

ITU Contribution to the Implementation of the WSIS Outcomes: 2021

Draft

as of 25/10/2021

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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 recognizes the need to contribute to the global partnership to strengthen the role of telecommunication/Information and Communication Technologies (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 ICTs to the Sustainable Development Goals (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) Implementer 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&SDG Task Force that is chaired by the Deputy Secretary-General. Taking into account resolves of Resolution 1332, the terms of reference of the WSIS&SDG 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 2021 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) 2021¹

9. The **2021 High Level Political Forum (HLPF)**, convened under the auspices of the Economic and Social Council, met virtually from 6 to 15 July, under the theme of "Sustainable and resilient recovery from the COVID-19 pandemic that promotes the economic, social and environmental dimensions of sustainable development: building an inclusive and effective path for the achievement of the 2030 Agenda in the context of the decade of action and delivery for sustainable development".
10. The twenty-four meetings brought together ten Heads of State and Government, 160 Deputy Prime Ministers, Ministers and Vice Ministers, 180 speakers from around the world, among these Members of Parliament, NGOs, think tanks, academia, business sector and the UN system. Over the eight days, 276 side events, 17 VNR Labs, ten special events, and 12 exhibitions took place providing platforms for different communities engaged around the 2030 Agenda. Overall, it is estimated that the HLPF attracted over 6,000 participants online, with more than 72,000 live views.
11. The HLPF in 2021 discussed in depth, Sustainable Development Goals 1 on no poverty, 2 on zero hunger, 3 on good health and well-being, 8 on decent work and economic growth, 10 on reduced inequalities, 12 on responsible consumption and production, 13 on climate action, 16 on peace, justice and strong institutions, and 17 on partnerships in depth. The Forum also considered the integrated, indivisible and interlinked nature of the Sustainable Development Goals.
12. Forty-two² countries presented Voluntary National Reviews (VNR). Many countries informed they had speeded up the integration of the 2030 Agenda into their development plans and into different sectors. Countries underlined numerous challenges, which included poverty; access to quality education; social inequalities; unsustainable consumption and production

¹ 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.

² Afghanistan, Angola, Antigua and Barbuda, Azerbaijan, Bahamas, Bhutan, Bolivia, Cabo Verde, Chad, China, Colombia, Cuba, Cyprus, Czech Republic, Democratic People's Republic of Korea, Denmark, Dominican Republic, Egypt, Germany, Guatemala, Indonesia, Iraq, Japan, Lao People's Democratic Republic, Madagascar, Malaysia, Marshall Island, Mexico, Namibia, Nicaragua, Niger, Norway, Paraguay, Qatar, San Marino, Sierra Leone, Spain, Sweden, Thailand, Tunisia, Uruguay, Zimbabwe

patterns; climate action; biodiversity; overfishing and vulnerability to natural disasters; gender inequality and gender-based violence; ineffective monitoring and evaluation systems; lack of data especially for identifying those being left behind, limited technical and financial capacities, as well as the digital divide.

13. In terms of the critical role of ICTs, the pandemic has shown the need to enhance digital skills and bridge digital gaps, particularly in developing countries. With the acceleration of digital transformation that COVID engendered and the reality that digital technologies became essential for work, education, business, services and connecting with family and friends, the digital divide is rapidly becoming the new face of inequality.
14. All VNR reports make reference, in one way or another, on the importance of digital technologies and access to the Internet for achieving the SDGs. In this regard, many countries alluded to digital solutions to cope with the COVID-19 crisis and the need to bridge the digital divide. A few reports referred directly to ITU's work, including among these: ITU World Telecommunication/ICT Indicators database, when providing world mobile cellular network coverage; International Girls in ICT Day; ITU contribution used for development activities; ITU work on the revision of the country's ICT policy; Membership in the ITU Council; country's Digital Terrestrial Television Project. The following table provides a non-exhausted list of detected ICT references by corresponding SDG:

SDG	Related ICT references, as seen in VNRs
SDG 1 – No Poverty	ICT4SDGs; digital financial inclusion; poverty alleviation through e-commerce; Digital transformation and employment; digital inclusion to end poverty; ICT access for the poor
SDG 2 – No Hunger	ICTs for food security; digital / smart agriculture / farms; agricultural information systems; digital inclusion to end hunger; ICT skills for farmers
SDG 3 – Good Health and Well-being	Well-being; e-health; COVID-19; digital transformation of health information system; early warning systems in healthcare; ICTs for public communication during COVID-19; digital learning platform for nutrition and health education; global health big data exchange
SDG 4 – Quality Education	Digital education / skills / competencies / literacy; distance learning (COVID-19); Internet access for schools; digital platforms for pre-employment training
SDG 5 – Gender Equality	Gender digital divide / gap; Girls' and women's empowerment; ICT training for women; opportunities for women in the digital economy; gender-based violence (online + digital tools to detect it); mobile hot lines available to gender-based violence victims; financial inclusion of women through mobile and digitized services; diversity in ICT development; employment opportunities in the ICT sector; STEM education for girls
SDG 6 – Clean Water and Sanitation	Water management / efficiency / administration; Use of ICTs in sanitation management systems
SDG 7 – Affordable and Clean Energy	Energy efficiency; digitalization of energy technology; environmentally sustainable technologies; environmentally sustainable digital platforms; climate-neutral technologies and infrastructure; ICTs for energy

	traceability; blockchain platform to support low carbon ecosystem; smart grids
SDG 8 – Decent Work and Economic Growth	Digital economy; professional competencies; ICTs for SMEs/MSMEs; high-tech industry; employment productivity; e-commerce; innovation hubs; ensuring employment remains safe amidst the digital age; digital transition for migrant workers; digital transformation of national economic activities; adoption of digital technologies for recovery of tourism sector; financial inclusion of micro business through digital financial services; growth of internet-based business during COVID-19
SDG 9 – Industry, Innovation and Infrastructure	Digital transformation; universal access; telecommunication / ICT infrastructure; ICT / digital policies; Information Society; innovation ecosystems; Artificial Intelligence; IoT; blockchain; robotics; broadband; spectrum; 4G; 5G; LTE; emerging technologies; cloud storage; new technologies; mobile network; research; digital divide; rural connectivity
SDG 10 – Reduced Inequalities	Digital social inclusion; youth; persons with disabilities; older persons; rural connectivity; digital divide; internet accessibility in LDCs; affordable connectivity; gender digital divide; financial inclusion of the poor; access to broadband
SDG 11 – Sustainable Cities and Communities	Smart cities; smart villages; intelligent / smart transport systems; traffic management; early warning systems; e-government; digital public goods; ICTs for energy efficiency in buildings; ICTs for mobility; autonomous vehicles
SDG 12 – Responsible Consumption and Production	Sustainable consumption; smart waste platform; e-waste; waste management technologies; waste recovery technologies; circular economy; bio-material preservation managed with ICTs
SDG 13 – Climate Action	CO2 emissions; research and investment in green technologies; use of modern technologies to strengthen the recycling market; environmentally sustainable technologies; sustainable digital transformation
SDG 14 – Life Below Water	Maritime technology; technology for biodiversity; smart solutions in aquaculture; advanced technologies for fish production and conservation; sustainable technologies for water waste; satellite surveillance at sea; electronic monitoring
SDG 15 – Life on Land	Technology for biodiversity; technology transfer for forestry development; real-time monitoring system and database of forest management
SDG 16 – Peace, Justice and Strong Institutions	e-Government; digital public services; digital taxes; emergency communications; technology to facilitate the delivery of justice service; digital adaptation of the judicial system; development of 'electronic court'; digitalised social support; cybersecurity; STI to promote international peace; STI for diplomacy; ICTs for humanitarian projects; digital citizen
SDG 17 – Partnerships for the Goals	Digital transformation; national digitalisation; national digital plan; international digital cooperation; international knowledge-sharing on technology and innovation; private-public partnerships; global partnerships for technology development; technology transfers to developing countries

15. Outcomes of the HLPF include the [Ministerial Declaration](#) and a [Summary by the President of ECOSOC](#). The Ministerial Declaration contains substantial references to the critical role of ICTs and the digital transformation than seen in previous HLPF Ministerial Declarations, which include: 15 on ICTs for agriculture; 17 on digital and mobile banking services and inclusion; 18 on digital technologies for resilient financial and public services, safe and secure ICT, digital inclusion, digital divide, digital transformation; 21 on digital cooperation for inclusive and equitable delivery and access to public services; 22 on transfer of technology and cooperation to close the digital divide; 34 on violence and abuse, etc. in digital contexts; 39 on ICT for disaster risk reduction; 40 on leveraging technologies to promote inclusive digital economy and connectivity and digital capacity building, infrastructure, connectivity initiatives, emerging technologies and actions to bridge the digital gap, STI Forum and taking note of the UNSG Roadmap for Digital Cooperation, digital skills and information literacy, human rights online; 45 taxing of the digital economy; 48 committing to significantly increase access to ICT and universal and affordable access to the Internet in LDCs; and 50 on leveraging digital technologies.

16. Key ITU inputs and activities included the following:

Inputs:

- [ITU Council contribution to HLPF 2021](#)
- [Partnership on Measuring ICT for Development input](#)
- [United Nations Group on the Information Society \(UNGIS\) input](#)
- [World Summit on the Information Society Forum input](#)
- [Broadband Commission for Sustainable Development](#)

Statements/Interventions:

- General Debate statement by the ITU Secretary General (pre-recorded video)
- Mobilizing science, technology and innovation and strengthening the science-policy-society interface (Keynote delivered by the ITU Secretary General)
- Looking at the 2020 targets: implementation and review (BDT submitted statement)

Side and Special events:

- ITU/Russian Federation side event with the engagement of the UN Group on the Information Society (UNGIS) – with the participation of ITU Deputy Secretary-General.
- ITU side event "[Digital Partnerships for a Sustainable and Resilient Recovery from COVID-19](#)" ([Video](#)) – with the participation of the BDT Director.
- Business and Industry Major Group Side event: [Private sector partnerships and contributions to the SDGs](#) - Keynote by the BDT Deputy Director.

Inputs to UN Reports:

- [UNSDG's Progress towards the Sustainable Development Goals](#)
- [2021 Financing for Sustainable Development Report](#)
- [IATT - STI Forum 2021 Report](#)
- [Synthesis of voluntary submissions by functional commissions of the Economic and Social Council and other intergovernmental bodies and forums](#)

Inter-Agency Task Team (IATT) - Background Thematic papers on:

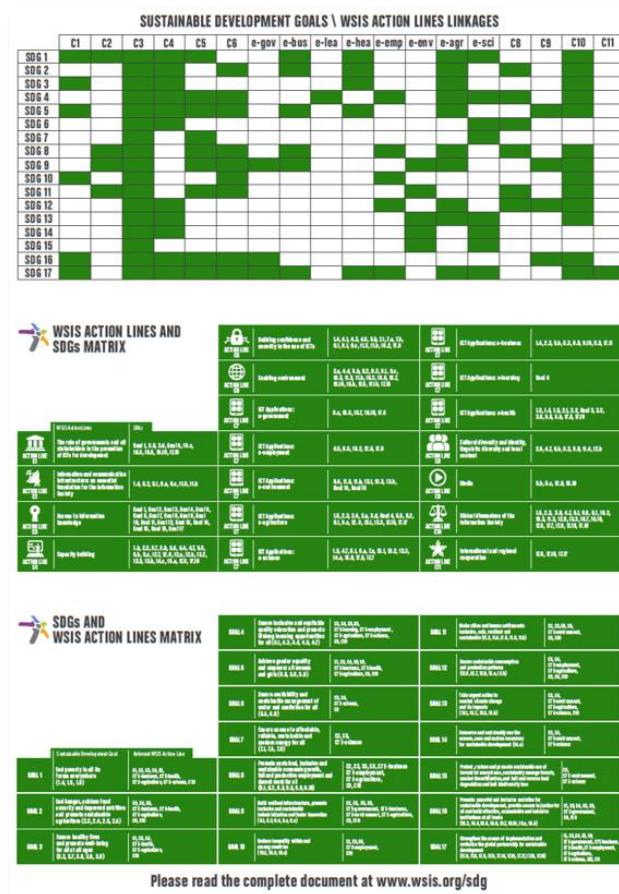
- The SDGs in time of crisis: A sustainable, inclusive and resilient recovery from COVID-19 as an opportunity to realize the SDGs
 - Ensuring that no one is left behind How do we protect the poorest and most vulnerable from the crisis and empower them to realize the SDGs?
 - Progress summary for SDG targets with a 2020 deadline; Review of SDG 9 from ITU
 - How do we get on track for building more peaceful, equal and inclusive societies? (SDGs 3, 10, 16, 17 and interlinkages among those goals and with other SDGs)
 - How do we revamp and transform consumption and production and address and mitigate climate change? (SDGs 12, 13, 17 and interlinkages among these goals and with other SDGs)
 - Mobilizing science, technology, and innovation and strengthening the science-policy-society interface

(b) WSIS Action Lines and SDG Matrix

17. 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.

18. The mapping exercise draws direct linkages of the WSIS Action Lines with the proposed SDGs to continue strengthening the impact of 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.

19. 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.



20. 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 annual theme of the WSIS Forum has been aligned with the SDGs process, please read more at www.wsis.org/sdgs

21. **WSIS Forum 2021 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](#).

