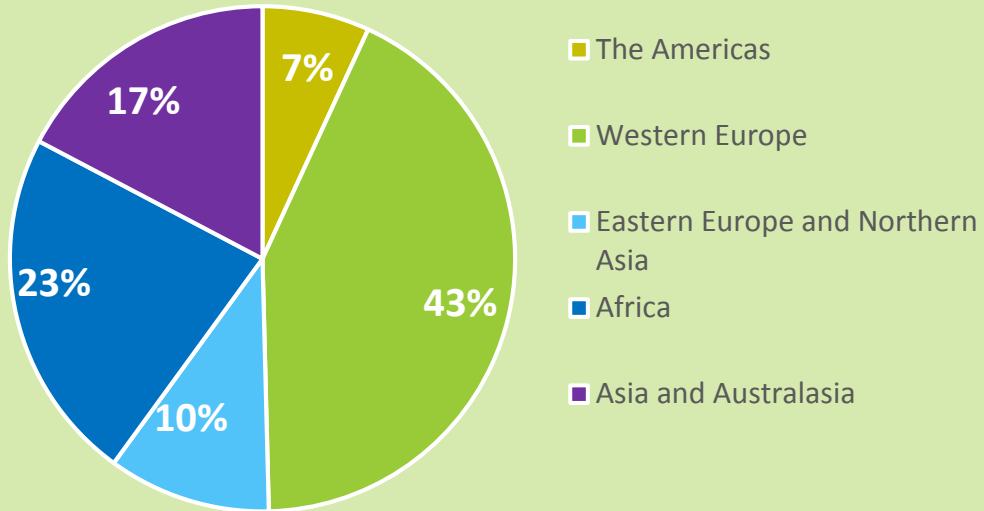
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- The role of information and communication technologies in Achieving & Measuring SDGs with Columbia University and other partners.
 - The E-waste Challenge with KU Leuven, Belgium and other partners. Both MOOCs are developed with the contribution and in cooperation with ITU.
- Launch of Global Alliance of Open Scholarly Communication Platforms (GLOALL). In Inclusive Knowledge Societies, people have ready access to information and communications resources, in languages and formats that suit them, the skills to interpret and make use of them. Within this framework, promoting strategies for enhancing access to scientific scholarship to the all regions of the world has remained a central challenge to most Member States. UNESCO, with its partners, continues to pursue this objective through its own programmes on open science as well as in partnership with other organizations and UN agencies.
 - UNDESA announced the following:
 - The 2020 Edition of the United Nations E-Government Survey is currently being developed, portal assessments will take place in summer months of 2019, and the report will be available during the first two quarters of 2020.
 - The deadline for the Member States Questionnaire (MSQ) in preparation for the 2020 UN E-Government Survey is extended until the end of April 2019.
 - The work done by ITU on collaborative regulation focuses on the interplay between ICT markets and regulation and the innovative regulatory tools and processes at hand to support Membership and stakeholders to further enable digital transformation. Information and tools are available at the ITU Regulatory and Market Environment website (<https://www.itu.int/treg>).
 - ITC, UPU, and UNCTAD are all Partners of the eTrade for All initiative, which channels technical assistance to developing countries to leverage e-commerce for development (etradeforall.org). The eTrade for All initiative launched the eTrade for Women Network (MyeT4Women) to support women involved in e-commerce in developing countries by collecting, nurturing and showcasing their experiences, providing them with opportunities to network, and amplifying their voices in domestic and international policy processes (<https://etradeforall.org/etrade-for-women-network/>). The first High Level session presented the first draft of the “Internet Universality Indicators” and assessed their utility as a comprehensive tool to help states and other stakeholders to measure Internet policies in support of achieving the 2030 Sustainable Development Agenda at national levels.
 - The United Nations General Assembly approved the Outcome Document of the High Level Meeting of the General Assembly on the Overall Review of the Implementation of the WSIS Outcomes (A/RES/70/125), mandates the UN Regional Commissions (UNRCs) to continue their support to implementation of WSIS Action Lines (section 5 and paragraph 68). In this regard, this meeting discussed the key role played by the regional commissions

in the wider deployment of ICTs by leveraging a number of actions that are taken by Governments and civil society. UN Regional Commissions presented their regional perspectives on WSIS, especially the successful regional reviews as well as the convening of the Regional Forum on Sustainable Development that have been conducted. The UN Regional Commissions expressed their willingness to collaborate together and with other international and regional organizations to exchange experiences, to peer learn and to use the regional space as an opportunity to consolidate lessons learnt through national and sub-regional implementation and to reflect on knowledge deficit areas, and other new opportunities that will enable institutional and regional co-ordination to exchange best practices vis a vis WSIS outcomes. It is noted that both UNDESA, ESCWA and ECA conduct similar surveys with their Member States in the area of WSIS Action Lines. To avoid duplication, the meeting agreed to share the survey and to harmonize it.

408. **WSIS Forum 2019 Participation:**

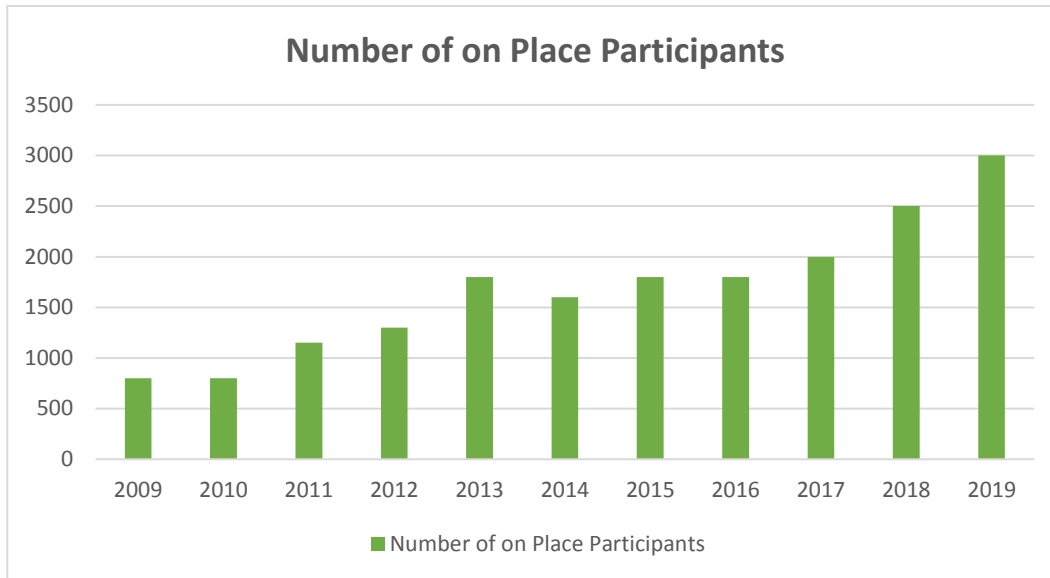


Representation of Participation by Region



Gender Participation in the WSIS Forum 2019





409. Hackathon - **Hack For Education**

410. At the WSIS Forum 2019 Hack For Education Hackathon, three teams from across regions came together in Geneva to Hack Solutions for lifelong learnings and livelihoods. This event was co-organized by the International Telecommunication Union (ITU), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Impact Hub Geneva as a part of the WSIS Forum 2019. For 36h on Sunday and Monday, the teams worked day and night on a viable business model for technology solutions to help address the issue of access to education. The teams developed innovative digital services, mobile & web applications, mainly for middle and lower-income countries, using artificial intelligence, as well as algorithms based on various datasets. All teams faced a different challenge, such as:

- How to ensure the availability of sustainable microfinance services for poor farmers?
- How to optimize the water usage for farmers?
- How to share food with those who need it and help with poverty and youth unemployment?
- How to use ICTs to help farmers with contacts, information and good practices?

More details on the outcomes, the teams, and the different challenges/solutions [here](#).

411. **WSIS Forum 2019: Virtual Reality for SDGs**

412. Pursuing a first partnership in 2016, WSIS and World VR Forum join forces to be at the forefront of Virtual Reality for advancing development. A shiny new Virtual Reality Track was held at the WSIS Forum 2019 bringing together high-level personalities, world class VR experience and a very special focus on education. During the WSIS Forum 2019 two special sessions were held on “Experience a live demonstration on Virtual Reality”, including one that focused on the VR for Development thematic.

Exhibitors prepared a number of ground-breaking and innovative projects, including Virtual Reality, Augmented Reality and autonomous robots, as potential solutions to specific issues that will advance achievement of the SDGs.

Nowadays Virtual Reality tools are no longer reserved for gaming purpose. It can be related to several Action Lines, such as:

- AL C7 E-Learning: providing lessons to children, allowing new forms of learning.
- AL C7 E-Health: Surgery Training, Virtual Reality Exposure Therapies (Phobias, PTSD)

413. **WSIS Forum 2019: Photo Contest**

414. For the [WSIS Forum 2019 Photo Contest](#), stakeholders were invited to picture how ICTs are playing an enabling role in achieving the SDGs, to participate in building a collage of ICT for Sustainable Development photographs from around the world. The contest was launched 11 September 2019 and collected photos until 10 February 2019. During this period, people were sending photos of their projects, people, and organizations that are leveraging the power of ICTs to make difference.

415. The three winning entries in the WSIS photo contest were awarded and presented at the WSIS Forum 2019, 8-12 April 2019 in Geneva, Switzerland. In addition the winners were invited to join ITU's #ICT4SDG campaign. A dedicated poster and other campaign materials highlighting their work were created and shared within ITU and its stakeholders.

416. **WSIS Forum 2019 Photo Contest Winners:**

1) Use of ICTs in learning:

417. Pupils at Kacgae Primary School using ICTs in learning. Classes are offered by Ms. Felicity Kedidimetse, the UASF IT Officer placed at the school. She also offers ICT classes to teachers and members of the community in the remote village of Kacgae.



2) The Peasant Woman:

418. Mobile phones have become an indispensable communication terminals during the current period of rapid information development. Even in the poor and backward areas of Daliangshan, occasionally can man see the peasants using mobile phones.



3) The fascinations of villages' kids to the computer:

419. Some children from a rural area of Andhra Pradesh, India learn autonomously to carry out projects for their communities with local materials and resources. The workshop was held during a visit to the maker space of Project DEFY in Proto Village, within the framework of the Inventors4Change project.



WSIS Forum 2020

420. The annual WSIS Forum is a global multi-stakeholder platform facilitating the implementation of the WSIS Action Lines for advancing sustainable development. The Forum is co-organized by ITU, UNESCO, UNDP and UNCTAD, in close collaboration with all WSIS Action Line co-/facilitators and other UN organizations (UNDESA, FAO, UNEP, WHO, UN Women, WIPO, WFP, ILO, WMO, ITC, UPU, UNODC, UNICEF, UNIDO, UNHCR and UN Regional Commissions). It provides an opportunity for information exchange, knowledge creation and sharing of best practices, while identifying emerging trends and fostering partnerships, taking into account the evolving Information and Knowledge Societies.
421. In follow up to the outcomes of the UN General Assembly Overall Review of the Implementation of WSIS Outcomes (Res. A/70/125) and with the adoption of the 2030 Agenda for Sustainable Development (Res. A/70/1), the WSIS Forum is constantly evolving

and strengthening the alignment between the WSIS Action Lines and the Sustainable Development Goals.

422. The WSIS Forum is the only event of its kind where the programme and agenda are completely crowdsourced. Therefore, as organizers, ITU, UNESCO, UNCTAD and UNDP, are pleased to announce the Open Consultation Process on thematic aspects and innovations on the format of the WSIS Forum 2020. The process aims at ensuring a participatory and inclusive spirit of the Forum, scheduled to be held from 6 to 9 April 2020 at ITU in Geneva. This process actively engages governments, civil society, the private sector, academia, the technical community and intergovernmental organizations in the preparatory process to ensure broad ownership and further improvements of the Forum.