ICT and Sport Creating Value in the Sport Sector - the Role of the Private Sector	WIPO	SDG
International Organization of Women in Sport (IOWS) - the Role of Women in Sport and Physical Activity	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	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
Asian Confederation of Sports Associations (ACSA) - the Role of Sports and Physical Activity	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	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
Hanover Ghana and United Kingdom	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	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
Innovators & Digital Leaders Award	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	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

ICT and Sport Creating Value in the Sport Sector - the Role of the Private Sector	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	Digital literacy increases better access to quality education for all (Goal 4), increases gender parity, and facilitates Goal 5, ends work with dignity (Goal 8), while it can reduce income inequality (Goal 10) and assist poverty from economic perspective (Goal 1). Internet provides a platform for political engagement, innovation and entrepreneurship to increase the quality of life (Goals 3, 5, 9, 11, 13, 15, 17).
University of Oviedo	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	Policy is a human right and important for achieving many SDGs. It's needed and based on them: • SDG 9: Decent work and economies: growth. Priority of the workshop is important for providing a decent work environment. • SDG 9: Industry, innovation and infrastructure: Many new industries are one of the fastest, safest and most effective ways to combat climate change. It's important to have a sustainable development. • SDG 10: Reduced inequalities: Inequalities are often defined in the context of small cities and local areas. Inequalities cause and sustainable communication. Inequality is often defined in the context of small cities and local areas. Inequalities cause and sustainable communication. Inequality is often defined in the context of small cities and local areas.
Ministries and State Programs	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	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
World Summit Award	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	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

22. 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 SDGs.
23. In this regard, the **WSIS Prizes 2021** contest aligned its rules to highlight the linkages between the WSIS Action Lines and SDGs, this approach will be strengthened in 2022.

III. Overview of ITU activities and projects undertaken since 2021 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*.

24. 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.



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25. 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.
26. 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.
27. 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. More information on the WSIS Action Line Facilitator's meeting [here](#).
28. 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.

1. **WSIS Forum 2009:** <http://www.itu.int/wsis/implementation/2009/forum/geneva/>
2. **WSIS Forum 2010:** <http://www.itu.int/wsis/implementation/2010/forum/geneva/>
3. **WSIS Forum 2011:** <http://www.itu.int/wsis/implementation/2011/forum/>
4. **WSIS Forum 2012:** <http://www.itu.int/wsis/implementation/2012/forum/>

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5. **WSIS Forum 2013:** <http://www.itu.int/wsis/implementation/2013/forum/>
 6. **WSIS Forum 2014:** <http://www.itu.int/wsis/implementation/2014/forum/>
 7. **WSIS Forum 2015:** <http://www.itu.int/wsis/implementation/2015/forum/>
 8. **WSIS Forum 2016:** <http://www.itu.int/wsis/implementation/2016/forum/>
 9. **WSIS Forum 2017:** <http://www.itu.int/net4/wsis/forum/2017/>
 10. **WSIS Forum 2018:** <https://www.itu.int/net4/wsis/forum/2018/>
 11. **WSIS Forum 2019:** <https://www.itu.int/net4/wsis/forum/2019/>
 12. **WSIS Forum 2020:** <https://www.itu.int/net4/wsis/forum/2020/>
 13. **WSIS Forum 2021:** <https://www.itu.int/net4/wsis/forum/2021/>
29. 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
30. WSIS Forum 2021 was hosted virtually by ITU under the overarching theme *ICTs for Inclusive, Resilient and Sustainable Societies and Economies (WSIS Action Lines for achieving the Sustainable Development Goals)*. The Forum started on 26 January until the final week on 17-21 May 2021. The Forum featured a weekly programme, including a series of thematic/country workshops, high-level policy sessions, special tracks on various thematic areas, and a virtual exhibition to address issues that are critical to WSIS implementation and review progress on using ICTs to achieve the SDGs. The final week of the Forum consisted of interactive high-level dialogues, a WSIS Prize ceremony, a ministerial round table as well as the closing ceremony. The Forum garnered a lot of interest and excitement worldwide – with a cumulative attendance of over 50,000 attendees from around 185 countries who took part in more than 250 virtual sessions with 961 different speakers. The virtual sessions were organised by WSIS stakeholders to highlight the role of ICTs in sustainable development. More than 150 High-Level speakers representing Ministers, Heads of Regulatory Authorities, Private Sector, Civil Society, Academia and International Organizations contributed passionately towards the program of the Forum. In addition, more than 130 exhibitors 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.

31. The Chairman of the WSIS Forum 2021 was H.E. Mr. Maxim Parshin, Deputy Minister, Digital Development, Communications and Mass Media, Russian Federation. The high-level policy sessions were moderated [by 11 High-Level Track Facilitators](#) nominated and identified by the different WSIS stakeholders types.
32. With the constant objective of strengthening the alignment of WSIS and SDG processes, the overall theme for WSIS Forum 2021 was *ICTs for Inclusive, Resilient and Sustainable Societies and Economies (WSIS Action Lines for achieving the Sustainable Development Goals)*. The concrete outcomes of WSIS Forum 2021 will enable stakeholders to strengthen implementation of WSIS Action Lines and the alignment of the WSIS and SDG processes. The many announcements, launches, agreements and commitments at this year's summit highlighted the progress relating to digital cooperation, cybersecurity, environmental impact, digital accessibility, COVID-19, education, gender equality, youth, older persons, ethics and wellbeing. The Forum's commitment to connect the unconnected has spearheaded many initiatives to enable everyone to benefit from digital technologies, wherever they are, and however they live.
33. WSIS Forum 2021 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](#).
34. The WSIS Forum 2021 Outcomes linked to WSIS Action Lines SDGs Sustainable Development Goals - Matrix Flyer can be found [here](#).
35. The WSIS Forum 2021 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.
36. The WSIS Stocktaking Report 2021 can be found [here](#). This document reflects around 1,260 activities relating to ICTs for development, submitted to the WSIS Stocktaking Platform from 1 January to 31 March 2021, 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 2021 for Stocktaking updates and new entries. The inputs from WSIS Action Line facilitators and co-facilitators also contributed to the present Report.
37. The WSIS Stocktaking Success Stories 2021 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.
38. The WSIS Forum 2021: Report – Sustainable and resilient recovery from the COVID-19 pandemic that promotes the economic, social and environmental dimensions of sustainable development: building an inclusive and effective path for the achievement of the 2030 Agenda

in the context of the decade of action and delivery for sustainable development, can be found [here](#). This document outlines the progress on the implementation of the respective WSIS Action Lines towards the achievement of the SDGs, in particular in line with the theme of the High level Political Forum 2021.

39. The WSIS Forum 2021 organised Special Tracks during the Forum, including:

- ICTs and Accessibility for Persons with Disabilities and Specific Needs: the track aims to inform and observe how ICTs can help people living with disabilities whilst focusing on progressing towards the United Nations Sustainable Development Goals. Stakeholders from academia and international organizations to civil society and the private sector discussed their efforts to leverage ICTs to assist people with various disabilities and impairments, consider the importance of educator training and inclusive universal design, and how to support startups and firms that are designing emerging assistive technologies to help persons with disabilities.
- ICTs and Youth: 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.
- ICTs and Older Persons: the track aimd to address the role of technology in achieving healthier ageing but also how technology can help us build smarter cities, combat age-based discrimination at the workplace, ensure financial inclusion of older persons, and support millions of caregivers across the world.
- ICTs and Gender Mainstreaming: the track aims to integrate and mainstream a gender equality perspective through the use of ICTs as well as to strive for 50/50 gender balance participation at the WSIS Forum 2021. This track comprised interactive sessions with different topics covering gender and ICTs issues.
- Cybersecurity: the new track comprised sessions that align with the WSIS Action Line C5: Building Confidence and Security in the Use of ICTs. Cybersecurity is crucial to ensuring universal, trustworthy, and equitable access to connectivity.
- Emerging Technologies for Sustainable Development (Startups): Emerging technologies are set to have a vital impact in our future. Artificial Intelligence, Augmented Reality and Big Data are already proving to hold immense potential in industries such as healthcare, education, agriculture and many more. This new track explored how frontier technological solutions address sustainable development challenges and help facilitate innovation in a rapidly changing world.
- ICTs for Well-being and Happiness: this new track brought a series of workshops focusing on efforts and success stories to promote healthy lives and well-being for everyone at all ages, in the context of COVID-19 pandemic.

Photographs: click [here](#).

All WSIS Forum 2021 outcomes, photos and videos documentation and highlights are available at www.wsis.org/forum.

40. The Open Consultation Process for the WSIS Forum 2021 was structured in five phases as follows:

- **Phase I: Launch of the Open Consultation Process**

The virtual launch of the open consultations took place on Wednesday 9 September 2020, 15:00–16:00 CEST. The recording is available at the following link: <https://bit.ly/37NfbFx>

- **Phase II: 1st Virtual Meeting**

The 1st Virtual Meeting of the open consultations took place on Friday 6 November 2020, 10:10 to 11:10 CET during IGF 2020. The recording is available at the following link: <https://www.youtube.com/watch?v=A8d0fK7etVI>

- **Phase III: 2nd Virtual Meeting**

The 2nd Virtual Meeting of the open consultations took place on Monday 1 February 2021, 14:00 to 15:00 CET.

- **Phase IV: Deadline for Submissions of Official Contributions and Binding Requests for Workshops**

The deadline for OCP submissions was 8 March 2021

- **Phase V: Final Brief**

The Final Brief of the open consultations took place on Monday 19 April 2021, 14:00 to 15:30 CEST.

41. The **WSIS Forum 2022** is scheduled to be held starting from 15 March 2022 with the final week that will be held on 30 May – 3 June 2022 at ITU Headquarters, Geneva with the fallback option of a fully virtual event or a hybrid event depending on the evolving COVID-19 pandemic situation. The agenda and program will build on a basis of submissions received during the Open Consultation Process. Additional information about the WSIS Forum 2022 is available [here](#) and below in section V.

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

Action Line C2: Information and Communication Infrastructure



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)



42. 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.

43. The 16th Action Line C2 Facilitation Meeting was held on Wednesday 28 April 2021, 13:00-14:00 CEST as an integral part of the WSIS Forum 2021. The title of the Action Line Facilitation meeting was: “Roundtable on Innovative investment and financing models for the Last Mile Internet Connectivity Infrastructure”. The session explored innovative financing and investment models for the last mile connectivity and different types of financing and investment mechanisms that can contribute to develop local businesses capacity to expand connectivity and bridge the digital divide. More details on this session [here](#).
44. The WSIS Prizes 2021 Winner for the Action Line C2 is [National Implementation of the Financial Inclusion Initiative in China, China Academy of Information and Communications Technology \(CAICT\), China](#).



National Implementation of the Financial Inclusion Global Initiative is a three-year action plan (2018-2020) funded by the Bill & Melinda Gates Foundation and implemented in partnership with ITU, the World Bank Group, and the Committee on Payments and Market Infrastructure. Since 2018, ITU has been collaborating with the China Academy of Information and Communications Technology (CAICT) to provide tailored technical support (including diagnostic assessments, and pilots of innovative approaches) relevant to digital financial inclusion, with a focus on improving the legal and regulatory framework, financial markets infrastructure, and ICT infrastructure, aiming at digital financial inclusive services. As part of the national implementation in China, pilot projects are being implemented to promote the development of digital finance, especially digital inclusive finance. The project is to pilot test new innovations in DFS within selected counties in Yu county in Hebei China. The project promotes the development of digital Inclusive Financing in Yu County and enhances the availability and inclusiveness of digital finance through digital Inclusive Financing training, digital agriculture platform and agricultural e-commerce platform.

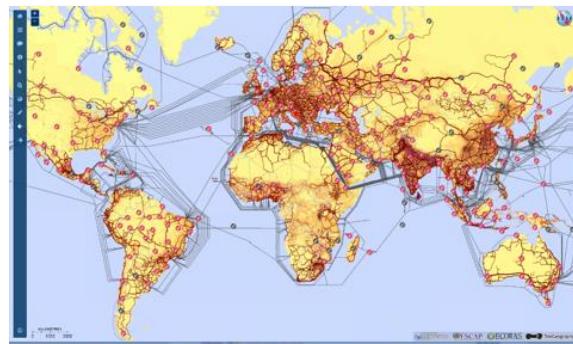
Project website

<http://www.caict.ac.cn/>

Sustainable development goals related to this project

- Goal 1: No poverty

- Goal 5: Gender equality
 - Goal 9: Industry, innovation and infrastructure
 - Goal 10: Reduced inequalities
45. 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.
46. 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 underserviced 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.
47. 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 geospatial data of 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.
48. Implementation and updates of the ITU Interactive Terrestrial Transmission Maps (<http://itu.int/go/map-publics>) 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.
49. At the time of this reporting, the Map presented information from 600 operator networks. The research on the transmission links has reached 20 million km of routes. Submarine cables, information on IXPs and satellite earth stations have been updated.
50. In order to enhance the Interactive Terrestrial Transmission Map worldwide, ITU coordinated the data collection and validation process covering infrastructure of more than 190 countries. The geospatial is being used to assess connectivity gaps and is feeding different connectivity models from ITU initiatives (e.g. GIGA, C2R, FIGI) to support investment decisions according to user profile (schools, financial inclusion, health centers, etc.)



51. 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.
52. 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, creation of National Table of Frequency Allocations, the transition from analogue to DTTV broadcasting and other technical issues. Some of the examples of such assistance programs are provided below.
53. 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.
54. Enhanced knowledge in Conformance & Interoperability for Africa with a training held in Ghana, September 2019 (English) and in November 2019 (French). 30 participants from 15 countries participated in the training in Regulatory framework and practical EMC tests. A Training in ITU Centres Of Excellence Network For Asia Pacific Region: Conformity and Interoperability relating to Smart City, 18-21 September 2019, Guangzhou, P.R. China (https://www.itu.int/en/ITU-D/Technology/Pages/CI_Events.aspx). Conformity and Interoperability virtual/online Training Workshop for Africa Region, November 2020
55. 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.
56. The procurement of ICT equipment is under way in Burkina Faso as part of the Broadband Wireless Network project.
57. Broadband Wireless Network for Djibouti was completed for Phase 2 and the maintenance contract was finalized and signed by Djibouti Telecom.
58. Procurement for the Broadband Wireless Network in Mali is in progress. The international call for Proposals has been done. The technical evaluation is following.
59. Basic National Spectrum Management System is to assist developing countries to establish basic structure of spectrum management system. Projects for Comoros, Bolivia and Kyrgyzstan



were finished. The results of the assistance are the workplan for countries for implementing/updating their spectrum management structures and activities.

60. 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. 3 Trainings have been organized.
61. Project to set up IPv6 and IoT expertise centre in Sudan has been signed.
62. 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 2020 with the participation of several countries in the regions.
63. Several moduls of Training material for C&I (CITP) have been prepared and others are under preparation.
64. 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.
65. 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.
66. 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](#).
67. In the framework of ITU-D Study Groups, the following questions related to AL-C2 were approved by WTDC-17 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](#). ITU Toolkit on Business Planning for ICT Infrastructure development was prepared and a training based on this toolkit is running in 26 October-11 December 2020.

68. 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).
69. 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 2020, ITU-T [approved more than 200 texts](#) (as of 15 September 2021), including ITU-T Recommendations, Supplements and Technical Reports.
70. The ITU [Last Mile Connectivity Solutions Guide](#) was developed to help accelerate actions to address last-mile Internet connectivity issues in situations that include a lack of network infrastructure and with a view to encouraging more affordable service delivery. The tools, service interventions and policy solutions reflect how to extend Internet access to areas and users in geographies without Internet while considering their unique characteristics. The Solutions Guide is designed for use during initial consultations on how to address these gaps and includes reference materials, resources and links to other content to support the process, dialogue and decision-making that accompanies intervention design.
71. To complement this Solutions Guide, a range of resources is developed to help Member States address last-mile connectivity challenges, including a database of case studies ([LMC Case Studies Database](#)) and [capacity-development courses on last mile connectivity](#). In addition, interactive last-mile connectivity diagnostic and decision-making tools are being developed that includes methodologies for technology selection and cost estimation for building broadband access networks in localities or connecting schools, hospitals or other specific objects to broadband transport backbones.
72. [Emerging technology trends: Artificial intelligence and big data for development 4.0](#): contains hands-on guidelines for policy-makers and other stakeholders in crafting a national AI and data strategy for development. The report also identifies the main building-blocks of a national AI and data system for development (governance; regulation; ethics; digital and data skills; the digital environment and data infrastructure; the innovation system; AI and data-intensive sectors; and international collaboration).

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73. [ITU's Emerging Technology for Connectivity 2021](#) was held from July 5 to July 16 2021 with about 25 sessions and 595 total present participants. It featured about 154 speakers. In addition, capacity development activities were conducted with 5 training courses. The presentations, recordings and reports are available on the event [website](#).
74. New graphical interface of the ITU Interactive Transmission Maps is under development.
75. Results of ITU-T study groups on Action Line C2 are:
- ❖ [**ITU-T F.Suppl.4 “Overview of convergence of artificial intelligence and blockchain”**](#) focuses on the research on the convergence of AI and blockchain, specifically analyzes the mutual promotion between AI and blockchain, and provides a technical reference for the application of AI and blockchain. Besides, this Supplement also provides application analysis of the convergence of AI and blockchain.
 - ❖ [**ITU-T G.Suppl.71 “OLT Capabilities for supporting CO DBA”**](#): describes the passive optical network optical line termination or PON OLT capabilities needed for applying cooperative dynamic bandwidth assignment (CO DBA) both in a generic sense and for specific use cases. It explains the interactions of the optical line termination (OLT) with the external entity sending information for CO DBA, the way to interpret such information, and the needs for coordination on choosing values for configurable parameters. The specific use case described in this version of the Supplement is mobile fronthaul (MFH) over PON by using O-RAN's cooperative transport interface (CTI) for the interaction between the PON OLT and mobile distributed units (DUs).
 - ❖ [**ITU-T G.Suppl.72 “Modelling consideration for optical media network”**](#): provides supplemental information to Recommendation [ITU-T G.876], “Management Requirement and Information Model for the optical media network” and [ITU-T G.7711] Generic protocol-neutral information model for transport resources. It provides various examples of the use of the Common Information Model (CIM), defined in Recommendation [ITU-T G.7711] to model optical media structures.
 - ❖ [**ITU-T L.Suppl.41 to ITU-T L-series of Recommendations “Requirements on energy efficiency measurement models and the role of AI and big data”**](#): unveils the requirements for energy efficiency assessment, and the features that affect the energy demand. It attempts to define a unified assessment model for energy efficient cities.
 - ❖ [**ITU-T L.Suppl.42 to ITU-T L-series of Recommendations “Guidelines on the Environmental Efficiency of Machine Learning Processes in Supply Chain Management”**](#) provides guidelines on the environmental efficiency of machine learning (ML) processes in supply chain management. This guidance document is intended to support machine learning researchers and operators to measure and improve the environmental efficiency of ML, and other emerging technologies (e.g. Blockchain, Big Data, 5G, ...) use in supply chain management.
 - ❖ [**ITU-T L.Suppl.43 to ITU-T L-series of Recommendations “Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption”**](#) explores how network energy saving technologies that have emerged since the 4G era, such as carrier shutdown, channel shutdown, symbol shutdown etc., can be leveraged to mitigate 5G energy consumption. It also analyses how enhanced technologies like deep sleep, symbol

aggregation shutdown etc., have been developing in the 5G era. This report aims to detail these fundamentals. More details about AI-driven smart energy saving solution will be elaborated. This Supplement could help achieve the most energy-efficient network with good performance and lower operating expense (OPEX) for the mobile network operators (MNOs).

- ❖ [**ITU-T L Suppl.44 to ITU-T L-series of Recommendations “A Guideline on best practices and environment friendly policies for effective ICT deployment methods”**](#) identifies best practices and opportunities for new applications using ICTs to foster environmental sustainability, identify appropriate actions and promote best practices towards implementing environmental friendly policies and practices.
- ❖ [**ITU-T Q Suppl.73 “Guidelines for permissive versus restrictive system implementations to address counterfeit, stolen and illegal mobile devices”**](#) provides detailed information on two mechanisms for combating counterfeit, stolen and illegal mobile devices, and highlights the strengths and weaknesses of each approach. Additionally, it provides guidelines to ensure a successful system implementation with a broad range of comprehensive measures to be adopted to combat the said issues.
- ❖ [**ITU-T Q Suppl.74 “Roadmap for the Q.5050-series - Combat of Counterfeit ICT and Stolen Mobile Devices”**](#) specifies the index and relation for the ITU-TQ.5050-series Recommendation, Technical Reports and Supplements on the combat of counterfeit ICT and stolen mobile devices.
- ❖ [**ITU-T Supplement 11 to ITU-T J-series of Recommendations “Installing a digital TV service for cable networks and relating Recommendations”**](#): There have been several requests from developing countries, who are going to deploy fibre optics facilities and advanced digital transmission over Hybrid Fibre/Coaxial (HFC), to help them to introduce digital cable television services on their infrastructure. This Supplement will help their consideration of development of their system based on ITU-T Recommendations.
- ❖ [**ITU-T Technical Paper FSTP.SS-OTA “Standardization survey for over-the-air updating in vehicle”**](#) is prepared for the purpose of grasping the examination situation in various organizations of the technology to remotely update the software of the on-board system in the automobile with the communication function as a connected car. Based on this survey/study, we clarify the importance of quickly and accurately grasping the movement in various organizations around the world including the United Nations and accelerating the activities for practical application. The study in this field will be continued and accelerated in the future, so it is extremely important for whole world not only for Japan to continue to participate, contribute, and contribute to various activities including the subject of this study in the context of international competition and cooperation.
- ❖ [**ITU-T Technical Paper HSTP.ACC-UC "Use cases for inclusive media access services"**](#) describes use cases for multimedia accessible system. This Technical paper describes an experiment of IPTV services with accessibility functions based on ITU-T Recommendation about accessibility profiles for IPTV systems.
- ❖ [**ITU-T Technical Report TR.EENM “Guidelines for effective and efficient national E.164 numbering plan administration”**](#) provides the most effective, efficient methods and guidelines for national E.164 numbering plan administrations depending on best practices.

- ❖ [**ITU-T TR.spoofing “Countering Spoofing”**](#) provides information that could assist in implementing measures to counter spoofing.
- ❖ [**ITU-T Z.100 Implementer's guide “Specification and Description Language implementer's guide – Version 4.0.1”**](#) compiles reported defects with resolutions and other agreed changes for the ITU T Specification and Description Language related ITU T Recommendations (Z.100, Z.101, Z.102, Z.103, Z.104, Z.105, Z.106, Z.107, Z.109, Z.111 and Z.119) prior to these changes being published in approved Recommendations.
- [**Recommendation ITU-T D.1041 “Policy and methodological principles for determining co-location and access charges”**](#) offers policy and methodological principles for Member States interested in establishing transparent co-location access and service rates.
- [**Recommendation ITU-T D.600R Amd.1 “Cost methodology for the regional tariff group for Africa applicable to the international automatic telephone service – Annex B: Guidelines for implementing efficient cost models for telecommunication service tariffs in the Africa region”**](#) provides guidelines to Member States of the Africa region for the construction of costing model, within the framework of the approval of prices of telecommunication services, taking into account the technological development and innovation in the field of telecommunications as well as the specificity of each country.
- [**Recommendation ITU-T D.607R “One Network Area Roaming”**](#), based on African regional experiences, aims to promote regional integration by bringing down the high cost of mobile roaming. It provides a framework and tools for facilitating and making affordable international telecommunications services to and from Africa's countries.
- ❖ [**Recommendation ITU-T E.157 \(revised\) “International calling party number delivery”**](#) provides guidance for international calling party number delivery across boundaries of countries which is technology neutral.
- [**Recommendation ITU-T E.212 \(2016\) Amd.3 "The international identification plan for public networks and subscriptions - Annex H: Criteria and procedures for the assignment and reclamation of shared ITU-T E.212 mobile country codes \(MCC\) for regional and other international organizations \(ROIO\)/standards development organization \(SDO\)-specified networks and their respective mobile network codes \(MNCs\)"**](#) provides criteria for assignment of shared E.212 resources for specific use cases to applicants that are regional and other international organizations (ROIO)/standard development organization (SDO)-specified networks.
- ❖ [**Recommendation ITU-T E.805.1 “Quality of service operational strategy for improved regulatory supervision of providers of mobile telecommunication services”**](#) provides guidance to telecommunication regulators on how to achieve their regulatory goals for quality of service (QoS) at reduced regulatory effort and improved operational efficiency, thereby providing desired benefits to consumers and providers of mobile telecommunication services.
- ❖ [**Recommendation ITU-T F.735.2 “Architecture and protocols for software-defined cameras”**](#) specifies service-oriented interfaces for the software-defined camera to guide the different developers to implement algorithms according to these APIs, and guide camera manufacturers to design more open and flexible cameras to achieve algorithms easily upgrade and camera hardware resource maximum utilization. This Recommendation specifies an architecture and interface protocols for the software-

defined cameras, including the functional architecture of software-defined camera system, service-oriented interface message protocol structure, and service-oriented interface protocols.