423. The Open Consultation Process for the WSIS Forum 2020 is structured in six phases as follows:

- **Phase I: 4 June 2019** : Launch of the Open Consultations (Virtual Meeting open to all Stakeholders)
 1. Launch of the WSIS Forum 2020 Website for the Official Submissions
 2. Official submissions to the WSIS Secretariat on the Thematic Aspects and Innovations on the Format to be made via www.wsis.org/forum
 3. Open call for nominations for WSIS Forum 2020 Multi-stakeholder High-Level Track Facilitators
 4. Launch of the WSIS Photo Contest 2020
- **Phase II: 20 June 2019** : 1st Physical Meeting: Open Forum on Implementation of WSIS Action Lines and WSIS Forum
- **Phase III: 27 November 2019**: 2nd Physical Meeting: Open Forum on Implementation of WSIS Action Lines and WSIS Forum (during IGF)
- **Phase IV: 7 February 2020**: 3rd Physical Meeting (ITU Headquarters, Geneva) (along with the CWG WSIS&SDGs)
- **Phase V: 3 February 2020**: Deadline for Submissions of Official Contributions and Binding Requests for Workshops
- **Phase VI: 28 February 2020**: Final Brief on the WSIS Forum 2020 (ITU Headquarters, Geneva)

424. Please refer to www.wsis.org/forum for updates. The Open Consultation Process will include a collection of inputs from regional and national WSIS related events and the physical meetings of the Open Consultation Process will benefit from remote participation.

(b) WSIS Action Lines and SDGs Matrix

425. The vital role of ICTs as a catalyst for development is specifically recognized in the new development framework Transforming Our World: The 2030 Agenda for Sustainable Development, which acknowledges that “the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress and to develop knowledge societies, to bridge the digital divide and to develop knowledge societies, as does scientific and technological innovation across areas as diverse as medicine and energy”.

426. Four targets of the SDGs explicitly recognize the role of ICTs. This applies to the targets on Education and scholarships (4.b) on Gender empowerment (5.b) on Infrastructure for Universal and Affordable access to ICTs and the Internet in the Least Developed Countries (9.c) and more broadly, Goal 17 on Strengthen the means of implementation and revitalizing the global partnership for sustainable development, which calls to enhance the use of enabling technology, in particular ICTs. There are also several references to technology in general throughout the SDGs in which ICTs play an important direct or indirect role.
427. ICTs already empower billions of individuals around the world with wide ranging applications cutting across sectoral boundaries in agricultural productivity; population, health and education; transportation; industry, trade and finance; climate change and protection of our environment; as well as for the prevention and management of disasters, among many others.
428. Internet, mobile technologies and relevant ICT applications and services unquestionably help strengthen governance; empower people, in particular women and youth; enable wider exercise of human rights including freedom of expression; foster social inclusion of marginalized groups; open up employment opportunities; promote cultural diversity; expand access to learning and scientific knowledge; and create efficiencies in basic services including energy and water, to name here just a few.
429. However, we do need to acknowledge that, although access to advanced technologies has grown at a fast pace, the impressive gains observed during the MDG era are still hampered by existing gaps in access to ICTs— inequalities still persist among and within countries, between urban and rural sectors and among men and women. A major digital divide is still in place, with more people offline than online and particularly poor access in Least Developed Countries (LDCs).
430. ITU's latest data reveal that while access to the Internet is approaching saturation levels in the developed world, the Net is only accessible to 35% of people in developing countries. The situation in the 48 UN-designated LDCs is particularly critical, with over 90% of people without any kind of Internet connectivity.
431. With the newly adopted 2030 Development Agenda, the WSIS Forum may need to evolve and adapt to strengthening the linkages between the WSIS Action Lines and the Sustainable Development Goals, as well as in light of the outcomes of the UN General Assembly Overall Review of the Implementation of WSIS Outcomes.
432. WSIS SDG Matrix: The WSIS Action line and SDG matrix was launched during the WSIS Forum 2015. The matrix aims to underline the key role of ICTs in promoting sustainable development, all WSIS Action Line Facilitators, under coordination by ITU, developed this WSIS-SDG Matrix demonstrating the direct links between the WSIS Action Lines and the proposed SDGs. Please see at : <http://www.itu.int/net4/wsis/sdg/>

(c) WSIS Prizes



433. Each year, on the occasion of the WSIS Forum, 18 WSIS stakeholders are awarded WSIS Prizes, as a unique mark of global recognition for excellence in the implementation of WSIS outcomes. WSIS Prizes honor outstanding projects that leverage the power of ICT to accelerate socio-economic development around the globe. To this end, 18 projects are selected as the most successful stories worldwide, under each category, to serve as best-practice models to be replicated by other stakeholders interested in information and communication technologies (ICTs) for development. These projects brilliantly demonstrate how established Sustainable Development Goals (SDGs) can be realized in concrete actions and inspire other stakeholders all over the world to follow their success. Besides recognizing the WSIS Prizes Winners, this year we have continued to implement the WSIS Prize Champions category for the [WSIS Prizes 2019](#) contest.

434. WSIS Prizes is a unique international contest developed in response to requests from the WSIS stakeholders to create an effective mechanism to evaluate and recognize individuals, governments, civil society, local, regional and international agencies, research institutions and private-sector companies for outstanding success in implementing development

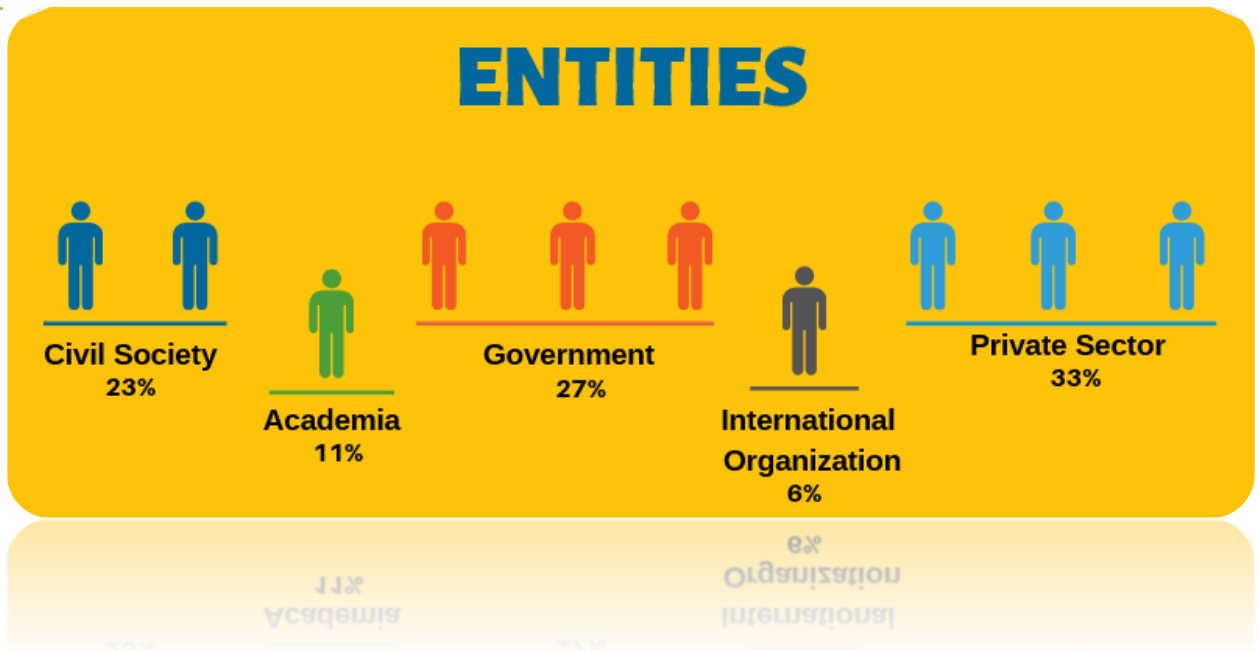


oriented strategies that leverage the power of ICTs as an enabler of the development. The WSIS Prizes contest is an integral part of the WSIS Stocktaking process (click here for more details) set up in 2004 to assist WSIS implementation and follow-up. The contest was held for the first time in 2012, and rapidly gained attention and popularity within the ICT for Development (ICT4D) community, including ICT for SDG community since 2016.

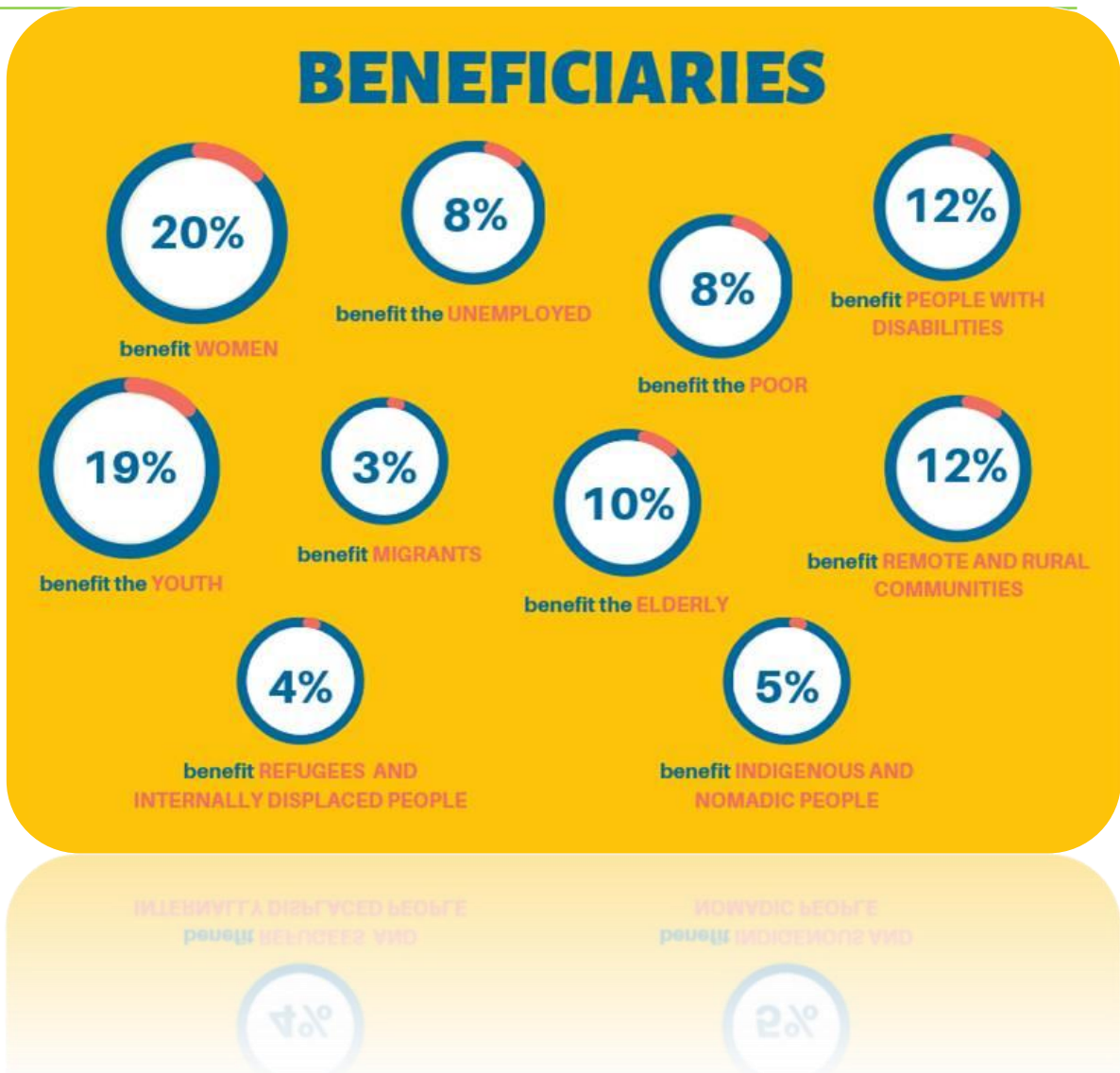
435. Building upon the outcomes of the United Nations General Assembly Overall Review on WSIS as well as the 2030 Agenda for Sustainable Development, the WSIS Prizes 2019 reflect close linkages with achieving the Sustainable Development Goals (SDGs). The WSIS Prizes contest serves as the platform for identifying and showcasing the success stories across the WSIS Action Lines defined in the Geneva Plan of Action and SDGs. It also provides us with models that can be replicated in the interests of empowering the community at the local level, providing everyone with an opportunity to participate in the contest and, most importantly, recognizing the efforts made by stakeholders to contribute to the development of society and their commitment to achievement of both the WSIS goals and SDGs.