- ❖ [**Recommendation ITU-T F.743.12 “Requirements for edge computing in video surveillance”**](#) defines the requirements for edge computing in video surveillance. This Recommendation describes the application scenarios and requirements for the edge computing in the video surveillance system.
- ❖ [**Recommendation ITU-T F.748.12 “Deep learning software framework evaluation methodology”**](#) provides the evaluation methodology for deep learning software framework.
- ❖ [**Recommendation ITU-T F.748.13 “Technical framework for shared machine learning system”**](#) defines the roles, technical and security requirements of the shared machine learning system, and provides technical architectures, functional components and processing procedures of the shared machine learning system in the centralized and decentralized modes.
- ❖ [**Recommendation ITU-T F.749.13 “Framework and requirements for civilian unmanned aerial vehicle flight control using artificial intelligence”**](#) provides the general framework and functional requirements for civilian unmanned aerial vehicle (CUAV) flight control using artificial intelligence, including the flight navigation control of a CUAV itself and the specific flight control according to the vertical industry application requirements.
- ❖ [**Recommendation ITU-T F.749.14 “Requirements of coordination for civilian unmanned aerial vehicles”**](#) specifies the requirements of coordination for civilian unmanned aerial vehicles (CUAVs), as well as the typical CUAV coordination scenarios in commercial or civilian application areas.
- ❖ [**Recommendation ITU-T F.749.4 “Use cases and requirements for multimedia communication enabled vehicle systems using artificial intelligence”**](#) describes the use cases and scenarios, high-layer architecture, service and network requirements, functional requirements and non-functional requirements for multimedia communication enabled vehicle systems using artificial intelligence.
- ❖ [**Recommendation ITU-T G.703 Amd.1 “Physical/electrical characteristics of hierarchical digital interfaces - Amendment 1”**](#) adds a new Annex B that specifies an interface with high-timing accuracy (1PPS). It also updates key references to refer to the latest versions.
- ❖ [**Recommendation ITU-T G.709.1/Y.1331.1 \(2018\) Amd.2 “Flexible OTN short-reach interfaces - Amendment 2”**](#) restructures the definition of a FlexO-x frame and its overhead, adds payload type and reserved client specific overhead. In addition, FlexOsec encryption OH and functions are added.
- ❖ [**Recommendation ITU-T G.709.3/Y.1331.3 \(revised\) “Flexible OTN long-reach interfaces”**](#) defines the flexible optical transport network (OTN), known as FlexO, long-reach interfaces that support bonding (i.e. grouping) of multiple of these interfaces such that one or more client signals (e.g. one or more OTUCn ($n \geq 1$)) can be transferred via one or more optical tributary signals (OTSi) over one or more physical interfaces. The Recommendation specifies the frame structure for FlexO long reach interfaces using forward error correction codes with a higher coding gain than used in the FlexO short

reach interfaces that are specified in Recommendation ITU-T G.709.1/Y.1331.1 and multiplexing of OTUCn client signals into the payload of a FlexO group. Edition 2 contains the following extensions to Edition 1.1:

- Addition of 100G, 200G and 400G FlexO with OFEC (16, Annexes D, E, G, appendices III, IV, V, bibliography)
- Addition of 100G FlexO with concatenated FEC (15.4.1, 15.5.4)
- Addition of multiplexing of OTUCn client signals into the payload of a FlexO group (Annex F).

❖ [**Recommendation ITU-T G.709/Y.1331 Amd.1 \(revised\) “Interfaces for the optical transport network \(OTN\) - Amendment 1”**](#) defines the requirements for the optical transport network (OTN) interface signals of the optical transport network, in terms of:

- OTN hierarchy
- functionality of the overhead in support of multi-wavelength optical networks
- frame structures
- bit rates
- formats for mapping client signals.

Edition 6.1 of this Recommendation includes the addition of tables with GCC bit rates, enhancements to the description of OTUCn-M behaviour, addition of an appendix that describes the implications on fault management for the case that the OTSiG (de)modulator process and associated OTSiG-O|OCh-O_TT function are located in adjacent equipment, and several typographical/editorial corrections.

❖ [**Recommendation ITU-T G.7701 Amd.2 “Common control aspects - Amendment 2”**](#) describes concepts that are common to both software defined networking (SDN) controller and automatically switched optical network (ASON) control approaches, including common aspects of the interaction between the control functions, management functions and transport resources.

❖ [**Recommendation ITU-T G.7703 “Architecture for the automatically switched optical network”**](#) describes the reference architecture and requirements for the automatically switched optical network (ASON) as applicable to connection-oriented circuit or packet transport networks.

❖ [**Recommendation ITU-T G.7714.1/Y.1705.1 Amd.1 “Protocol for automatic discovery in transport networks - Amendment 1”**](#): In clause 6.1 and Appendix VI.4.2 Case B, clarifies that the ODU TCM sublayer to be used for discovery is not restrict to TCM6 only.

❖ [**Recommendation ITU-T G.7719 “Management information model for MC components and functions”**](#) defines a protocol-neutral information model for managing the components that provide the functions of managing and/or controlling the transport network resources.

❖ [**Recommendation ITU-T G.798 Amd.3 “Characteristics of optical transport network hierarchy equipment functional blocks - Amendment 3”**](#) contains text modifications and additions for:

- supporting 25 Gb/s and 50 Gb/s OTN interfaces.
- supporting 200 Gb/s and 400 Gb/s FlexO interfaces.
- supporting the adaptation of ODUkP to Ethernet Coding sublayer for 50 Gb/s Ethernet signals.

- supporting the adaptation of ODUkP to SDI/1.5G SDI signals.
 - alignment with ITU-T G.709.1 and ITU-T G.709.3.
- ❖ [**Recommendation ITU-T G.8010 Amd.3 “Architecture of Ethernet layer networks - Amendment 3”**](#) describes the functional architecture of Ethernet networks using the modelling methodology described in ITU-T Recommendations G.805, G.809 and G.800.
- ❖ [**Recommendation ITU-T G.8051/Y.1345 "Management aspects of the Ethernet Transport \(ET\) capable network element"**](#): addresses management aspects of the Ethernet transport (ET) capable network element containing transport functions of one or more of the layer networks of the Ethernet transport network. The management of the Ethernet layer networks is separable from that of its client layer networks so that the same means of management can be used regardless of the client. The management functions for fault management, configuration management, performance monitoring and security management are specified.
- ❖ [**Recommendation ITU-T G.8052.1/Y.1346.1 “Transport OAM Management Information/Data Models for Ethernet Transport Network Element”**](#) specifies the management information model and data models for Ethernet Transport Network Element (NE) to support specific interface protocols and specific Management Control (MC) functions.
- ❖ [**Recommendation ITU-T G.8052.2/Y.1346.2 “Resilience Information/Data Models for Ethernet Transport Network Element”**](#) specifies the resilience information models and data models for Ethernet Transport Network Element (NE) to support specific interface protocols and specific management and control (MC) functions.
- ❖ [**Recommendation ITU-T G.807 Amd.1 “Generic functional architecture of the optical media layer - Amendment 1”**](#) describes the generic functional architecture of the optical media network that supports the propagation of signals in the context of a transport network.
- ❖ [**Recommendation ITU-T G.8152.1/Y.1375.1 “AM Information/Data Models for MPLS-TP Network Element”**](#) specifies the OAM information model and data models for MPLS-TP transport Network Element (NE) to support specific interface protocols and specific management and control functions.
- ❖ [**Recommendation ITU-T G.8152.2/Y.1375.2 “Resilience Information/Data Models for MPLS-TP Network Element”**](#) specifies the resilience management information model and data models for MPLS-TP Network Element (NE) as defined in [ITU-T G.8131] and [ITU-T G.8132].
- ❖ [**Recommendation ITU-T G.8265.1 \(revised\) “Precision time protocol telecom profile for frequency synchronization”**](#) describes the architecture and requirements for packet based frequency distribution in telecom networks.
- ❖ [**Recommendation ITU-T G.8271.2/Y.1366.2 \(revised\) “Network limits for time synchronization in packet networks with partial timing support from the network”**](#) 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 these packet networks at phase and time synchronization interfaces. It also outlines the minimum requirements for the synchronization function of

network elements. Recommendation ITU-T G.8271.2/Y.1366.2 addresses the case of time and phase distribution across a network with packet based method with partial timing support to the protocol level from the network.

- ❖ **Recommendation ITU-T G.8273.4/Y.1368.4 Amd.1 “Timing characteristics of telecom boundary clocks and telecom time slave clocks for use with partial timing support from the network - Amendment 1”** provides the following updates:
 - Changes in clauses 2, 4, 7.3, 7.6.2, 9.1, Annex A, Annex B, and Bibliography
 - Adds Appendix VI: PTP Noise Tolerance Testing for PTS and APTS Clocks.
- **Recommendation ITU-T G.8275.1/Y.1369.1 Amd.1 “Precision time protocol telecom profile for phase/time synchronization with full timing support from the network - Amendment 1”** provides the following updates:
 - Annex B, Annex E, and Appendix V, common to G.8275.1 and G.8275.2, moved to G.8275.
 - Add Packet timing signal fail support.
- ❖ **Recommendation ITU-T G.8275.1/Y.1369.1 Amd.2 (revised) “Precision time protocol telecom profile for phase/time synchronization with full timing support from the network: Amendment 2”** provides the following updates:
 - Clarify the setting of frequencyTraceable for T-GM and T-BC
 - Add details on the use of IEEE 1588-2019
 - Clarification on some procedures
 - Add new appendix “Considerations in an environment of more than two PTP ports on a single PTP communication path when using transparent clocks and multicast addressing”.
- ❖ **Recommendation ITU-T G.8275.2/Y.1369.2 (2020) Amd.2 “Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network - Amendment 2”** provides the following updates:
 - Details added on the use of [IEEE 1588-2019]
 - New profileVersion 1.2 and new profile Identifier added for [IEEE 1588-2019]
 - New appendix added “Considerations on selecting time out values” New material added to clause 6.7.11 Packet timing signal fail. New member “defaultDS.sdold” added to Table A.1 defaultDS data set member specifications
 - New member “currentDS.meanDelay” added to Table A.2 currentDS data set member specifications
 - New member “portDS.minorVersionNumber” added to Table A.5 portDS data set member specifications
 - Parameters for “portDS.syncReceiptTimeout” and “portDS.delayRespReceiptTimeout” in Table A.5, which were “for further study”, were filled in.
- **Recommendation ITU-T G.8275.2/Y.1369.2 Amd.1 “Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network - Amendment 1”** provides the following updates:
 - Annex B, Annex E, and Appendix IV, common to G.8275.1 and G.8275.2, moved to G.8275.
 - Updated “for further study” references to refer to G.8273.4.

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- New material added to clause 6.7.11 Packet timing signal fail.
 - New members “portDS.syncReceiptTimeout” and “portDS.delayRespReceiptTimeout” added to Table A.5 portDS data set member specifications.
 - ❖ [**Recommendation ITU-T G.8275/Y.1369 Amd.1 “Architecture and requirements for packet-based time and phase distribution - Amendment 1”**](#) incorporates reference to IEEE1588-2019 and includes Appendix IX: Considerations on the use of IEEE1588-2019.
 - ❖ [**Recommendation ITU-T G.8310 “Functional architecture for metro transport network”**](#) describes the functional architecture of the metro transport network (MTN) using the modelling methodology described in [ITU T G.800], and [ITU T G.805].
 - ❖ [**Recommendation ITU-T G.8312 “Interfaces for a metro transport network”**](#) describes a transport technology targeted for metro transport networks, including transport of distributed radio access network (D RAN) and centralized radio access network (C RAN) traffic.
 - ❖ [**Recommendation ITU-T G.872 Amd.1 “Architecture of the optical transport network - Amendment 1”**](#) 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.
 - ❖ [**Recommendation ITU-T G.876 "Management Requirement and Information Model for the optical media network"**](#) describes the management requirements and the information model for network elements (NEs) that contain optical media layer functions defined by the ITU-T equipment Recommendation based on the [ITU-T G.807] architecture, e.g., [ITU-T G.798]. The management requirements are based on [ITU-T G.7710] and the information model is based on [ITU-T G.7711] object classes.
 - [**Recommendation ITU-T G.9711 “Multi-gigabit fast access to subscriber terminals \(MGfast\) - Physical layer specification \(New\)”**](#) specifies a multi-gigabit broadband access technology that exploits the existing infrastructure of wire-pairs and coaxial cable that were originally deployed for plain old telephone service (POTS) or TV services.
 - ❖ [**Recommendation ITU-T G.9802.1 “Wavelength division multiplexed passive optical networks \(WDM PON\): General requirements”**](#) describes the general requirements for Wavelength Routed ODN based WDM PON. The general architecture and system level requirements, such as line rates, capacity in terms of channel count, OLT and ONU modularity, security, are given. The symmetric nominal line rate combinations of 25 Gbit/s and 10Gbit/s per wavelength channel are supported. The requirements for a range of relevant applications are described in terms of the needed interfaces, physical layer, operation, synchronization, resilience and protection options.
 - ❖ [**Recommendation ITU-T G.9804.1 Amd.1 “Higher Speed Passive Optical Networks: Requirements - Amendment 1”**](#) includes additional requirements for higher speed PON.
 - ❖ [**Recommendation ITU-T G.9804.2 “Higher Speed Passive Optical Networks: Common Transmission Convergence layer Specification” \(under approval\)**](#) specifies the common transmission convergence (ComTC) layer of Higher Speed passive optical network (HSP) systems providing optical access for residential, business, mobile backhaul and other applications. This specification will define operation of HSP systems in a manner agnostic

of transmission rates, number of operating wavelength channels, and signal modulation. It is intended to be applicable to systems implementing a subset of the specified range of features.