436. Facilitated by ITU in coordination with all WSIS stakeholders, the WSIS Prizes 2019 contest provided a platform to identify and showcase success stories across the WSIS Action Lines defined in the Geneva Plan of Action and Sustainable Development Goals. For the seventh year in a row, the World Summit on the Information Society (WSIS) recognized outstanding success stories from around the world for their part in building an inclusive information society. It is a pleasure to have the opportunity to award the WSIS Prize 2019 winners and champions' dedication and commitment in the implementation of the WSIS Outcomes, while honoring the outstanding projects from the international WSIS community.

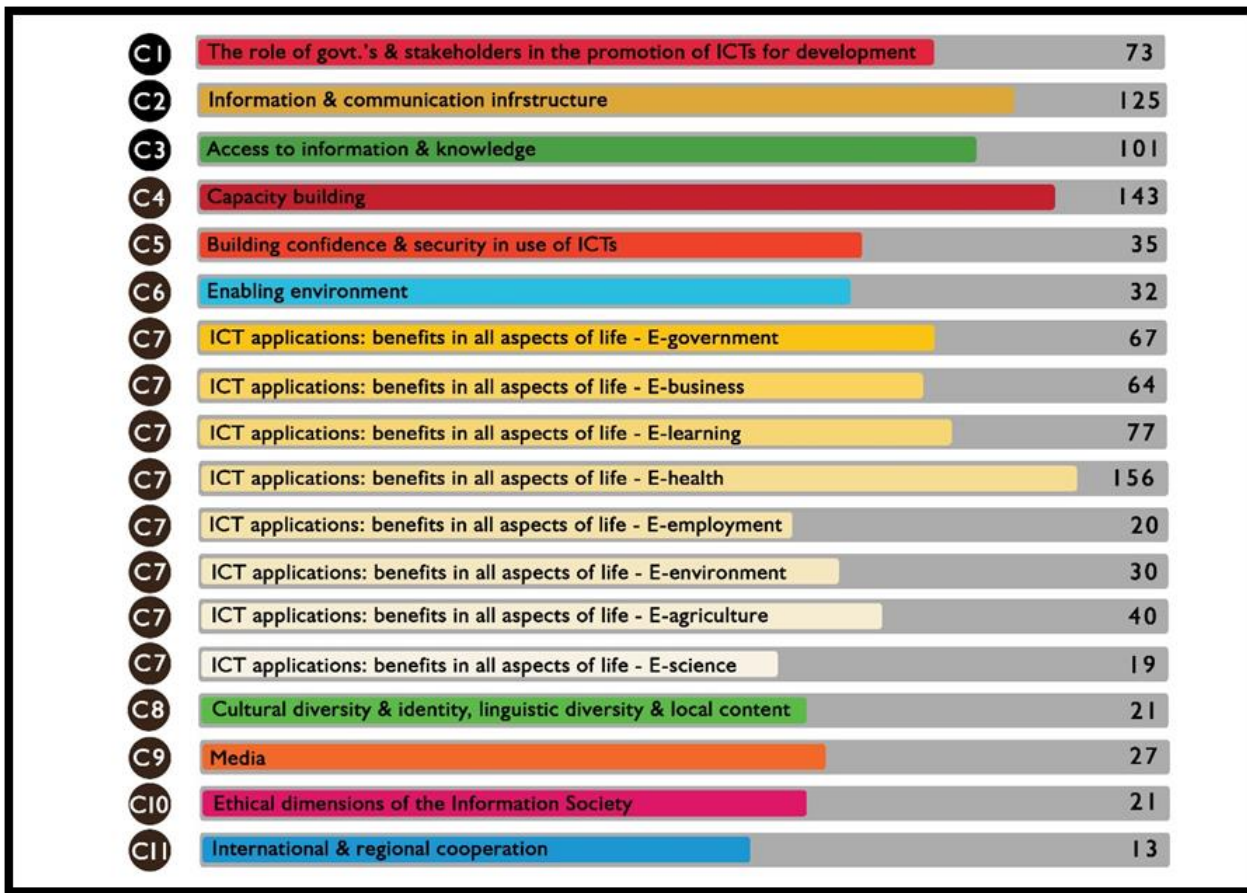
437. So far, more than 3,000 ICT projects were nominated for the WSIS Prizes contests since 2012 with 430 projects being awarded: 144 best practices were recognized as the WSIS Prizes Winners, while 286 projects were awarded as the WSIS Prizes Champions since 2016 (the year we started recognizing the runner-up projects as well).



438. ITU announced 90 Champions of the prestigious WSIS Prizes contest while the 18 Winners, out of these 90 Champions, were recognized at a ceremony at Geneva International Conference Centre on 9 April 2019, as part of the annual WSIS Forum 2019.
439. In 2019 contest the 90 WSIS Prizes champions were recognized through the Online Voting phase, with more than 2 million votes received from the WSIS Community during the Online Voting Phase from more than 120,000 voters from around the world. Their projects are among the most voted ones and have gained one of the best reviews by the members of the Expert Group. Among the five selected projects per each of 18 categories, one is the Winner, while other runner-ups are WSIS Prize Champion.
440. The WSIS Prizes contest values the incredible innovations made by different stakeholder entities. Comprising of 18 different categories which are directly linked to the WSIS Action Lines outlined in the Geneva Plan of Action, the WSIS Prizes contest this year had over 240 projects submitted from governments of various countries, 97 projects were submitted by business sector entities, while the civil society entities gave a contribution of 82 projects. International organizations and other entities together submitted over 100 projects for the WSIS Prizes contest.



441. The submission phase which began from 5 July 2018 to 12 December 2018 received a record number of 1,141 project submissions, out of which 1,061 exceptional projects were nominated for WSIS Prizes 2019. More than 2 million online votes were cast from 21 December till 10 February 2019 for these projects and following a comprehensive review by the Expert Group lead to the selection of 90 extraordinary ICT-related projects and initiatives for the seventh edition of the WSIS Prize contest.



442. In line with the inclusive, multi-stakeholder character of the WSIS Process, the prizes recognize the outstanding achievements of a wide range of organizations. This year's 18 Winners, by WSIS Action Lines, are:

[Category 1 AL C1. The role of governments and all stakeholders in the promotion of ICTs for development](#)

[The e-payment of social security contributions](#)

[National Social Insurance Fund \(CNAS\)](#)

[Algeria](#)

[Category 2 AL C2. Information and communication infrastructure](#)

[The Village Broadband Internet Project](#)

[Ministry of Digital Economy and Society](#)

[Thailand](#)

[Category 3 AL C3. Access to information and knowledge](#)

[United libraries portal - free knowledge for all](#)

[St. Petersburg State Unitary Enterprise "St. Petersburg Information and Analytical Centre"](#)

[Russian Federation](#)

[Category 4 AL C4. Capacity building](#)

[Capacity Building through end-to-end ICT enabled "Utkarsh Bangla" programme](#)

Paschim Banga Society for Skill Development, Dept of Technical Education, Training & Skill Development, Govt. of West Bengal

India

Category 5 AL C5. Building confidence and security in use of ICTs

Data Encryption Leak-proof and Tamper-resistant Network System Based on Quantum Communication Trunk Line

China United Telecommunications Co., Ltd.

China

Category 6 AL C6. Enabling environment

Establishment of Bangladesh National Digital Architecture (BNDA) and e-Government Interoperability Framework (e-GIF)

Bangladesh Computer Council

Bangladesh

Category 7 AL C7. ICT applications: benefits in all aspects of life — E-government

Licenses Portal

Ministry of Environment Water & Agriculture

Saudi Arabia

Category 8 AL C7. ICT applications: benefits in all aspects of life — E-business

BnC Bot

BnC Bot (Bot Bán Hàng)

Viet Nam

Category 9 AL C7. ICT applications: benefits in all aspects of life — E-learning

Generative Schools

University of La Punta

Argentina

Category 10 AL C7. ICT applications: benefits in all aspects of life — E-health

E-Health Mato Grosso (Telessaude Mato Grosso)

Ministry of Health

Brazil

Category 11 AL C7. ICT applications: benefits in all aspects of life — E-employment

Digital Jobs Africa

The Rockefeller Foundation

United States of America

Category 12 AL C7. ICT applications: benefits in all aspects of life — E-environment

A less intrusive rhinos conservation, a hope for endangered species

Sigfox Foundation

France

Category 13 AL C7. ICT applications: benefits in all aspects of life — E-agriculture

Swift Vee (Livestock)

mLab Southern Africa

South Africa

Category 14 AL C7. ICT applications: benefits in all aspects of life — E-science

IRAN National Research and Education Network

IRAN National Research and Education Network

Iran (Islamic Republic of)

Category 15 AL C8. Cultural diversity and identity, linguistic diversity and local content

Uganda Computer Aid

Musabe Foundation

Uganda

Category 16 AL C9. Media

Working in ICT is cool

Chamber of Information and Communication Technologies (Cámara de Tecnologías de Información y Comunicación)

Costa Rica

Category 17 AL C10. Ethical dimensions of the Information Society

Artificial Intelligence (AI) Governance and Ethics Initiatives in Singapore

Personal Data Protection Commission, Infocomm Media Development Authority

Singapore

Category 18 AL C11. International and regional cooperation

UAE Space Agency Global Efforts in Partnership Sustainable Development

UAE Space Agency

United Arab Emirates

Detailed descriptions of all WSIS Prizes 2019 winning projects are available [here](#).



It is critical to highlight the importance of the multistakeholder and bottom-up approach that is the essential philosophy of the WSIS Forum. Stakeholders highly appreciated the multi-stakeholder approach of the contest and highlighted the importance of the continuation of this contest to serve as a mechanism to recognize stakeholders for their efforts on the implementation of WSIS outcomes.

443. The principal role of the WSIS Stocktaking exercise is to collect information, share knowledge and experiences and leverage the activities of stakeholders working on the implementation of WSIS outcomes. In this context, WSIS Stocktaking process provides a portal of best practices for stakeholders seeking updated information on the progress of implementation of WSIS outcomes. All stakeholders benefit from the sharing of interesting case studies, as this undoubtedly facilitates the transfer of knowledge, experiences and models for project implementation. The WSIS Platform helps to create partnerships and to provide greater visibility and add value to ICT projects all around the world.

444. All stakeholders are urged to encourage their networks to join the WSIS Prizes process, including the multistakeholder open consultation process for the WSIS Forum 2020, in order to ensure that all features correspond to the real needs of the WSIS implementation process towards 2025. Phase one will open the call for submissions to the contest of the WSIS Prizes 2020. All stakeholders are invited to submit WSIS related projects to the WSIS Prize 2020 contest. In order to process the submission, stakeholders are requested to complete the submission form for WSIS Prize 2020 online at www.wsis.org/prizes by deadline (soon to be announced).

445. ICTs are enablers for sustainable development, and reporting on ICT success stories to best showcase the possible achievement of SDGs is the major objective of WSIS Stocktaking process, including WSIS Prizes, as already recognized and anticipated by the WSIS stakeholders community. The contest thus comprises 18 categories which are linked to the 11 WSIS Action



Lines outlined in the Geneva Plan of Action and SDGs. Submitted projects are to be recognized solely for the 18 categories covering the 11 WSIS Action Lines.

WSIS Prize 2020:

446. ITU is pleased to announce that the WSIS Prizes 2020 Call, 9th edition of this major global exercise in recognizing best ICT practices that are implementing the WSIS Action Lines and advancing the Sustainable Development Goals, will soon be launched.

447. Phase 1 will open the call for submissions to the contest of the WSIS Prizes 2020. During this phase, all stakeholders are invited to submit WSIS related project to the WSIS Prizes 2020 contest.

(d) WSIS Stocktaking Portal

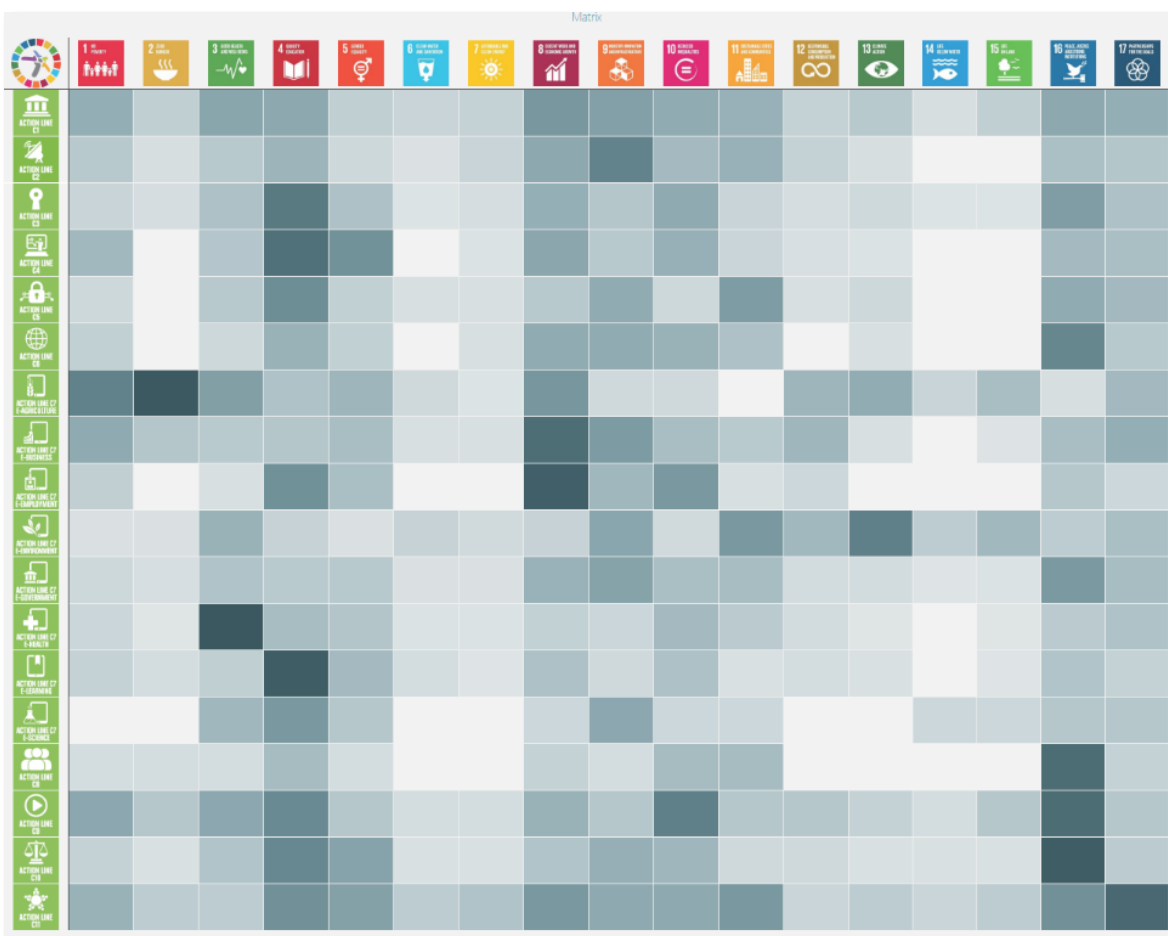
448. All stakeholders benefit from the sharing of interesting case studies, by the undoubtedly facilitation of the transfer of knowledge, experiences, and models for project implementation. The WSIS Stocktaking platform, launched in February 2010, helps to create partnerships, provide greater visibility, and add value to ICT projects all around the

world. The many and varied stakeholders who have implemented innovative projects and contributed to the success of the WSIS Stocktaking process deserve our sincere gratitude.

449. WSIS Stocktaking Portal provides a repository of best practices for stakeholders seeking updated information on progress in the implementation of WSIS outcomes (§ 28.e of the Geneva Plan of Action). The WSIS Stocktaking Platform, transformed the previous static database into a unique portal to highlight ICT-related projects and initiatives in line with WSIS implementation. The platform offers stakeholders exciting and interactive networking opportunities via Web 2.0 applications.
450. The principal role of the WSIS Stocktaking exercise is to leverage the activities of stakeholders working on the implementation of WSIS outcomes and share knowledge and experience of projects by replicating successful models designed to achieve SDGs. The WSIS Stocktaking process was initiated in October 2004 during the Tunis phase of WSIS, and in the years since then it has come to comprise the database of:
- exchanges of information on projects,
 - sharing of best practices of certain regions,
 - initiatives related to the implementation of the 11 WSIS action lines
 - linkages between the 11 action lines and the Sustainable Development Goals (SDGs) - a linkage that became an essential guidelines of the WSIS Stocktaking process.
451. The WSIS Stocktaking process provides a register of activities, including, projects, programmes, training initiatives, conferences, websites, guidelines, tool-kits, etc., carried out by governments, international organizations, the private sector, civil society and other entities. To that end, in accordance with of the Tunis Agenda for the Information Society (TAIS) adopted by WSIS, ITU has been maintaining the WSIS Stocktaking Database as a publicly accessible system providing information on ICT-related initiatives and projects with reference to the 11 WSIS action lines (Geneva Plan of Action) and 17 SDGs.
452. As in 2015, the UN General Assembly within the framework of the ten year review of the WSIS (Res.A/70/125) called for a close alignment between the WSIS process and the 2030 Agenda for Sustainable Development (Res.A/70/1). The WSIS Stocktaking process responded by highlighting the contribution of 11 WSIS Action Lines to the achievement of 17 Sustainable Development Goals (SDGs).
453. The direct linkages between the WSIS action lines and the SDGs set out below are crucial to continuing to strengthen the impact of ICTs for sustainable development. Each UN action line facilitator has analyzed the connections and relations between their respective action lines and the proposed SDGs and their targets to create a clear and direct linkage and an explicit connection between the key aim of WSIS - that of harnessing the potential of ICTs to promote and realize the development goals – and the post-2015 development agenda, so as to contribute to realization of the latter.
454. At the WSIS Forum 2015, the SDG matrix was extremely well received by the WSIS community, offering as it does a better explanation of the potential of ICTs as enablers for sustainable development. A new component was introduced in the WSIS Stocktaking process in the form of reporting ICT success stories to best showcase the possible

achievement of SDGs through the implementation of WSIS action line-related projects. The majority of the collected submissions in 2019 clearly showcase the linkage between their related action lines and the various SDGs and targets.

- 455. WSIS Stocktaking Platform was introduced in 2010, providing a repository of best practices for stakeholders seeking updated information on progress in the implementation of WSIS outcomes (§ 28.e of the Geneva Plan of Action), continues to foster implementation of the WSIS outcomes and to facilitate exchange of information among its community of 350,000 WSIS Stakeholders representing governments, the private sector, international organizations, civil society, and others. We continue to maintain and improve the WSIS Stocktaking Database, which contains more than 11,000 entries so far. This encouraging outcome reinforces stakeholders’ belief in and commitment to the WSIS Stocktaking process and their desire to share best practices.
- 456. New WSIS Stocktaking products were introduced in 2018 with positive feedback from the WSIS stakeholders who showed much interest in using them. One such products has been designed in a form of an interactive matrix that is to be used as a graphical representation of WSIS and SDG data collected through the implementation of the WSIS Stocktaking process, where the individual values contained in a matrix are represented colorfully:



- 457. Shifting from theory to practice and impact, using the data from the WSIS Stocktaking platform, including projects submitted for the WSIS Prizes in past two years (when we have

started to reflect on SDGs), the objective of this product is to draw conclusions from the automated matrix providing strength of proposed links between WSIS Action Lines and SDGs, and the analysis of connections and relations between the respective Action Line with the proposed SDGs and their targets, as proposed by each Action Line Facilitator.

458. Furthermore, using the data provided for the WSIS Stocktaking process since 2016, in cooperation with the WSIS Prizes 2016 Champion, AgriNeTT from the University of West Indies, Trinidad and Tobago, the WSIS team has been developing a mobile application aiming to provide information on the linkages between WSIS Action Lines and SDGs. The



launch of this application took place during the World Café on WSIS Stocktaking at the WSIS Forum 2017, providing a quick access to relevant information on WSIS Action Lines and SDGs to WSIS Stakeholders community at the Forum and beyond. It portrays the WSIS-SDG Matrix, developed at WSIS Forum 2015 together with the UN Action Line Facilitators, with detailed information on each WSIS Action Line and SDG. New edition of the application is soon to be released showing the linkages on the ground by listing the projects submitted for the WSIS Stocktaking in past two years, since we started monitoring SDG process within the WSIS Stocktaking. This application was much appreciated and welcomed by the community at the WSIS Forum 2018 with a vibrant discussion on how to best use it, while new features were proposed to be considered in the future editions.

459. In 2017, as requested by the WSIS community during the WSIS Forum 2017, we have developed a **WSIS Stocktaking embeddable interface**, product that has much potential in expending the WSIS Stocktaking process through the WSIS multistakeholder community by uploading the WSIS Stocktaking platform in a form of an iFrame on portraying it on their websites and platforms. In 2018 we continue to develop this interface because we are convinced that Stocktaking is one of the best ways to collect and share projects and success stories. Thanks to this interface, the visitors are able to view live entries (live results are customizable upon a particular WSIS