- ❖ [**Recommendation ITU-T G.9804.3 “50-Gigabit-capable passive optical networks \(50G-PON\): Physical media dependent \(PMD\) layer specification”**](#) describes a 50-Gigabit-capable passive optical network (50G-PON) system in an optical access network for residential, business, mobile backhaul and other applications. This Recommendation contains the references, the common definitions, acronyms, abbreviations and the specifications of the physical media dependent layer of the 50G-PON system.
- ❖ [**Recommendation ITU-T G.9806 Amd.2 “Higher speed bidirectional, single fibre, point-to-point optical access system \(HS-PtP\) - Amendment 2”**](#) adds support for 50 Gbit/s.
- ❖ [**Recommendation ITU-T G.987.3 Amd.2 “10-Gigabit-capable passive optical networks \(XG-PON\): Transmission convergence \(TC\) layer specification - Amendment 2”**](#) aligns the ODN class table in G.987.3 to that recently added to G.9807.1. It also fixes some small graphical errors in the figures.
- ❖ [**Recommendation ITU-T G.988 \(2017\) Amd.4 “ONU management and control interface \(OMCI\) specification: Amendment 4”**](#) specifies the optical network unit (ONU) management and control interface (OMCI) for optical access networks. This amendment makes editorial changes to TWDM channel tuning performance history data part 1, TWDM channel managed entity and clause 9.2.21. Amendment 4 also adds:
 - Support of RFC2543 call hold (with connection address 0.0.0.0)
 - Support of dial plan alarms
 - Support of DHCP performance monitoring
 - Support of ONU operational performance monitoring
 - Supports additional VCD voice alarms
 - Adds clarifications to FEC seconds definition.
- ❖ [**Recommendation ITU-T G.989.3 \(revised\) “40-Gigabit-capable passive optical networks \(NG-PON2\): Transmission convergence layer specification”**](#) specifies the transmission convergence layer of 40 Gigabit-capable passive optical network (NG-PON2) systems providing optical access for residential, business, mobile backhaul and other applications.
- ❖ [**Recommendation ITU-T G.9903 Amd.1 “Narrowband orthogonal frequency division multiplexing power line communication transceivers for G3-PLC networks - Amendment 1”**](#) covers Cenelec A, Cenelec B, ARIB and FCC bandplans. It adds the G3-PLC Hybrid PLC & RF Profile as new Annex H.
- [**Recommendation ITU-T G.994.1 Amd.2 “Handshake procedures for digital subscriber line transceivers - Amendment 2”**](#) fully integrates the Amendment 1 to Recommendation ITU-T G.994.1 (2018) and includes the following new technical material:
 - A new annex with a collision control protocol for point-to-multipoint operation
 - Modify the mandatory carrier set for G.9701 Annex X with operation over coax
 - A new annex M with managed objects in a new format compatible with a YANG model
 - Add codepoints for the support of G.9711.

- ❖ **Recommendation ITU-T G.9961 (2018) Amd.3 “Unified high-speed wireline-based home networking transceivers - Data link layer specification Amendment 3”** includes enhancements to simplify routing mechanisms in tree topologies.
- ❖ **Recommendation ITU-T G.9963 Amd.1 “Unified high-speed wireline-based home networking transceivers - Multiple input/multiple output specification: Amendment 1”** aligns this Recommendation with recommendations [ITU-T G.9960], [ITU-T G.9961] and [ITU-T G.9962].
- **Recommendation ITU-T G.997.3 “Physical layer management for MGfast transceivers”** specifies the physical layer management for Multi-gigabit fast access to subscriber terminals (MGfast) transmission systems. It specifies managed objects for configuration, fault, status, inventory and performance management.
- ❖ **Recommendation ITU-T G.9976 “Support UHD video service over G.hn” (under approval)** studies the specificities of transmission of UHD video service over G.hn. This document provides analysis on typical deployment of UHD video types in home network, typical scenarios (including typical topology, medium usage, support endpoints), and network requirements.
- ❖ **Recommendation ITU-T G.9991 (2019) Amd.2 “High-speed indoor visible light communication transceiver - System architecture, physical layer and data link layer specification - Amendment 2”** includes a mechanism to support advanced inter-domain mobility through an external controller.
- ❖ **Recommendation ITU-T H.644.4 “Architecture for mobile/multi-access edge computing enabled content delivery networks”** specifies a functional architecture for mobile/multi-access edge computing (MEC) enabled content delivery network (MEC-CDN). The functions and functional blocks within this functional architecture and the related reference points are specified in this Recommendation for matching the requirements in [ITU-T F.743.10]. Particularly, this Recommendation also provides the deployment of virtualized CDN service and the interworking between virtualized CDN functionalities and MEC management system, within a MEC-CDN ecosystem. In addition, a containerized solution of MEC-CDN is given in this Recommendation, followed by the basic information flows. This Recommendation is intended to provide the references for the virtualized CDN solution providers to extend their CDN service to the network edges.
- ❖ **Recommendation ITU-T H.862.4 “Framework for ICT olfactory function test systems”** defines framework for ICT olfactory function test system. The scope of this Recommendation lies in the framework for ICT-based olfactory function test system involving the human factors. Specifically, the human's condition is checked for the olfactory examination, and the scent is sprayed accordingly to the human, and the human's reaction is collected and analysed to define the process of confirming the olfactory function. The proposed system is for four types of olfactory function tests: odour identification, olfactory threshold, odour recognition, and olfactory discrimination. Components and detailed actions according to the procedure of the corresponding tests are defined.
- ❖ **Recommendation ITU-T H.862.5 “Emotion enabled multimodal user interface based on artificial neural networks”** defines functional entities and architecture for emotion enabled multimodal user interface based on artificial neural network. In particular, the

scope of this Recommendation includes architectural framework, functional entities and interfaces and application to multimodal emotion analysis. The proposed system architecture is for multimodal UI based on emotion analysis with some properties and illustrations and data with artificial neural network. The multimedia data for the input is composed of text, speech, and image. For the unimodal emotion analysis, these data are pre-processed in the corresponding module.

- ❖ **Recommendation ITU-T J.1110 “Functional requirements specification for self-interference cancellation function of in-band full-duplex in HFC based network”** is focused on the functional specification of the self-interference cancellation for IFDX transmission system in HFC based network.
- ❖ **Recommendation ITU-T J.208 “Harmonization of Integrated Broadcast-Broadband DTV application control framework”**: defines methods for harmonization of IBB systems and/or their application environment by identifying commonalities across IBB systems and maximizing portability of IBB applications.
- ❖ **Recommendation ITU-T L.100/L.10 (revised) “Optical fibre cables for duct and tunnel application”** describes characteristics, construction, test methods, and performance criteria of optical fibre cables installed by pulling method for duct and tunnel application.
- ❖ **Recommendation ITU-T L.1060 “General principles for the green supply chain management of ICT manufacturing industry”** focuses on establishing general principles for the green supply chain (GSC) management of information and communication technology (ICT) manufacturing industry. It mainly gives the general principles for the green properties including upstream and downstream suppliers, logistics, recycling and utilization based on the product whole life cycle. General requirements such as the green supply chain management strategy, implementation, green production, recycling, and green information disclosure will be proposed as well.
- ❖ **Recommendation ITU-T L.1317 “Guidelines on energy efficient blockchain systems” (under approval)** focuses on the impact of blockchain in energy efficiency. A literature analysis is performed with regard to the understanding of the blockchain energy demands and how these can be optimized. The aim of this Recommendation is to explain the energy demand of blockchain, to define the blockchain energy model and to describe the energy efficiency parameters that can be calibrated in order to enhance the corresponding energy efficiency.
- ❖ **Recommendation ITU-T L.201 (revised) “Performance requirements for passive optical nodes: Sealed closures for outdoor environments”** refers to passive optical nodes in outdoor environments. It deals with the design of the closure housing as well as the fibre organizer or fibre management system, taking into account mechanical and environmental characteristics as well as the characteristics of the optical fibre organizer. The following new elements are added in this revision:
 - a new clause 5.3 on closure materials with detailed test requirements for UV-light exposure and fungus resistance of polymer materials and a material test requirement for the ageing of polymer materials by humidity;
 - a new clause 5.5 on cable attachment and termination with recommendations for electrical grounding of metallic elements of the cables;
 - a test program for the performance evaluation of sealed optical closures in ground level (OG) environment.

The following changes were made to harmonize the performance tests with [IEC 61753-1]:

- Sealing tests are done with 20 kPa overpressure for ground level (OG) and above ground (OA) closures;
- Pass-fail criteria of pressure loss during test are added to mechanical sealing tests for ground level (OG) and above ground (OA) closures;
- Reduced loads cable axial tension test for small diameter cables and microduct tubes;
- Reduced loads for cable axial compression test for small diameter cables;
- The duration of the cycles in cable torsion and cable bending test is added;
- Location for impact test added for rectangular shaped closures;
- Free fall test is removed (it is covered by a more reproduceable shock test);
- In the assembly and disassembly test the duration is reduced to 5 cycles;
- Resistance to solvents and contaminating fluids: added immersion in diesel with duration of 1 h and 24 h drying time and added immersion in petroleum jelly for 5 days.
- Kerosene is removed;
- Duration of the change of temperature is reduced to 12 cycles;
- Water immersion test at 1 m for 7 days for ground level (OG) closures.

- ❖ **Recommendation ITU-T M.3365 “Requirements for QoE management of video in visual surveillance” (under approval)** introduces requirements for QoE management of video in visual surveillance, includes management of video resource, management of QoE indicators for video, configuration management of QoE evaluation activity, management of QoE evaluation record. This Recommendation provides the scenario of video quality evaluation system, which is a tool that implements the requirements given in this Recommendation. This Recommendation also gives examples of video quality evaluation record for reference.
- ❖ **Recommendation ITU-T P.383 “Technical requirements and test methods for digital wired or wireless headset interfaces”** specifies requirements and provides corresponding test methods for headsets and headphones as well as terminals, when tested separately.
- ❖ **Recommendation ITU-T P.57 (revised) “Artificial ears”** specifies the electro-acoustical characteristics of artificial ears to be used for telephonometric measurements. Four devices are specified: a telephone band type for measurements on traditional telephone sets, an insert earphone type, a type faithfully reproducing the characteristics of the human ear and a type faithfully reproducing the characteristics of the human ear including an average adult human ear canal.
- ❖ **Recommendation ITU-T P.58 (revised) “Head and torso simulator for telephonometry”** specifies the electroacoustic characteristics of the head and torso simulator (HATS) to be used for telephonometric measurements.
- ❖ **Recommendation ITU-T P.700 (revised) “Calculation of loudness for speech communication”** describes a unified method required for calculating loudness, allowing comparison of narrowband (NB) (300-3.4k Hz), wideband (WB) (100-8k Hz), super-wideband (SWB) (50-14k Hz) and fullband (FB) (10-20k Hz) telephony, for all types of terminals including handset, hands-free and conference terminals. 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.808 \(revised\) “Subjective evaluation of speech quality with a crowdsourcing approach”**](#) describes a crowdsourcing approach for conducting subjective evaluations of speech quality. This Recommendation gives guidance on the test material, experimental design, and the procedure for conducting listening tests in the crowd.
- ❖ [**Recommendation ITU-T P.913 \(revised\) “Methods for the subjective assessment of video quality, audio quality and audiovisual quality of Internet video and distribution quality television in any environment”**](#) describes non-interactive subjective assessment methods for evaluating the one-way overall video quality, audio quality or audiovisual quality for applications such as Internet video and distribution quality video.
- ❖ [**Recommendation ITU-T Q.4044 “Test suite for interoperability testing of virtual switch”**](#) provides test suite for interoperability testing of virtual switch, which contains test cases specifying the test objective, test procedures and expected results.
- ❖ [**Recommendation ITU-T Q.4065 “Framework of model network for Tactile Internet testing”**](#) describes the architecture, scenarios, and key networks metrics for establishing model network for testing Tactile Internet services. Particularly, the aim of a model network is to study the general principles of data generation for transmission of a tactile sensation through the telecommunication networks, including analysis of the network latency and other network performance parameters.
- ❖ [**Recommendation ITU-T Q.4067 “Signalling requirements for VNF lifecycle management under the testing environment”**](#) specifies the process and signalling requirements for virtualized network function (VNF) lifecycle management under testing environment by architecturally adding the testing platform in the NFV framework. The signaling focuses on the interface between the VNF instantiation functional component in testing platform and NFVO functional component in MANO.
- ❖ [**Recommendation ITU-T Q.4068 “Open APIs for interoperable testbed federations”**](#) presents a set of open APIs for interoperable testbed federation able to manage not only the interconnection and the interoperability of testbeds in a federation, but also to handle the resources advertisement, allocation and provision. The APIs are designed to manage the users involved in the federation like the experimenters and to assign roles to the users. In the same way, the usage of a resource is attributed to an experimenter through the open APIs for interoperable testbed federation.
- ❖ [**Recommendation ITU-T Q.4101 “Hybrid peer-to-peer \(P2P\) communications: Tree and data recovery procedures”**](#) specifies procedures for construction and recovery of a tree-based hybrid overlay network as well as recovery of data lost during reconstruction of the overlay network. provides two recovery modes, which are push and pull mode. The data recovery mode is specified on its creation by an owner of the overlay network based on the characteristics of data to be distributed over the network.
- ❖ [**Recommendation ITU-T Q.5023 “Protocol for managing intelligent network slicing with AI-assisted analysis in IMT-2020 network”**](#) specifies protocol for managing intelligent network slicing with AI-assisted network analysis function in IMT-2020 networks. It describes architectural concept of intelligent network slicing APIs and management system, reference points among relevant functional elements, signalling flows over each reference point, and message formats with detail information.