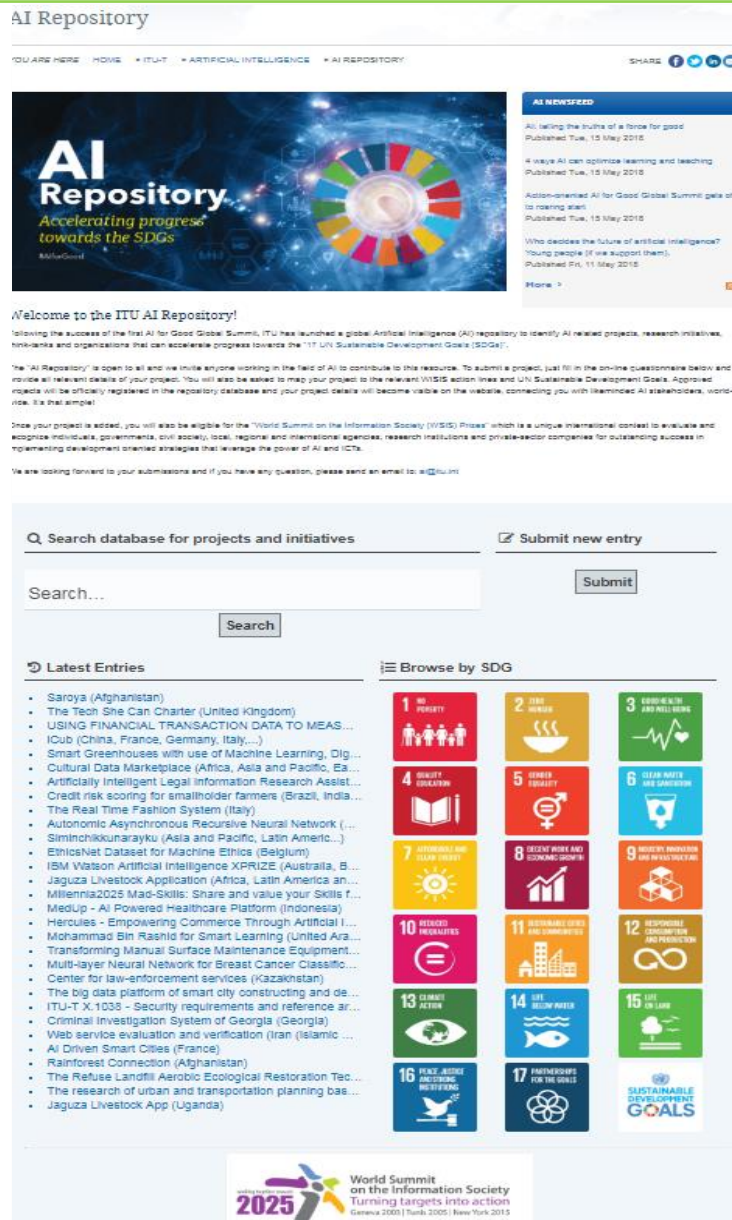
Action Line or SDG or region or other data focus relevant to the user), search the WSIS stocktaking database within partners' websites environment, and to submit ICT-related projects from the embeddable WSIS Stocktaking interface for the WSIS Prizes contests or for the WSIS Stocktaking reports:

- WSIS Stocktaking ensuring the opportunity for expanded collection of ICT projects and initiatives with NEW embeddable interface
- Embed this iframe on your websites facilitating sharing local success stories with global community
- Enrich content of your web site sharing the good ICT for SDG practices from all over the world

460. We encourage all WSIS Stakeholders to consider using this new WSIS Stocktaking product and:

- ❖ Provide opportunity for their networks and communities to SEARCH on collected ICT projects by WSIS Action Lines or SDGs
- ❖ Provide opportunity to their website visitors to join global effort and SUBMIT many ICT projects under the radar

461. In collaboration with the Telecommunication Standardization Bureau (TSB) of ITU, WSIS Stocktaking has produced a customized segment of the online platform, serving for the benefits of AI Repository for collecting international best practices of the artificial intelligence (AI) for development, striving to provide tangible overview of projects and initiatives in this emerging field. Although customized for the needs of the AI for Good Global Summit and TSB objectives, the inputs are also be reflecting the essential components of the WSIS Stocktaking, namely all inputs will reflect projects' implementation of the WSIS Action Lines and how ICTs are advancing sustainable development around the world using AI technology. Within last year, more than 140 AI Projects were collected. All submitted projects were also considered for the WSIS Prizes 2019 contest.



The screenshot shows the ITU AI Repository website. At the top, it says "AI Repository" and "Accelerating progress towards the SDGs". Below this is a "Welcome to the ITU AI Repository!" section with introductory text. A search bar is present with the text "Search database for projects and initiatives" and a "Submit new entry" button. Below the search bar, there are two columns: "Latest Entries" with a list of project titles and "Browse by SDG" with a grid of 17 Sustainable Development Goal icons. The bottom of the page features the World Summit on the Information Society logo and text.

462. We invite all ICT4D community stakeholders to visit the ITU AI Repository and explore latest entries and browse by SDGs, search for good AI practices advancing sustainable development worldwide, and submit AI-related projects and initiatives and be globally recognized.

463. We invite all stakeholders to take part in this unique opportunity towards evidence based policy making and promote it within different communities and networks. The WSIS Team will provide the necessary information, sufficient to test and run the interface, upon request.

464. The WSIS Stocktaking process has been maintained by ITU since 2004 as requested by the WSIS Outcomes (TAIS, Para 120). This publicly accessible WSIS Stocktaking database (here), currently with close to 11,000 entries and a growing up community of 350,000 stakeholders, is a unique global tool for collecting information and regular reporting on information and communication technology related initiatives and projects, carried out by governments,

international organizations, civil society, the private sector, academia and other entities, in the context of the 11 WSIS Action Lines.

465. The new call for update and new entries 2019-2020 will be open in June 2019 and we invite you to submit entries online at www.wsis.org/stocktaking. Submitted activities will be reflected in various forms in the WSIS Stocktaking 2020 (reports, exhibitions, videos etc.) which will be released at WSIS Forum 2020 to be held on 6-9 April 2020 at ITU headquarters, Geneva. We look forward to receiving your responses to this call. Timeline of this process will soon be announced.

(e) WSIS Stocktaking Publications

466. This year, **1,141 ICT-related projects** from around the world were submitted for the Report on the WSIS Stocktaking 2019 by the WSIS Stakeholder community. The tenth edition of the Report on WSIS Stocktaking set a new record of global multistakeholder engagement in implementation of WSIS action lines for SDGs. The Report was presented during the WSIS Forum 2019, 8–12 April 2019 in Geneva. At the same occasion, an interactive session was dedicated to the presentation of the results of this year's WSIS Stocktaking and to listening to the voices of the WSIS stakeholders' community on how to improve the process in the future.



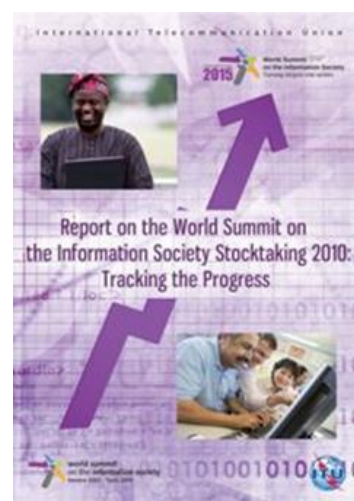
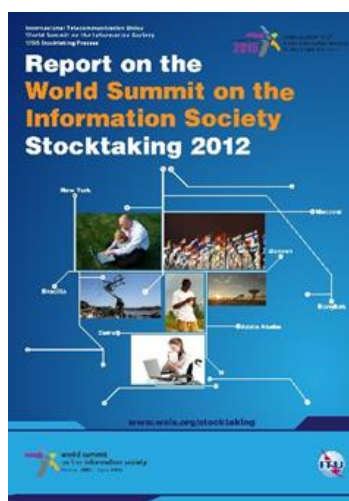
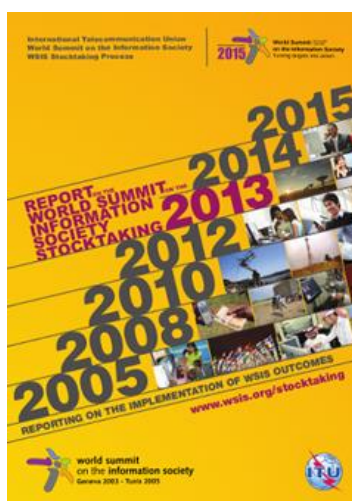
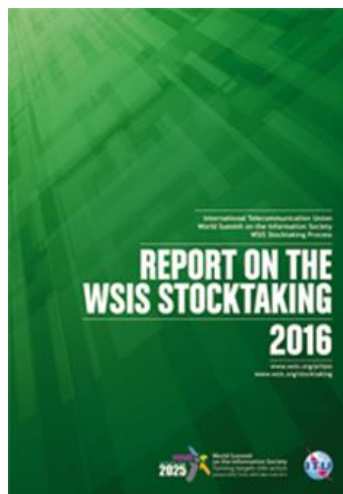
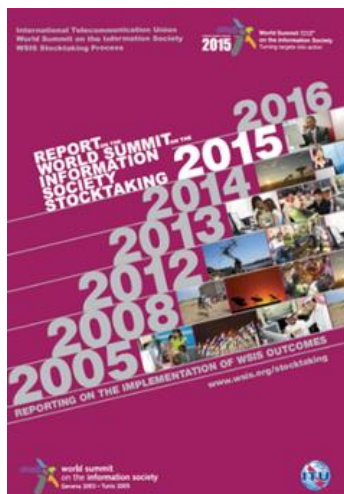
467. The 2019 edition of the Report on the WSIS Stocktaking is the continuation of the series. This tenth edition reflects around 1,061 activities relating to ICTs for development, submitted to the WSIS Stocktaking Platform from the 5 July 2018 to the 12 December 2018, each one highlighting the efforts deployed by stakeholders involved in the implementation of the SDGs. The Report is based on the multistakeholder approach, including input from stakeholders from all over the world responding to ITU's official call in 2018 for Stocktaking updates and new entries. The inputs from WSIS action line facilitators and co-facilitators also contributed to the present Report.

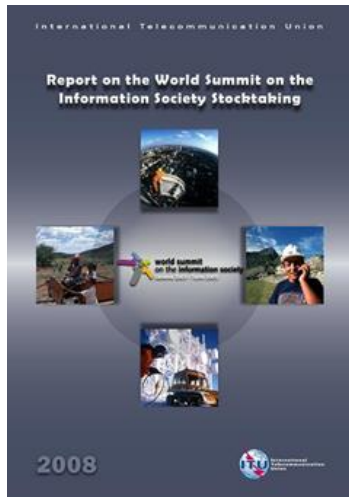
468. The WSIS Stocktaking database (www.wsis.org/stocktaking) was introduced in 2010 and currently has 11,000+ entries and a growing community of 350.000 stakeholders. It is a unique global tool for collecting information and regular reporting on information and communication technology related initiatives and projects, carried out by governments, international organizations, the business sector, civil society, academia and other entities, in the context of 11 WSIS Action Lines. The WSIS Stocktaking process has been maintained by ITU since 2004 as requested by the WSIS Outcomes (TAIS, Para 120).

469. Since the WSIS Stocktaking Process was established, eleven editions of global WSIS Stocktaking Reports have been published, providing an overall picture of progress and an insight into latest WSIS-related activities. Since the 2016 Report, all reports also focused on contributions by stakeholders worldwide to WSIS and Sustainable Development Goals. The 2019 Report seeks to provide key findings on emerging trends in the development of the

information society, and references major activities being implemented in the eighteen areas covered by the eleven WSIS action lines and seventeen SDGs.

470. All WSIS-related publications, including the WSIS Stocktaking reports (2004-2019), are available to download at the [ITU Bookshop](http://www.itu.int/itu-bookshop/).





471. WSIS Stocktaking continues to also report on the progress made in the six ITU regions: Africa, Americas, Arab States, Asia and Pacific, CIS, and Europe. Following the first series of the WSIS Stocktaking Regional Reports portraying projects submitted in the period 2014-2016, the second series of Regional WSIS Stocktaking Reports were produced for the period 2016-2018 and presented during the WSIS Forum 2018. The following series of the WSIS Stocktaking Regional Reports 2018-2020 is planned for the WSIS Stocktaking reporting in 2020. All WSIS Stocktaking publications are available at the ITU Bookshop.



472. The United Nations Economic and Social Council (ECOSOC) resolution 2018/28 on "Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society" reiterates the importance of sharing best practices at the global level, and, while recognizing excellence in the implementation of the projects and initiatives that further the WSIS goals, encourages all stakeholders to submit ICT-related projects and initiatives to the WSIS Stocktaking platform.
473. The same Resolution also reiterates the importance of recognizing excellence in the implementation of the projects and initiatives that further the goals of the World Summit on the Information Society process, and encourages all stakeholders to nominate their ICT-related projects for the annual WSIS Prizes contest as an integral part of the WSIS Stocktaking process. With the year-round ongoing call for updates and new entries, all stakeholders are invited to continue sharing best practices on the WSIS Stocktaking Platform and emphasize how ICT-related initiatives and projects are enabling SDGs.