- ❖ **Recommendation ITU-T Q.5053 “Mobile device access list audit interface”** defines the methodologies and interfaces between Mobile device access list audit system (MDALAS) and Mobile Network Operators’ Equipment Identity Register (EIR) to audit and reconcile whether the MNOs are complying with the defined Mobile device access list requirements. This document proposes different types of methodologies and interfaces to check and reconcile the Mobile device access list used by the MNOs to comply with the regulations with the Mobile device access list Audit System (MDALAS).
- ❖ **Recommendation ITU-T Q.834.1 (2004) Amd.1 “ATM-PON requirements and managed entities for the network and network element views: Amendment 1 - Replace the reference to IEEE 802.1D by IEEE 802.1Q”** replaces the reference from IEEE 802.1D to 802.1Q (2018), and makes some corresponding changes for the related texts.
- ❖ **Recommendation ITU-T Q.834.4 (2003) Amd.2 “A CORBA interface specification for Broadband Passive Optical Networks based on UML interface requirements: Amendment 2 - Replace the reference to IEEE 802.1D by IEEE 802.1Q”** adds the reference 802.1Q (2018), and makes some corresponding changes for the related texts.
- ❖ **Recommendation ITU-T Q.838.1 (2004) Amd.1 “Requirements and analysis for the management interface of Ethernet Passive Optical Networks (EPON): Amendment 1 - Replace the reference to IEEE 802.1D by IEEE 802.1Q”** replaces the reference from IEEE 802.1D to 802.1Q (2018), and makes some corresponding changes for the related texts.
- ❖ **Recommendation ITU-T T.627 “Test specification for video surveillance networking”** describes the test specification for video surveillance networking. Recommendation ITU-T H.626V2 defines the architecture of the video surveillance system, and Recommendation ITU-T H.627V2 defines the signalling and protocols for a video surveillance system. This Recommendation specifies the test objects, test classification and test tools, test environment, and test requirements, which can be used for testing against ITU-T H.626V2 and ITU T H.627V2.
- ❖ **Recommendation ITU-T X.501 Amd.1 “Information Technology - Open systems Interconnection - The Directory – Models: Draft amendment 1 (to Rec. ITU-T X.501(2019) | ISO/IEC 9594-2:2020): Miscellaneous enhancements” (under approval).**
- ❖ **Recommendation ITU-T X.672 | ISO/IEC 29168-1 (revised) “Information technology – Open systems interconnection – Object identifier resolution system” (under approval)** specifies the object identifier (OID) resolution system (ORS). This enables (arbitrary) information to be associated with any ORS-supported OID node (of the international object identifier tree defined in Rec. ITU-T X.660 | ISO/IEC 9834-1). This associated information is identified by an application specification that may have a requirement for instances of that application (running on any computer system) to obtain the associated information by an ORS search, using an ASN.1 OID-IRI value to identify the node. Currently defined application information for a node includes the canonical form of an international object identifier, child node information, registration information about the owner of the node, a reference to an ASN.1 module identified by the node, information supporting tag-based applications, and information supporting cybersecurity.
- ❖ **Recommendation ITU-T X.680 | ISO/IEC 8824-1 (revised) “Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation”** provides a notation called Abstract Syntax Notation One (ASN.1) for defining the syntax of

information data. It defines a number of simple data types and specifies a notation for referencing these types and for specifying values of these types.

- ❖ [**Recommendation ITU-T X.681 | ISO/IEC 8824-2 \(revised\) “Information technology – Abstract Syntax Notation One \(ASN.1\): Information object specification”**](#) provides the ASN.1 notation which allows information object classes as well as individual information objects and sets thereof to be defined and given reference name.
- ❖ [**Recommendation ITU-T X.682 | ISO/IEC 8824-3 \(revised\) “Information technology – Abstract Syntax Notation One \(ASN.1\): Constraint specification”**](#) provides the ASN.1 notation for the general case of constraint and exception specification by which the data values of a structured data type can be limited.
- ❖ [**Recommendation ITU-T X.683 | ISO/IEC 8824-4 \(revised\) “Information technology – Abstract Syntax Notation One \(ASN.1\): Parameterization of ASN.1 specifications”**](#) defines the provisions for parameterized reference names and parameterized assignments for data types which are useful for the designer when writing specifications where some aspects are left undefined at certain stages of the development to be filled in at a later stage to produce a complete definition of an abstract syntax.
- ❖ [**Recommendation ITU-T X.690 | ISO/IEC 8825-1 \(revised\) “Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules \(BER\), Canonical Encoding Rules \(CER\) and Distinguished Encoding Rules \(DER\)”**](#) defines a set of Basic Encoding Rules (BER) that may be applied to values of types defined using the ASN.1 notation.
- ❖ [**Recommendation ITU-T X.691 | ISO/IEC 8825-2 \(revised\) “Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules \(PER\)”**](#) describes a set of encoding rules that can be applied to values of all ASN.1 types to achieve a much more compact representation than that achieved by the Basic Encoding Rules and its derivatives (described in Rec. ITU-T X.690 | ISO/IEC 8825-1).
- ❖ [**Recommendation ITU-T X.692 | ISO/IEC 8825-3 \(revised\) “Information technology – ASN.1 encoding rules: Specification of Encoding Control Notation \(ECN\)”**](#) defines the Encoding Control Notation (ECN) used to specify encodings (of ASN.1 types) that differ from those provided by standardized encoding rules such as the Basic Encoding Rules (BER) and the Packed Encoding Rules (PER).
- ❖ [**Recommendation ITU-T X.693 | ISO/IEC 8825-4 \(revised\) “Information technology – ASN.1 encoding rules: XML Encoding Rules \(XER\)”**](#) specifies rules for encoding values of ASN.1 types using the Extensible Markup Language (XML).
- ❖ [**Recommendation ITU-T X.694 | ISO/IEC 8825-5 \(revised\) “Information technology – ASN.1 encoding rules: Mapping W3C XML schema definitions into ASN.1”**](#) defines rules for mapping an XSD Schema (a schema conforming to the W3C XML Schema specification) to an ASN.1 schema in order to use ASN.1 encoding rules such as the Basic Encoding Rules (BER), the Distinguished Encoding Rules (DER), the Packed Encoding Rules (PER) or the XML Encoding Rules (XER) for the transfer of information defined by the XSD Schema.
- ❖ [**Recommendation ITU-T X.695 | ISO/IEC 8825-6 \(revised\) “Information technology – ASN.1 encoding rules: Registration and application of PER encoding instructions”**](#) specifies the rules for applying PER encoding instructions using either type prefixes or an encoding control section.

- ❖ [**Recommendation ITU-T X.696 | ISO/IEC 8825-7 \(revised\) “Information technology - ASN.1 encoding rules: Specification of Octet Encoding Rules \(OER\)”**](#) specifies two sets of binary encoding rules that can be applied to values of all ASN.1 types using less processing resources than the Basic Encoding Rules and its derivatives (described in Rec. ITU T X.690 | ISO/IEC 8825-1) and the Packed Encoding Rules (described in Rec. ITU-T X.691 | ISO/IEC 8825 2).
- ❖ [**Recommendation ITU-T X.697 | ISO/IEC 8825-8 \(revised\) “Information technology - ASN.1 encoding rules: Specification of JavaScript Object Notation Encoding Rules \(JER\)”**](#) specifies a set of JavaScript Object Notation Encoding Rules (JER) that may be used to derive a transfer syntax for values of types defined in Rec. ITU-T X.680 | ISO/IEC 8824-1, Rec. ITU T X.681 | ISO/IEC 8824-2, Rec. ITU-T X.682 | ISO/IEC 8824-3, Rec. ITU-T X.683 | ISO/IEC 8824-4. It is implicit in the specification of these encoding rules that they are also to be used for decoding.
- ❖ [**Recommendation ITU-T X.785 “Guidelines for defining REST-based managed objects and management interfaces”**](#) defines a set of guidelines for managed object modelling and a management interface for REST-based network management. It is part of a framework for REST-based network management interfaces. It specifies how REST-based management interfaces should be defined. It covers the generic accessing methods of REST-based managed objects, accessing methods for specific MOs, information modelling in REST/HTTP and YAML/JSON schemas. Some HTTP requests/responses and YAML/JSON schemas are provided for defining some basic data types: generic managed object (MO) and generic MO accessing methods.
- ❖ [**Recommendation ITU-T Y.1545.1 Amd.1 “Framework for monitoring the quality of service of IP network services - Amendment 1”**](#) gives guidance to regulators about QoS parameters for evaluating the quality of internet services, QoS evaluation scenarios and sampling methodologies. Amendment 1 introduces text for the radio coverage availability parameter, which was previously identified for further study.
- ❖ [**Recommendation ITU-T Y.2086 “Framework and Requirements of Decentralized Trustworthy Network Infrastructure” \(under approval\)**](#) specifies the framework and requirements of the decentralized network infrastructure. The decentralized network infrastructure is expected to enhance the trustworthiness of the network infrastructure via a universal basic framework for different kinds of high-level network services. This Recommendation includes the framework, requirements, and use cases of the decentralized network infrastructure.
- ❖ [**Recommendation ITU-T Y.2343 “Scenarios and Capability Requirements of Programmable Log Analysis in Next Generation Networks”**](#) specifies scenarios and capability requirements for programmable log analysis assurance for the next generation networks (NGN-PLA). This Recommendation first provides an overview of programmable log analysis in next generation networks. This Recommendation introduces the ecosystem for programmable log analysis in next generation networks, including roles and sub roles such as: log provider of NGN-PLA; log collection and forwarding service provider of NGN-PLA; log analysis service provider of NGN-PLA; log storage service provider of NGN-PLA; and log analysis service customer of NGN-PLA. This Recommendation then describes the requirements of programmable log analysis in next generation networks which are derived from the scenario use cases introduced in appendix I. Based on the overview and

requirements. This Recommendation specifies programmable log analysis capabilities assurance for the next generation network.

- ❖ [**Recommendation ITU-T Y.2501 “Computing Power Network - framework and architecture”**](#) describes the framework and architecture of computing power network. It is a new type of network that realizes the optimized resource allocation, by distributing computing, storage, network and other resource information of service nodes through network control plane. It combines network context and user requirements to provide the optimal distribution, association, transaction and scheduling of computing, storage and network resources.
- ❖ [**Recommendation ITU-T Y.2623 “Requirements and framework of Industrial Internet networking based on future packet based network evolution”**](#) provides definitions and requirements of Industrial Internet networking in support of customized, collaborative, service-oriented and intelligent production/services. It also describes a framework of Industrial Internet networking for understanding significant relationships among the entities of factory internal network and factory external network.
- ❖ [**Recommendation ITU-T Y.3113 “Requirements and framework for latency guarantee in large scale networks including IMT-2020 network”**](#) specifies the requirements and the framework for effective and efficient solutions for latency guarantee and the cooperation among heterogeneous QoS domains.
- ❖ [**Recommendation ITU-T Y.3177 “Architectural framework of artificial intelligence-based network automation for resource and fault management in future networks including IMT-2020”**](#) specifies an architectural framework of artificial intelligence (AI)-based network automation for resource management and fault management for the purpose of improving network efficiency and performance by continuously monitoring the network and promptly deciding about appropriate actions for resource adaptation and fault recovery with the help of AI including machine learning.
- ❖ [**Recommendation ITU-T Y.3178 “Functional framework of AI-based network service provisioning in future networks including IMT-2020”**](#) specifies a functional framework of artificial intelligence (AI)-based network service provisioning in future networks, including IMT-2020. This Recommendation addresses the following aspects:
 - Business role-based model for AI-based network service provisioning;
 - High-level requirements for the roles and their interactions from an AI-based operational perspective;
 - Functional components and their interactions for AI-based operations for network service provisioning.
- ❖ [**ITU-T Y.Suppl.58 “Internet of things and smart cities and communities standards roadmap”**](#) presents the Joint Coordination Activity on Internet of Things and Smart Cities and Communities (JCA-IoT and SC&C) roadmap, which contains a collection of standards and ITU-T Recommendations related to Internet of things (IoT), smart cities and communities (SC&C), network aspects of identification systems, including RFID (NID) and ubiquitous sensor networks (USNs).
- ❖ [**ITU-T Y.Suppl.68 “Framework for Internet of Things ecosystem Master Plan”**](#) describes a framework to support Member States to define their IoT ecosystem Master Plan, based

on vertical domain assessment and identification of technical aspects to support the selected verticals. It also presents some actions to support the Master Plan deployment.

- ❖ **ITU-T Y.Suppl.69 “Web based data model for IoT and smart city systems and services”** covers the following: - Suggestions for generic considerations of data format; - Necessity for a new type of metadata for interoperability; - Necessity and importance for a common data model for bridging existing data models; - Necessity, importance, and adequacy of microdata formats for data management in web environments; - Fundamental concepts and background of current web environments and microdata formats in terms of structuring and managing data in detail; - A new category of metadata, called procedural metadata, and its basic principles.
- **Recommendation ITU-T Y.4122 “Requirements and capability framework of edge computing-enabled gateway in the IoT”**: The gateway is an important component of IoT systems, enabling IoT devices to connect to communication network. Edge computing technologies can benefit the IoT providing computation, storage, networking and intelligence in proximity to IoT devices. Compared with the common gateway [ITU-T Y.4101], the edge computing-enabled gateway in the IoT (EC-enabled IoT gateway) has additional capabilities supporting service layer interworking, and application layer interworking among IoT devices, IoT platforms and IoT application servers. In addition, the EC-enabled IoT gateway supports data transmission capabilities for IoT applications sensitive to time, latency, jitter and packet loss. Based on common requirements and capabilities of a gateway for Internet of things applications [ITU-T Y.4101] and IoT requirements for support of edge computing [ITU-T Y.4208], additional capabilities and capability framework of the edge computing-enabled gateway in the IoT are specified. Examples of applicability of the edge computing-enabled gateway in the IoT are also given.
- **Recommendation ITU-T Y.4211 “Accessibility requirements for smart public transportation services”** specifies accessibility requirements for smart public transportation services.
- **Recommendation ITU-T Y.4419 “Requirements and Capability Framework of Smart Utility Metering (SUM)”** specifies requirements and capabilities for the support for smart utility metering (SUM). Smart Utility Metering (SUM) can provide remote data collection for utility metering, device maintenance in real time and can support a variety of applications.
- **Recommendation ITU-T Y.4420 “Framework of IoT based monitoring and management for Lift”** describes a framework of IoT based monitoring and management for lift with a protocol and data model to solve these problems.
- **Recommendation ITU-T Y.4421 “Functional architecture for unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks” (under approval)** is to solve the issues of civilian UAVs accessing and communicating in IMT-2020 networks using its transmission capabilities.
- **Recommendation ITU-T Y.4471 “Functional architecture of network-based driving assistance for autonomous vehicles”** defines a reference functional architecture of network-based driving assistance (NDA) for autonomous vehicles. It clarifies the concept of NDA, specifies key functional entities and defines reference points between entities. The use cases and operational procedures are also provided in an informative appendix.

For improvement in the driving of autonomous vehicles, coordination between vehicles and infrastructures need to be improved with network technologies to provide the increasing transportation services and application requirements. NDA can improve the safety and efficiency of automated driving with capabilities of cooperative perception and decisions.

- [**Recommendation ITU-T Y.4476 “OID-based resolution framework for transaction of distributed ledger assigned to IoT resources”**](#) describes the concepts, functional requirements, architecture and procedures of an OID-based resolution framework by using DLT.
- [**Recommendation ITU-T Y.4559 “Requirements and functional architecture of base station inspection services using unmanned aerial vehicles”**](#) describes requirements and functional architecture of BSI services using UAVs. It focuses on how to effectively provide inspection services for the base station using BSI-dedicated UAVs (BSI-UAVs).
- [**Recommendation ITU-T Y.4809 “Unified IoT Identifiers for Intelligent Transport Systems” \(under approval\)**](#) defines field formats for identifying road signs/signals and identifies specific values for identifiers of such signs/signals.
- [**Recommendation ITU-T Y.4908 “Performance evaluation frameworks of e-health systems in the IoT”**](#) addresses this need for effective performance evaluation frameworks of e-health systems in the IoT and includes:
 - A classification of e-health services in the IoT
 - A non-exhaustive set of non-functional performance evaluation factors applicable to the e-health systems in the IoT
 - Performance evaluation frameworks for e-health systems in the IoT.
- ❖ [**Recommendation ITU-T Z.100 \(revised\) “Specification and Description Language - Overview of SDL-2010”**](#) introduces the Specification and Description Language, intended for unambiguous specification and description of telecommunication systems. The scope of the Specification and Description Language is elaborated in clause 1. The ITU-T Z.100 series for SDL 2010 together form a reference manual for the language. The objective of this Recommendation is to provide an introductory overview to the language and the rest of the reference manual contained in the ITU-T Z.100 series for SDL 2010.
- ❖ [**Recommendation ITU-T Z.100 Annex F3 \(revised\) “Specification and Description Language - Overview of SDL-2010 - SDL formal definition: Dynamic semantics”**](#) defines the SDL 2010 dynamic semantics.
- ❖ [**Recommendation ITU-T Z.161 \(revised\) “Testing and Test Control Notation version 3: TTCN-3 core language” \(under approval\)**](#) 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. This revision of the Recommendation contains amendments, clarifications, corrigenda and editorial corrections.

- ❖ **Recommendation ITU-T Z.161.2 (revised) “Testing and Test Control Notation version 3: TTCN-3 language extensions: Configuration and deployment support” (under approval)** defines the configuration and deployment support package 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 Common Object Request Broker Architecture (CORBA) based platforms, application programming interfaces (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 this Recommendation.
- ❖ **Recommendation ITU-T Z.161.3 (revised) “Testing and Test Control Notation version 3: TTCN-3 language extensions: Advanced parameterization” (under approval)** defines the advanced parameterization package 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 Common Object Request Broker Architecture (CORBA) based platforms, application programming interfaces (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 this Recommendation.
- ❖ **Recommendation ITU-T Z.161.4 (revised) “Testing and Test Control Notation version 3: TTCN-3 language extensions: Behaviour types” (under approval)** defines the behaviour types package 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 Common Object Request Broker Architecture (CORBA) based platforms, application programming interfaces (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 this Recommendation.
- ❖ **Recommendation ITU-T Z.161.7 (revised) “Testing and Test Control Notation version 3: TTCN-3 language extensions: Object-Oriented Features” (under approval)** defines the support for object-oriented features in 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.
- ❖ **Recommendation ITU-T Z.167 (revised) “Testing and Test Control Notation version 3: Using ASN.1 with TTCN-3” (under approval)** 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. The harmonization of other languages with TTCN-3 is not covered by this Recommendation. This revision of the Recommendation contains amendments, clarifications, corrigenda and editorial corrections.

- ❖ **Recommendation ITU-T Z.168 (revised) “Testing and Test Control Notation version 3: The IDL to TTCN-3 mapping” (under approval)** defines the mapping rules for Common Object Request Broker Architecture (CORBA) Interface Definition Language (IDL) to TTCN-3 (as defined in Recommendation ITU-T Z.161) to enable testing of CORBA-based systems. The principles of mapping CORBA IDL to TTCN-3 can be also used for the mapping of interface specification languages of other object /component-based technologies. The specification of other mappings is outside the scope of this Recommendation. This revision of the Recommendation contains amendments, clarifications, corrigenda and editorial corrections.
- ❖ **Recommendation ITU-T Z.169 (revised) “Testing and Test Control Notation version 3: Using XML schema with TTCN-3” (under approval)** defines the mapping rules for the world wide web consortium (W3C) schema to Testing and Test Control Notation 3 (TTCN-3) to enable testing of XML-based systems, interfaces and protocols. This revision of the Recommendation contains amendments, clarifications, corrigenda and editorial corrections.
- ❖ **Recommendation ITU-T Z.171 (revised) “Testing and Test Control Notation version 3: Using JSON with TTCN-3” (under approval)** 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.

76. The [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. FIGI is designed to advance research in digital finance and accelerate digital financial inclusion in developing countries. ITU leads the FIGI Security, Infrastructure and Trust Working Group as well as the organization of FIGI symposia. The third FIGI Symposium 2021 was held online over six weeks from 18 May to 24 June 2021. H.M Queen Maxima of Netherlands and UN Secretary General's Special Advocate for Inclusive Finance and Development made a keynote address at the opening of the event. The recordings of the sessions of the Symposium can be accessed online [here](#). The event saw participation of some 1,782 live participants from 148 countries over the six week period and the recordings were accessed by some 5,870 persons worldwide.

FIGI has worked to raise awareness about SS7's security vulnerabilities and associated mitigation techniques. As the need to mitigate these vulnerabilities increases, network operators can look to ITU's new Q.3057 standard outlining signalling requirements and architecture for interconnection between trustable network entities.

Under ITU led work in the FIGI Security, Infrastructure and Trust working group, the following activities were undertaken in 2021:

- The use of the guidance note on ‘Methodology for measurement of Quality of Service (QoS) Key Performance Indicators (KPIs) for Digital Financial Services’ as an [international standard](#) by ITU in December 2019.

- The Methodology for QoS/QoE measurement for interoperability and cross border payment report will be further discussed in ITU-T Study Group 12 in 2021 to be integrated in a new ITU-T Recommendation.
- A new Question (Q13) was created in Study Group 12 on Perceptual and field assessment principles for quality of service (QoS) and quality of experience (QoE) of digital financial services (DFS) – all DFS QoS recommendations including the interoperability and cross border QoS testing will be standardized in this Question.
- ITU set up a DFS Security Lab under FIGI work to conduct security audit of DFS mobile applications used in developing and Least Developed countries. The security lab has conducted security audit of mobile payment applications used in Zambia and is working with developing economies in Africa and Asia to implement the security recommendations from FIGI and conduct security audit of mobile payment applications used in those countries.
- The following reports were published in 2021:
 - [eKYC use cases in DFS](#);
 - [DFS Competency Framework](#);
 - [DFS Security audit guideline](#);
 - [Security audit of Android based DFS applications](#) which describes a methodology for analysis security of Android DFS apps based on OWASP Mobile Top 10 Security Risks
- The new [Digital Currency Global Initiative](#) is a collaboration between ITU and Stanford University that was established in July 2020. The Initiative is an open platform for dialogue and research on pilot implementations of digital currency, their use cases, applications and developing specifications for technical standards that will foster adoption, universal access, and ultimately financial inclusion. Its various working groups and work streams held some 11 virtual meetings in the period January to September 2021.

77. The [United for Smart Sustainable Cities \(U4SSC\)](#) initiative, supported by 17 UN bodies, advocates for public policy to ensure that ICTs – and ICT standards in particular – play a definitive role in the transition to smart cities.

More than 150 cities worldwide are evaluating their progress towards the SDGs with “[Key Performance Indicators for Smart Sustainable Cities](#)” based on ITU standards, indicators promoted by U4SSC. New U4SSC reports include “[Simple ways to be smart](#)” and “[Guidelines on tools and mechanisms to finance smart sustainable cities projects](#)”, as well as a range of [city snapshots, factsheets and verification reports](#) sharing the results of the latest KPI evaluations.

The first United for Smart Sustainable Cities (U4SSC) Austrian U4SSC Country Hub will be hosted by the Austrian Economics Center in Vienna, Austria. The main objective of this country hub is to promote the work of U4SSC.

The [U4SSC implementation programme](#) is supporting cities’ pursuit of the SDGs by working together with national administrations and city leaders to building a comprehensive

approach to smart city development, looking at both KPI evaluations and wider national contexts for planning and action.

U4SSC is working on the following Thematic Groups:

- City Platforms
- Economic recovery in cities and urban resilience building in the time of COVID-19
- Innovative Financing Instruments for Smart Sustainable Cities
- Guiding principles for artificial intelligence in cities
- Procurement Guidelines for Smart Sustainable Cities.

78. The [ITU/WMO/UNESCO-IOC Joint Task Force on SMART³ 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.

The information from SMART cables can be used for:

- Climate change monitoring including ocean circulation, heat content and sea level rise;
- Tsunami and earthquake early warning for disaster risk reduction;
- Seismic monitoring for earth structure and related hazards;
- Quantifying risk to inform sustainable development of coastal and offshore infrastructure, and
- Warning of external hazards to cables, and improved routing of cable systems

Several recent events have contributed to positive developments:

- The Italian National Institute of Geophysics and Volcanology (INGV) has undertaken a technical “wet demo” project off Sicily, jointly funded by the government and the European Commission, to be installed 2022.
- The Portuguese Government, with guidance from its telecom regulatory agency ANACOM, directed that the new CAM ring (Continent-Azores-Madeira) “... enhance the use of submarine cables such as seismic detection, environmental monitoring Oceanography, Geophysics and Environment” This culminated in the announcement in September 2020 describing the scope, implementation and funding for deployment, implementation and operation. Recent public conferences indicate this project is well underway for installation in 2024.
- In late 2019, the President of Indonesia issued a Regulation defining the structure of a revitalized tsunami warning system with cable-based tsunami warning at its foundation. Indonesia is currently implementing a hybrid SMART system in Makassar Strait, as a first step in a phased approach to developing the capacity leading to SMART systems monitoring the megathrust zone west and south of Sumatra and Java while providing improved telecom services to the Indian Ocean side of the country.
- Alcatel Submarine Networks issued a press release 29 September 2020: “Climate change is one of the major challenges that our society as a whole is facing today. Our

³ Science Monitoring and Reliable Telecommunications

entire portfolio will benefit from this new “CC” (Climate Change) philosophy to propose dedicated applications such as TEWS (tsunami early warning system), monitoring of underwater seismic activity, global warming, and water temperature and level. From now on, tackling climate change is an intrinsic part of our strategy and will drive our decisions.” (<https://web ASN com/en/press-release/climate-change.html>)

- In addition, ITU-T Study Group 15 (SG15) created a new work item on SMART cables under Question 8/15 (Characteristics of optical fibre submarine cable systems) at an SG15 meeting in April 2021.

79. 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

The [ITU Journal on Future and Evolving Technologies](#) (ITU J-FET), launched in September 2020, is an international journal providing complete coverage of all communications and networking paradigms, free of charge for both readers and authors. Free, fast and for all, this publication addresses fundamental and applied research sharing new techniques, concepts, analyses, and tutorials while discussing implications of the latest research on policy, regulations, legal frameworks and the economy and society. The ITU Journal welcomes submissions at any time, on any topic within its scope and publishes papers continuously throughout the year. In December 2020 the ITU J-FET published its first complete regular issue with the second regular issue published in April 2021, and the third one to be completed by the end of this year.