(f) Launch of the WSIS Forum Photo Competition 2019

474. The World Summit on Information Society (WSIS) Forum launched in 2017 its first-ever photo contest – asking WSIS stakeholders community to picture a more sustainable world, with the theme: Information and Knowledge Societies for Achieving the Sustainable Development Goals. Following the successful first edition, we will continue to exercise the Photo Contest and invite the community to picture how Information and Communication Technologies are playing an enabling role in achieving the Sustainable Development Goals. Participate in building a collage of ICT for Sustainable Development photographs from around the world by promoting the Photo Contest within your networks and communities. The deadline to submit photos was on 10 February 2019.
475. WSIS Forum invited the community to picture how Information and Communication Technologies (ICTs) are playing an enabling role in achieving the Sustainable Development Goals (SDGs). Photographers from around the globe were invited to share photo submissions that demonstrate this year’s theme of “Information and Communication Technologies for achieving the Sustainable Development Goals”.
476. The three winning entries in the WSIS photo contest were presented at the WSIS Forum 2019 8-12 April 2019 in Geneva, Switzerland. In addition the winners were invited to join ITU’s #ICT4SDG campaign. A dedicated Photo Exhibition was set up at the WSIS Forum 2019 attracting many visitors and positive feedback, and it continues to be exposed in the ITU HQ. All photos are also reflected in the [WSIS Stocktaking Report 2019](#).



Use of ICTs in learning

Pupils at Kacgae Primary School using ICTs in learning. Classes are offered by Ms. Felicity Kedidimetse, the UASF IT Officer placed at the school. She also offers ICT classes to teachers and members of the community in the remote village of Kacgae.



The peasant woman

Mobile phones have become an indispensable communication terminals during the current period of rapid information development. Even in the poor and backward areas of Daliangshan, the peasants are using mobile phones. Daliangshan, southwest China's Sichuan Province



The fascinations of village kids about the computer

Internet and similar technologies are rarely to be found in villages. It is still a very rare sight to see villagers using internet, while as we all know, it might help people in so many ways. Desa Simanindo, Samosir

(g) Exhibition

477. WSIS Forum 2019 gathered more than 40 exhibitors from Civil Society, Academia, International Organizations, Private Sector, and Governments. The exhibition set the stage that encouraged all stakeholders to share their initiatives for a more effective Information



Society. Exhibitors prepared a number of ground-breaking and innovative projects, including Virtual Reality, Augmented Reality and autonomous robots, as potential solutions to specific issues that will advance the achievement of the SDGs. Moreover, the photo gallery displaying images from the WSIS Photo Contest finalists and winners optimized the exhibition experience for more than 3,000 WSIS attendees from more than 150 countries.

At 10:45 AM, April 8th, 2019, the exhibition inauguration was honoured by Mr. Houlin Zhao, the Secretary General of ITU, and H.E Majed Sultan Al Mesmar, Deputy Director General of the Telecommunications Regulatory Authority (TRA) of the United Arab Emirates, as well as the WSIS Forum 2019 Chairman, H.E. Mr. Mustafa Jabbar, Minister, Ministry of Posts, Telecommunications and Information Technology, Bangladesh.

478. The exhibition of WSIS Forum 2019 was also privileged to host such an interestingly diverse range of other exhibitors, as mentioned before, from Civil Society, Academia, International Organizations, Private Sector, and Governments, all with a common goal to use ICTs for development. The thematic topics were as multidisciplinary as they were groundbreaking and focused on the following categories:

- WSIS Action Lines and SDGs
- VR and education
- E-Business
- E-agriculture
- ICTs and health
- Development through crowdfunding
- Information Accessibility • Social network and entrepreneurship
- Internet of Things (IoT) for development
- Mobile remote presence devices (MRPs) for remote participation
- Emerging legal principles in the regulation of cyber security

479. In addition to the wide range of thematic topics from many organizations across assorted sectors, the participation and involvement of women, due to a proactive inclusion, and youth, special thanks to Ecole La Découverte, was very noticeable, which is merely one step forward in the effort to achieve the SDGs. WSIS Forum continually endeavors to be as inclusive as possible, though not without challenges, in hopes to yearly increase the participation of underrepresented stakeholders.

(h) Hackathons and World Café



Hackathon Winners

1. **Best pitch: Team Oslomet, Norway**
2. **Highest Potential impact: Team WHA, USA**
3. **Most creative application idea: Team PeerEd, Zimbabwe**

480. World Café

World Café is the ideal multi-stakeholder platform, enabling active involvement of each and every participant to explore key questions about the successful implementation of the WSIS Action lines at international, regional and local level, while addressing challenges towards achieving the Sustainable Development Goals (SDGs). This collaborative format facilitates brainstorming trends, challenges and opportunities in the ICT Ecosystem and further development of the Information and Knowledge Societies.

During the World Café “15 Years of implementation of Geneva Plan of Action – Looking towards 2025”, stakeholders had the opportunity to discuss and explore the insights, and actions that these Winners and Champions take for the promotion of their projects in their homeland. This World Café gave a glimpse into the success stories around the world as delivered by the WSIS Prizes 2019 Winners and Champions in which ICTs are used to enable grassroots enhancement and how they are paving the way to achieving development in all segments of life. It has also provided a platform to discuss the trials and triumphs of

implementing ICT4SDG, focusing on the mechanisms that will further enhance “taking stock” of ICT progress and implementation of effective policies from the multi-stakeholder perspective. Highlighting the importance of identifying good practices around the world, discussions were enriched by the presence of WSIS Prize Winners and Champions, who had share and present their innovative projects and ideas.

This was a unique opportunity to meet-the-winners and champions and learn from their valuable experience. This exchange has also yield insights into concrete ways in which WSIS can help them to promote their project on their platform.

(i) **The Global Cyber Security Agenda (GCA)**

481. In May 2007, ITU launched the GCA: a framework for international cooperation in cyber security. The GCA has seven main strategic goals and is built around the following five work areas or pillars: (1) Legal Measures; (2) Technical and Procedural Measures; (3) Organizational Structures; (4) Capacity Building; and (5) International Cooperation. It acts on existing national and regional initiatives to avoid duplication of work and encourage collaboration amongst all relevant partners. Within the overall framework of the cyber security agenda (GCA), ITU along with its partners, are deploying joint services. These services harmonize, at the international level, different national approaches to better prepare countries to face cyber threats and solve cyber-attacks. This is achieved through information sharing, awareness raising and trainings programs. The momentum generated by the GCA and the broad nature of this ITU initiative have resulted in interest from other stakeholders and opportunities for collaboration and cooperation. More on activities under the GCA can be found in the Section on Action Line C5: Building Confidence and Security in the use of ICTs.

(j) **Connect 2020 Agenda for global telecommunication/ICT development**

1. Background

482. At the 2018 Plenipotentiary Conference (PP-18), ITU Member States adopted Resolution 200 (rev. Dubai, 2018): “Connect 2030 Agenda for global telecommunication/information and communication technology, including broadband, for sustainable development”, establishing a set of global targets to be achieved by the whole Union by 2023 in the areas of growth, inclusiveness, sustainability, innovation and partnerships in the telecommunication/ICT sector.

483. Resolution 200 invites ITU Member States to participate actively in the implementation of the Connect 2030 Agenda; to contribute with national, regional, and international initiatives; to provide data and statistics, as appropriate, to monitor progress towards the achievement of the Connect 2030 goals and targets; and to engage all stakeholders through the promotion of partnerships around the Connect 2030 Agenda.

484. At PP-18, ITU Member States also adopted Resolution 71 (Rev. Dubai, 2018): “Strategic plan for the Union for 2020-2023”, which incorporates the Connect 2030 goals and targets into the framework of ITU’s strategic plan for the 2020-2023 period.

2. Progress for the reporting period

Measurement, monitoring and reporting

485. The five goals of the Connect 2030 Agenda include 24 targets, designed to provide an indication of progress towards the achievement of the goals up to 2023.
486. Section 2.b of Annex 2 to Resolution 71 (rev. Dubai, 2018), “Situational Analysis”, provides an analysis on the progress of the targets of the precedent Connect 2020 Agenda (a set of 17 targets included in the Strategic Plan 2016-2019 adopted at PP-14), based on the indicators and statistics collected and provided by the Telecommunication Development Bureau and other sources. The latest progress towards this former Connect 2020 Global Telecommunication/ICT Targets are presented in the 2018 Report on Implementation of the Strategic Plan and Activities of the Union presented to Council 2019. Regarding Connect 2030 goals and targets, the first progress report should be presented to Council 2020.
487. Roadmaps and methodologies have been developed or are under consideration by the ITU Statistics Dept., in order to be able to report on their progress achieved towards those targets.

Operationalization of the ITU Strategic Plan 2020-2023

488. The ITU secretariat contributed to the progress towards the Connect 2030 Agenda through the implementation of the operational plans of the three Sectors and the General Secretariat.

Contribution of the Connect 2020 Agenda to the Sustainable Development Goals

489. In order for ITU to respond to the needs of its constituents with regards to the 2030 Agenda for Sustainable Development, the secretariat developed the ‘ITU SDG mapping tool’, aiming to provide a comprehensive visual overview of how the ITU strategic framework and Connect 2030 Agenda contribute to the Sustainable Development Goals (SDGs). The tool visualizes the mapping and the linkage of the ITU strategic framework, Connect 2030 Agenda, WSIS Action Lines and the SDGs and Targets. It is also now linked to the WSIS Stocktaking DB and allows for third parties to publish success stories.

Example: Three map of SDG mapping to ITU activities:



Example: Three map of SDG mapping to activities on the WSIS Stocktaking DB:



Roadmap for 2020

490. ITU will further advance the implementation of Connect 2030 by the end of the year through:

- a) *Measurement, monitoring and reporting*: Effective measurement and data analysis is key in meeting the needs of policy-makers and practitioners. Further work required in specific cases to define measurement methodologies will be continued.
- b) *Coordinated implementation of the ITU strategic and operational plans contributing to the Connect 2030 Agenda*: Ensuring inter-sector coordination on the cross-sectoral thematic areas covered by the Connect 2030 Agenda goals and targets will ensure maximizing the impact of ITU's work.

3. Measurement and reporting status of Connect 2030 goals and targets

Goal / Target	Status
GOAL 1: GROWTH – Enable and foster access to and increased use of telecommunication/ICTs in support of the digital economy and society	
<ul style="list-style-type: none"> Target 1.1: By 2023, 65% of households worldwide with access to the Internet Target 1.2: By 2023, 70% of individuals worldwide will be using the Internet Target 1.3: By 2023, Internet access should be 25% more affordable (baseline year 2017) 	Targets 1.1 to 1.3 are measured in a yearly basis in the Annual report (see 2018 Report). Targets 1.4 to 1.7 are new and will be measured as from 2020

- Target 1.4: By 2023, all countries adopt a digital agenda/strategy
- Target 1.5: By 2023, increase the number of broadband subscriptions by 50%
- Target 1.6: By 2023, 40% of countries to have more than half of broadband subscriptions more than 10 Mbit/s
- Target 1.7: By 2023, 40% of the population should be interacting with government services online

GOAL 2: INCLUSIVENESS – Bridge the digital divide and provide broadband for all

- Target 2.1: By 2023, in the developing world, 60% of households should have access to the Internet
- Target 2.2: By 2023, in the least developed countries, 30% of households should have access to the Internet
- Target 2.3: By 2023, in the developing world, 60% of individuals will be using the Internet
- Target 2.4: By 2023, in the least developed countries, 30% of individuals will be using the Internet
- Target 2.5: By 2023, the affordability gap between developed and developing countries should be reduced by 25% (baseline year 2017)
- Target 2.6: By 2023, broadband services should cost no more than 3% of average monthly income in developing countries
- Target 2.7: By 2023, 96% of the world population covered by broadband services
- Target 2.8: by 2023, gender equality in Internet usage and mobile phone ownership should be achieved
- Target 2.9: By 2023, enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities should be established in all countries
- Target 2.10: By 2023, improve by 40% the proportion of youth/adults with telecommunication/ICT skills

Targets 2.1 to 2.9 are measured in a yearly basis in the Annual report (see [2018 Report](#)). Target 2.10 is new and will be measured as from 2020

GOAL 3: SUSTAINABILITY – Manage emerging risks, challenges and opportunities resulting from the rapid growth of telecommunications/ICT

- Target 3.1: By 2023, improve cybersecurity preparedness of countries, with key capabilities: presence of strategy, national computer incident/emergency response teams and legislation
- Target 3.2: By 2023, increase the global e-waste recycling rate to 30%
- Target 3.3: By 2023, raise the percentage of countries with an e-waste legislation to 50%
- Target 3.4: By 2023, net telecommunication/ICT-enabled Greenhouse Gas abatement should have increased by 30% compared to the 2015 baseline

Targets 3.1 and 3.2 are measured in a yearly basis in the Annual report (see [2018 Report](#)). Targets 3.3 to 3.5 will be measured as from 2020

<ul style="list-style-type: none"> Target 3.5: By 2023, all countries should have a National Emergency Telecommunication Plan as part of their national and local disaster risk reduction strategies 	
GOAL 4: INNOVATION –Enable innovation in telecommunications/ICT in support of the digital transformation of society	
<ul style="list-style-type: none"> Target 4.1: By 2023, all countries should have policies/strategies fostering telecommunication/ICT-centric innovation 	ITU is working with partners to develop indicators to measure achievement of Target 4.1
Goal 5 – PARTNERSHIP: Strengthen cooperation among the ITU membership and all other stakeholders in support of all ITU strategic goals	
<ul style="list-style-type: none"> Target 5.1: By 2023, increased effective partnerships with stakeholders and cooperation with other organization and entities in the telecommunication/ICT environment 	ITU is working with partners to develop indicators to measure achievement of Target 5.1

(k) Broadband Commission for Sustainable Development

491. In May 2010, ITU and UNESCO established the Broadband Commission for Sustainable Development, in response to calls by the UN Secretary-General Mr. Ban Ki-moon to step up efforts by the UN to accelerate progress towards the MDGs. The Commission believes that expanding broadband access in every country will be key to achieve the Sustainable Development Goals (SDGs), and it defines practical ways in which countries at all stages of development can achieve this, in cooperation with the private sector.
492. The Broadband Commission is a significant UN inter-agency initiative and high-profile advocacy group for the benefits of broadband and has succeeded in boosting broadband up the international agenda. Commissioners represent governments from around the world, academia, relevant industries, international agencies and development organizations, and are all leaders in their field. The group is co-chaired by H.E. President Paul Kagame of Rwanda and Mr Carlos Slim Helú, President of Carlos Slim Foundation, with ITU Secretary-General Mr Houlin Zhao, and UNESCO Director-General, Ms Audrey Azoulay, serving as joint Vice-Chairs.
493. The Broadband Commission believes that high-speed, high-capacity broadband connectivity to the Internet is essential in modern society, with wide economic and social benefits. It aims to promote the adoption of broadband-friendly practice and policies, so the entire world can take advantage of the benefits. It defines strategies for accelerating broadband roll-out worldwide and examine applications that could see broadband networks improve ICT delivery in healthcare, education, environmental management, safety and across society.
494. Every year, the UN Broadband Commission publishes its annual 'State of Broadband' report in September to take the pulse of the global broadband industry and to explore progress in connecting everyone on the planet via broadband. In 2018 a new report issued by the Broadband Commission showed that a growing number of governments now benchmark the status of broadband in their national broadband plans. This year, the report shows for the first time that at least 15 countries now have strategies in place for promoting the safe use of Artificial Intelligence.

495. Over the course of 2018, the Broadband Commission pursued a range of work through its Working Groups on: most vulnerable countries, digital health, digital entrepreneurship, epidemic preparedness, each of which published a report in 2018 . The Commission launched further Working Groups for the next year to be focused on among other topics on child online protection and the connectivity in Africa.
496. By issuing these reports, the UN Broadband Commission for Sustainable Development has made a worthy contribution to the debate about how best to expand broadband access and services and how to achieve digital inclusion for all. The Commission will continue working with many different stakeholders to achieve digital inclusion for all towards the forthcoming sustainable development goals (SDGs).
497. In addition to these reports, the Commission maintains an online portal with a wealth of online resources, country case studies, best practices and regulatory information, as well as the publicly available newsletter.
498. In addition to the working group activities, the Broadband Commission, hosts two regular face-to-face meetings each year to solicit feedback from regional constituents, including ministers and regulators, as well as members of the private sector. Broadband Commissioners debate key issues advance the work of the Commission and typically offer expertise and guidance to guest Ministers and VIPs.
499. The 2018 Spring Meeting of the Commission was held in Kigali, Rwanda, 6-7 May 2018 at the generous invitation of H.E. Mr Paul Kagame, President of Rwanda and the Broadband Commission Co-Chair. This meeting committed to concrete actions that will advance the roll-out of broadband around the world – and with it, much-needed digital connectivity, which is necessary for the achievement of the United Nations Sustainable Development Goals (SDGs). The session took place on the eve of the Transform Africa Summit 2018, being held 7-10 May, enabling the Commission to make available to Summit participants, its valuable expertise.
500. The Annual Fall meeting 2018 of the Commission was held in New York, on 22-23 September 2018 in parallel to the 73rd Session of the General Assembly of the United Nations also taking place in New York City. The meeting was preceded by three Working Group sessions on Saturday 22 September as well as the informal brainstorming meeting. Three groups released their concluding reports, including the Digital Entrepreneurship group, chaired by Andrus Ansip, Vice-President of the European Commission on Digital Entrepreneurship, the Working Group on Digital Health, co-chaired by The Novartis Foundation and Intel Corporation with the report: The Promise of Digital Health: Addressing Noncommunicable Diseases to Accelerate Universal Health Coverage in Low- and Middle-Income Countries, the group on Epidemic Preparedness, chaired by KT Corporation on Preventing the Spread of Epidemics using ICT; and the Digital Gender Divide group with the progress report 2018 on: Bridging the Gender Gap in Internet and Broadband Access and Use.
501. On Sunday 23 September, the Commission debated how to advance efforts to connect the world's nearly 4 billion people with no access to the internet – the world's other half. There was focus on how to disseminate the work of the Commission, as well as issues in relation to technology upgrades, 5G and digital infrastructure

502. In 2018 the Commission held a session at the WSIS Forum 2018. This meeting's objective presented the set of new Targets in the context of the current changes in the digital ecosystem and discuss them in relation to a previous set of Targets 2015. Broadband Commission for Sustainable Development 2025 Targets are the following ones:
1. By 2025, all countries should have a funded National Broadband Plan or strategy, or include broadband in their Universal Access and Service (UAS) Definition.
 2. By 2025, entry-level Broadband services should be made affordable in developing countries, at less than 2% of monthly Gross National Income (GNI) per capita.
 3. By 2025 Broadband / Internet user penetration should reach: 75% worldwide, 65% in developing countries, and 35% in least developed countries.
 4. By 2025, 60% of youth and adults should have achieved at least a minimum level of proficiency in sustainable digital skills.
 5. By 2025, 40% of the world's population should be using digital financial services.
 6. By 2025, overcome unconnectedness of Micro-, Small- and Medium-sized Enterprises should be reduced by 50%, by sector.
 7. By 2025, gender equality should be achieved across all targets.
503. Invited speakers explained the evolution of the Targets including the affordability, access, gender equality etc. While the WSIS Forum audience had a chance to interact with The Broadband Commission representatives and learn about the development of the Advocacy Agenda of the Broadband Commission in order to bring online the worlds 3.8 billion people not connected to the Internet. The session specifically served as a forum to discuss the role of all stakeholders in achieving these ambitious Targets contributing to the SDGs, as a milestone towards 2030.

(l) AI for Good Global Summit

Introduction

504. The 3rd edition of the AI for Good Global Summit was organized by ITU in Geneva on 28-31 May 2019, in partnership with XPRIZE Foundation, the Association for Computing Machinery (ACM) and 32 sister United Nations agencies and bodies.
505. Recognizing that all stakeholders should consider how AI will affect our future, the 2018 summit highlighted AI strategies and supporting projects to accelerate progress towards the United Nations Sustainable Development Goals. The action-oriented 2019 edition highlighted AI projects in fields including education, healthcare and wellbeing, social and economic equality, space research, and smart and safe mobility.
506. The event attracted more than 2300 attendees from more than 90 countries (38% women participants). It had 373 speakers from more than 45 countries with 35% women speakers.
507. The summit was designed to connected AI innovators with public and private-sector decision-makers. The matchmaking exercise introduced problem owners to solution owners, building collaboration to take promising strategies forward.

(m) Girls in ICT Day

508. ITU's flagship Girls in ICT Day raises visibility on the importance of attracting women and girls to ICT studies and careers. In 2019, Girls in ICT Day events were held in 102 countries around the world. ITU's own main event was held in Addis Ababa, Ethiopia and from now

on, the annual celebration will be held in a different region each year. The estimated total number of women and girls reached in 2019 could be as high as 20,000. That very impressive number testifies to the enormous momentum this event continues to generate around the world, and to the growing recognition of its importance by countries around the world.

509. An estimated 20,000 girls were reached by Girls in ICT Day 2019 events across 102 countries (more than half of ITU member states). Nearly 400 events were registered on the Girls in ICT Day Events Map for 2019, where organizers can post pictures, videos and descriptions of the results of their events. In terms of regional distribution, there were 43 events in Africa, 167 events in the Americas, 8 in Arab States, 79 in Asia and the Pacific, 7 in CIS Countries, 76 in Europe and an additional 6 events in other places. Awareness about Girls in ICT Day has been raised worldwide thanks to these events. On Twitter, the GirlsinICT hashtag was used in 21,319 tweets from 11,812 contributors, reaching 95,874,599 accounts for an estimated exposure of 344,436,854 timeline deliveries (during the week of 21-27 April 2019). On Instagram, #GirlsinICT reached 6,484,916 accounts. The Girls in ICT portal houses a toolkit and branding materials for organizers to use in their events.
510. As of 2019, over 377,000 girls and young women have taken part in more than 11,400 celebrations of International **Girls in ICT Day in 171 countries worldwide.**

(n) Equals in Tech Awards -2019

511. The Equals in Tech Awards initiative is designed to promote gender equality and mainstreaming in technology. The awards are part of EQUALS, an ITU and UN Women global partnership working to achieve gender equality in the digital age – with the support of a growing list of partner companies and non-governmental organizations. In addition to supporting gender equality in the ICT field and advancing the role of women as ICT decision-makers, the awards also showcase how ICTs can be used to dramatically improve social, political and economic outcomes for women and girls.
- 
512. The Equals in Tech Awards also bring valuable attention to all nominees and the important work that they are doing to bring tech to women and women to tech. As such, nominations are encouraged from all sectors – governments, companies, non-profit organizations, individuals, etc.
513. The nominated initiatives will be judged by a distinguished panel of partners and previous winners, recognized as Equals in Tech Advisors. Members include former award winners, and representatives of EQUALS Partners: ITU, UN WOMEN, International Trade Center.
514. The Equals in Tech Awards are presented in five categories:

Access: Develop gender-responsive ICT governance, policy and access: initiatives focused on new legislation, policy frameworks or internal corporate strategy to improve women's digital technology access, connectivity and security.

Skills: Encourage women and girls to pursue education in STEM studies: initiatives encouraging more women in the STEM field (science, technology, engineering and math), focusing on the development of more relevant content, and addressing and overcoming cultural and social barriers that women face when entering a STEM education.

Leadership: I Promote women in the technology sector: initiatives that promote gender equality in ICT careers,

Leadership II: Promote initiatives where girls and women are cultivated as creators, developers, leaders and decision-makers.

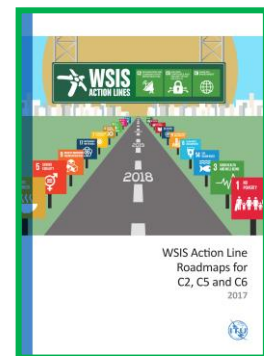
Research: Initiatives working to expand digital gender divide in support of evidence-based decision making.

515. The prestigious Equals in Tech Awards 2019 ceremony will be held in Berlin, Germany on 27 November.

For more information about the EQUALS initiative and awards, visit: www.equals.org

(o) Roadmaps for WSIS Action Lines C2, C5, C6

516. In line with its mandate and the WSIS outcome documents, the ITU continues to play a key role in the WSIS implementation and follow-up process, in particular, as the WSIS Action Lines Sole Facilitator for AL C2 (Information and Communication Infrastructure), AL C5 (Building Confidence and Security in the Use of ICTs), and AL C6 (Enabling Environment).



517. With the aim of strengthening the implementation mechanism, ITU Council 2009 agreed on the framework for roadmaps of ITU's activities in its role as the sole facilitator for the above mentioned WSIS action lines in the implementation of WSIS up to 2015. Highlighting the important role of ITU in implementing the WSIS Action Lines until 2025, revised resolution 1332 in para 3 under resolves instructs us to do the following with regard to the roadmap:

518. updating its WSIS Action Line Roadmaps for C2, C5, and C6 to account for activities underway to also achieve the 2030 Agenda for Sustainable Development;

519. providing input, as appropriate, *into the roadmap/work plans of WSIS Action Lines C1, C3, C4, C7, C8, C9 and C11, also related to the 2030 Agenda for Sustainable Development;*

520. Roadmaps are detailed plans to guide progress towards achieving WSIS goals, also related to the 2030 Agenda for Sustainable Development. They provide broad vision and detailed overview of the activities planned within the mandate of the Union. Direct links between the activities and the strategic goals and relevant resolutions, programmes and initiatives of the ITU are highlighted. The roadmaps include timeframes, expected results, impact on ITU's human and financial resources as well as list of relevant partners.

521. Elaborated framework may serve as a template for the other WSIS Action Line moderators/facilitators to strengthen the implementation mechanism of WSIS process. It has been widely disseminated amongst the WSIS Action Line Facilitators, members of the United Group on the Information Society as well as WSIS stakeholders. The Roadmaps can be accessed at www.itu.int/itu-wsis .

(p) Communication and Outreach

522. WSIS Flash: is a monthly newsletter on WSIS Related news, projects and activities. <http://groups.itu.int/stocktaking/WSISFlash.aspx>.

523. iwrite4WSISForum is a campaign that aims to empower stakeholders to write and report on all WSIS related events and activities, sharing their work and ideas with thousands of WSIS stakeholders online worldwide. This twitter campaign was introduced for effective and far reaching communication for and amongst WSIS Stakeholders. This empowers all the WSIS Stakeholders to become WSIS reporters and tweet information about their projects and community. <http://www.wsis.org/iwrite>



524. imeetyouatWSISForum provides all registered onsite participants of the WSIS Forum with an online social networking community experience. This component of the WSIS Forum has been specially designed for the WSIS Forum onsite participants. See [here](#)



525. WSIS Process on Facebook: The WSIS Facebook page gives opportunity to fans to get informed and actively contribute to the page <http://www.facebook.com/WSISprocess>

526. @WSISprocess on Twitter: The WSIS Twitter page gives opportunity to fans to get informed and actively participate at the page <https://twitter.com/WSISprocess>

527. WSIS Process on YouTube: WSIS Forum highlights, interviews and all the important WSIS Related Videos are available on the WSIS Forum You Tube site: <http://www.youtube.com/wsisprocess>.

528. WSIS Process on LinkedIn: WSIS Process has a LinkedIn group: https://www.linkedin.com/groups/WSIS-Process-World-Summit-on-2599279?gid=2599279&trk=hb_side_g.

529. WSIS in ITU News: The ITU News is a media partner of the WSIS Process and regularly publishes WSIS Process related articles in several issues <https://itunews.itu.int/en/>

530. WSIS is also on Instagram: the WSIS Process Instagram account allows to share pictures and videos and give the opportunity for the followers to comment and share them https://www.instagram.com/wsis_process/

(q) WSIS Fund in Trust

531. The WSIS Trust Fund was established in 2011 with the adoption of Plenipotentiary Conference [Resolution 140](#). Council [Resolution 1332](#) as modified by ITU Council in May 2016 takes into account the outcomes of the United Nations General Assembly Overall

Review of the Implementation of WSIS Outcomes and the 2030 Agenda for Sustainable Development, and resolves to maintain the fund to support ITU activities to facilitate the implementation of WSIS outcomes, calls for partnerships and strategic alliances, and invites the ITU Membership to make voluntary contributions to the fund.

532. Since its creation, information on the WSIS Trust Fund and stakeholder contributions has been reflected at the dedicated website: www.itu.int/itu-wsis/fund. This provides an opportunity to thank all those who have contributed towards the Trust Fund to date for their dedication and commitment towards WSIS Implementation, in particular the WSIS Forum. Moving towards 2025, and following the multi-stakeholder approach, the WSIS Forum will build upon the outcomes of the WSIS+10 Review and the 2030 Agenda for Sustainable Development.

533. The ITU would like to thank all WSIS Stakeholders who have generously contributed to the WSIS Fund in Trust, the names of all contributors are reflected in the dedicated site of the WSIS Fund in Trust <http://www.itu.int/en/itu-wsis/Pages/WSIS-Fund-in-Trust.aspx>

534. We thank United Arab Emirates, Saudi Arabia, Japan, Oman, Confederation of Switzerland, IEEE, Republic of Poland, Republic of Rwanda, Elm, ICANN, Internet Society, University of Geneva – Geneva-Tsinghua Initiative, IFIP, Nippon Foundation, and the United Nations University for their contribution to the WSIS Fund in Trust in 2019 to accelerate the implementation of the WSIS related activities undertaken by ITU.



(r) Future Actions

535. **1) WSIS Forum 2020 (Open Consultation Process)** www.wsis.org/forum

The Open Consultation Process for the WSIS Forum 2020 is structured in six phases as follows:

- **Phase I: 4 June 2019** : Launch of the Open Consultations (Virtual Meeting open to all Stakeholders)
 1. Launch of the WSIS Forum 2020 Website for the Official Submissions
 2. Official submissions to the WSIS Secretariat on the Thematic Aspects and Innovations on the Format to be made via www.wsis.org/forum

3. Open call for nominations for WSIS Forum 2020 Multi-stakeholder High-Level Track Facilitators
 4. Launch of the WSIS Photo Contest 2020
- **Phase II: 20 June 2019** : 1st Physical Meeting: Open Forum on Implementation of WSIS Action Lines and WSIS Forum
 - **Phase III: 27 November 2019**: 2nd Physical Meeting: Open Forum on Implementation of WSIS Action Lines and WSIS Forum (during IGF)
 - **Phase IV: 7 February 2020**: 3rd Physical Meeting (ITU Headquarters, Geneva) (along with the CWG WSIS&SDGs)
 - **Phase V: 3 February 2020**: Deadline for Submissions of Official Contributions and Binding Requests for Workshops
 - **Phase VI: 28 February 2020**: Final Brief on the WSIS Forum 2020 (ITU Headquarters, Geneva)

536. Please refer to www.wsis.org/forum for updates. The Open Consultation Process will include a collection of inputs from regional and national WSIS related events and the physical meetings of the Open Consultation Process will benefit from remote participation.

537. **2) WSIS Prize - Phases** – www.wsis.org/prizes

The contest is organized into five phases:

FIVE PHASES OF THE CONTEST

- The first phase: Submission phase
2 July 2018 – 30 November 2018 (Deadline for last submission: 23:00 Geneva time)
- The second phase: Nomination Phase. Revision of submitted projects by Expert Group that will result with a list of nominated projects
3 December 2018 – 21 December 2018 (ten project per each category will be nominated by the ITU [Expert Group](#))
- The third phase: Public Online Voting (identification of three projects per category with the highest number of votes)
21 December 2018 – 10 February 2019 (Deadline for casting last vote: 23:00 Geneva time)
- The fourth phase: Selection of winning projects by the ITU [Expert Group](#) that will result with a list of winning projects
11 February 2019 – 15 February 2019
- The fifth phase: Announcement of winners to the public during WSIS Prize 2019 Ceremony at WSIS Forum 2019 (8-12 April), and the release of publication “WSIS Stocktaking: Success Stories 2019”, which is a compilation of extended descriptions of the 18 winning projects and 72 champion projects.

538. **WSIS Stocktaking: 2019-2020 Year-around Call for Update and New Entries is OPEN**

www.wsis.org/stocktaking

539. The WSIS Stocktaking process has been maintained by ITU since 2004 as requested by the WSIS Outcomes (TAIS, Para 120). This publicly accessible WSIS Stocktaking database ([here](#)), currently with more than 11,000 entries and a growing up community of 350,000 stakeholders, is a unique global tool for collecting information and regular reporting on information and communication technology related initiatives and projects, carried out by governments, international organizations, civil society, the private sector, academia and other entities, in the context of the 11 WSIS Action Lines.
540. The new call for update and new entries 2019-2020 is open year-around and we invite you to submit entries online at www.wsis.org/stocktaking. Submitted activities will be reflected in various forms in **the WSIS Stocktaking 2020** (reports, exhibitions, videos etc.) which will be released at WSIS Forum 2020 to be held from 6 to 9 April 2020 at ITU headquarters, Geneva. We look forward to receiving your responses to this call. Timeline of this process will soon be announced.
541. WSIS Forum 2020 Photo Contest: Participate in building a collage of photographs from around the world demonstrating how ICTs are playing an enabling role in achieving the Sustainable Development Goals. We invite all to continue submitting photos through the WSIS Stocktaking platform and WSIS Forum website. Three winning entries will be awarded and presented at the WSIS Forum 2020.

(VI) Final conclusions

542. The ITU is committed to connecting the world in its role as one of the lead facilitating organizations for the WSIS Process. In 2018 ITU initiated, facilitated and implemented a number of activities and projects related to the implementation of the WSIS outcomes showcasing direct linkages with the SDGs. The three ITU sectors, Radiocommunication (ITU-R), Standardisation (ITU-T), Development (ITU-D), and the General Secretariat were active in this process in their respective areas of expertise, and worked to create an enabling environment for multistakeholder cooperation in line with the goals of WSIS.
543. As the leading UN specialized agency focusing on ICTs, ITU has been organizing activities on its own and with a variety of partners, highlighting and prioritizing the importance of multistakeholder collaboration. Participation from governments, international organizations, civil society, academia and the private sector from all over the world was noted in all these efforts, which contributed significantly to the advancement of the WSIS goals.
544. Building upon the outcomes of the UN Summit on Sustainable Development and the UNGA Overall Review on the Implementation of the WSIS Outcomes, both held in 2015, the alignment of these processes is ongoing and will require strengthened efforts by all stakeholders at all levels – national, regional and global – in order to ensure that the enabling power of ICT is leveraged for achieving the SDGs by 2030.