A series of special issues will be published in September-October 2021 on the topics of:

- [AI and machine learning solutions in 5G and future networks](#)
- [Internet of Everything](#)
- [Internet of Bio-NanoThings for health applications](#)
- [Terahertz communications](#)
- [Wireless communication systems in beyond 5G era](#)

Published papers are available to download free of charge from the [ITU Digital library](#).

The ITU J-FET is currently welcoming submissions to the following special issues that will be published in 2022:

- [Towards vehicular networks in the 6G era](#)
- [Integrated and autonomous network management and control for 6G time-critical applications](#)
- [Innovative network solutions for future services](#)

The joint publication between ITU and Tsinghua University Press, [Intelligent and Converged Networks](#), published its first issue in June 2020 which is available currently on the [IEEE Xplore Digital Library](#). The latest special issue titled [Series on data driven intelligence, sustainability and systems](#) published in June 2021, is also freely available to download.

❖ ITU Kaleidoscope Academic conference

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

The 12th edition of the conference, [Kaleidoscope 2020: “Industry-driven digital transformation”](#), was held as a fully online conference from 7-11 December 2020. This conference focused on the innovations contributing to digital transformation in the industry sector and the effect of new technologies on the automotive, energy, retail and healthcare industries and the role that standards play. This edition of the conference was technically co-sponsored by the IEEE, IEEE ComSoc and supported by the IEEE Technology and Engineering Management Society (IEEE TEMS).

The [conference proceedings](#) are available to download from the ITU website.

The 13th edition of the conference will be on the theme of [Connecting physical and virtual worlds](#) and will also be held completely online from 6-10 December 2021. Kaleidoscope 2021 original academic papers will share insight into ongoing projects and research relevant to the development of persistent virtual realities and customized computer-generated environments, as well as new possibilities and associated challenges appearing on the horizon.

80. 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.4044 “Test suite for interoperability testing of virtual switch”](#) which provides test suite for interoperability testing of virtual switch, including test cases specifying the test objective, test procedures and expected results;
- ❖ [Recommendation ITU-T Q.4065 “Framework of model network for Tactile Internet testing”](#) which describes the architecture, scenarios, and key networks metrics for establishing model network for testing tactile Internet services. Specifically, the aim of a model network is to study the general principles of data generation for transmission of a tactile sensation through the telecommunication networks, including analysis of the network latency and other network performance parameters;

- ❖ **Recommendation ITU-T Q.4067 “Signalling requirements for VNF lifecycle management under the testing environment”** which specifies the process and signalling requirements for virtualized network function (VNF) lifecycle management in a testing environment by architecturally adding the testing platform in the network functions virtualization (NFV) framework. The signalling focuses on the interface between the VNF instantiation functional component in a testing platform and the network functions virtualization orchestrator (NFVO) functional component in management and orchestration (MANO);
- ❖ **Recommendation ITU-T Q.4068 “Open APIs for interoperable testbed federations”** which provides a generic reference model for testbeds federation and describes the elements of this reference model. This Recommendation contains a technical framework consisting of guidelines, which provides a common reference for developers in order to facilitate the implementation and promotion of interoperability of testbeds.

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. CASC developed two ITU-T Guidelines “Testing Laboratories Recognition Procedure” (2015) and “ITU-T CASC procedure to appoint ITU-T technical experts” (2019).

ITU-T Guideline on “ITU-T CASC procedure to appoint ITU-T technical experts” (revised) describes the procedures to appoint an ITU-T technical expert to be involved in the TL assessment teams of existing conformity assessment programmes (e.g. ILAC, IECEE, etc.), for assessing /checking the competence of Testing Laboratories which requested such recognition against one or a set of ITU-T Recommendation(s).

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 ILAC in order to assist CASC to elaborate recognition procedure of TLs kindly provided by ILAC, without any additional assessment. There are no financial implications for ITU for implementing such procedures. Financial implications for TLs are to be covered by the cost structures of the accreditation bodies (ABs). The updated MoU among ITU, ILAC and IAF is under discussion among secretariats of the three organizations.

In March 2021, CASC decided that ITU may recognize TLs that have been accredited by ILAC MRA signatories AB which have ITU-T Recommendations in its scope of accreditation. ITU may approach those TLs. A test laboratory accredited for ITU-T Recommendations may apply to ITU-T for recognition by supplying, amongst other things: the identity of the AB (ILAC MRA signatory) performing the accreditation and relevant part of the scope of accreditation.

- 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.
- 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.



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.

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).

81. 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.

82. 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 UHDTV television with High Dynamic Range (HDR) were also approved in 2017.
83. ITU-R hosted its major events, RA-19 and WRC-19. These were well attended and forged pathways in key areas such as mobile and fixed broadband communications, radiocommunications for transportation systems, satellite services as well as global identifications for International Mobile Telecommunications (IMT).
84. Additional details of the ITU-R objectives ([Objective R.1](#), [Objective R.2](#), [Objective R.3](#)) are available online on ITU page.
85. In response to Resolution ITU-R 61-2 “ITU-R’s contribution in implementing the outcomes of the World Summit on the Information Society and the 2030 Agenda for Sustainable Development”, the Radiocommunication Bureau continues to work on WSIS implementation and follow-up activities within its mandate as well as in achieving the Sustainable Development Goals (SDGs). The document lists of the ITU-R publications related to the SDGs are available here: <https://www.itu.int/en/ITU-R/study-groups/Pages/Sustainable-dev-goals.aspx>

Action Line C5: Building Confidence and Security in the use of ICTs

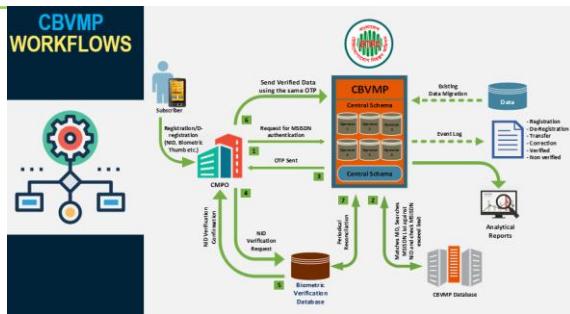


Related to SDGs: SDG 1 (1.4), SDG 4 (4.1, 4.3, 4.5), SDGs 5 (5.b), SDGs 7 (7.1, 7.a, 7.b), SDG 8 (8.1), SDGs 9 (9.1, 9.a), 11.3, 11.b, 16.2, 17.8



86. 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.
87. The 16th Action Line C5 Facilitator’s Meeting was held on Tuesday 20 April 2021, 13:00-14:00 CEST. The theme of this year was **“Multidimensional cybersecurity measures- Current opportunities and challenges in using indices to understand cybersecurity”**. The session featured a diverse panel of experts in data and indices relevant to the discussion of cybersecurity. More details about the meeting are available [here](#).
88. The WSIS Prizes 2021 Winner for the Action Line C5 is [Central Biometric Verification Monitoring Platform, Bangladesh Telecommunication Regulatory Commission \(BTRC\), Bangladesh](#).





During the last decade the usage of cellular mobile phones has infiltrated and revolutionized peoples' life style in Bangladesh. Although it has already been proved that such usage has positive impact on the development of various disciplines of the society, it has some drawbacks associated with it as well. Different types of criminal activities such as extortion, intimidation and harassment over mobile phones have reported to be increased, which affected country's image and provoked fear in the mind of general public. To prevent such activities the SIM registration process with biometrics verification including online personal identity verification documents has been promulgated as mandatory compliance from 16 December 2015. As a result, 112.1 million subscribers across all mobile operators re-registered their SIM through biometrics verification within 31 May-2016. After this date the unregistered SIMs were disconnected.

In order to monitor the said verification activities and apply necessary regulatory tools to that system, a central biometrics verification monitoring platform was set up. The data center of that central system was placed at the BTRC's office.

On July 16, 2017, the Central Biometrics Verification Monitoring Platform (CBVMP) was fully launched. As a result, all mobile operators' SIM registration, re-registration, deactivation, replacement, ownership changes were being fully monitored.

Project website

<http://www.btrc.gov.bd/central-biometrics-verification-monitoring-platform-cbvmp>

Sustainable development goals related to this project

- Goal 3: Good health and well-being
- Goal 11: Sustainable cities and communities
- Goal 16: Peace, justice and strong institutions

89. 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))

90. 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. In the area of legal measures, ITU collaborates closely with partners such as UNODC and others.

(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))

91. 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.
92. [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, and telebiometrics.
93. ITU-T approved the following Recommendations and other texts:
 - [ITU-T J.1012 "Implementers' guide for Embedded common interface for exchangeable CA/DRM solutions; CA/DRM container, loader, interfaces, revocation"](#) is an Implementers' Guide for ITU-T Recommendation of J.1012 Series. This revision contains all updates submitted up to and including those at Study Group 9 meeting in April 2021.
 - [Recommendation ITU-T F.747.10 "Requirements of distributed ledger systems \(DLS\) for secure human factor services" \(Determined; Decision planned January 2022\)](#) provides general requirements and functional capabilities for distributed ledger systems (DLS) for secure human factor services. This Recommendation describes the

requirements for the secure human factor distributed ledger service model, which can solve conflicting goals of privacy protection and big personal human factor data utilization. This Recommendation also includes the functional capabilities for human factor distributed ledger shared nodes to perform machine learning without decryption on encrypted human factor data. However, the computational burden of machine learning for encrypted data may be excessive.

- **Recommendation ITU-T X.1011 “Guidelines for continuous protection of service access process” (under approval)**: To prevent the unauthorized access to information and the abuse of ICT resources is fundamental to the cybersecurity. An extensive effort had been made towards the standardization of identity and access management. However, the access environment is continuously changing and traditional mechanisms could not deal with the challenges of current security threats. Firstly, traditional data center infrastructure is moving to the cloud, consequently the perimeter security device for traditional data center is not applicable to cloud data center. Secondly, internal threats are becoming more and more serious, e.g. authorized user trying to perform dangerous operations caused by negligence, and internal users being attacked by social engineering which may lead to impersonation risk. Thirdly, the status of the device or resource may become insecure during access process, e.g. OS or software in device and resource platform getting compromised by exploitation of misconfigure, and access request being intercepted, etc. Service access process is the process during the interval between a subject initiating access requests and receiving responses from a service, which may include a variety of above mentioned security threats. In order to deal with above challenges, it is crucial to continuously analyse related security status, keep the rationality of access activity, protect the security of access process and prevent unsecure access. Referring to the zero trust in current security industry, this recommendation is to define a reference framework for keeping continuous protection of service access process.
- **Recommendation ITU-T X.1046 “Framework of software-defined security in software-defined networks/network functions virtualization networks”** specifies a framework of software-defined security in software defined networks (SDN) and the network functions virtualization (NFV) networks.
- **Recommendation ITU-T X.1047 “Security requirements and architecture for network slice orchestration and management” (under approval)** establishes security requirements and architecture for network slice management and orchestration, as well as automatic creation of end-to-end (E2E) network slices with customized security capabilities, to deploy full-scale E2E network slicing for consumer, business and government segments.
- **Recommendation ITU-T X.1054 (revised) “Information security, cybersecurity and privacy protection - Governance of information security” (under publication)** provides concepts and guidance on principles and processes for the governance of information security, by which organizations can evaluate, direct and monitor the management of information security.
- **Recommendation ITU-T X.1060 “Framework for the creation and operation of a Cyber Defence Centre”** defines Cyber Defence Centre as the entity that plays a central role in an organization to address cybersecurity risks. The three processes of build,

management and evaluation that CDC should practically implement are described as a framework, and the services that the organization should have in order to implement more specific cybersecurity measures are also provided.

- **Recommendation ITU-T X.1061 “Cyber insurance acquisition guideline”** provides the understanding of cyber insurance coverage and the requirements of cyber security risks assessments, selection of insurer, assessment by the insurer, and evaluation of insurer for organisations that adopt cyber insurance as a risk treatment option to manage the impact of a cybersecurity incident.
- **Recommendation ITU-T X.1080.2 “Biology to machine protocol” (under approval)** allows a medical centre remotely to monitor a patient and to retrieve information from that patient. It defines a general protocol for exchange of biometric information from a patient facility to a medical expert facility. It also allows the medical expert facility to control the sensors and other devices at the patient facility and to establish the environment for a monitor session at the patient facility. It also defines a versatile and open-ended information model that allows any type of medical and non-medical information to be transferred.
- **Recommendation ITU-T X.1217 “Guidelines for applying threat intelligence in telecommunication network operation”** specifies guidelines for applying threat intelligence in telecommunication network operation after an overview analysis.
- **Recommendation ITU-T X.1233 “Guidelines for countering spam over instant messaging”** specifies guidelines for instant messaging (IM) service providers and users to counter spam over instant messaging (SPIM) and to reduce propagation of SPIM in cyberspace and improve IM user's experience. This Recommendation analyses scenarios of generating SPIM in instant messaging, specifies technical measures and mechanisms to counter SPIM for IM service providers, as well as recommendations to counter SPIM for IM users.
- **Recommendation ITU-T X.1234 “Guideline for countering Multimedia Messaging Service (MMS) spam” (under approval)** to provide some guidelines for countering MMS spam. It analyses typical scenarios, characteristics and recognition methods of MMS spam, and provides a technical framework, work flows and some key technologies of MMS spam recognition, to help MMS providers and MMS users to counter spam.
- **Recommendation ITU-T X.1235 “Technologies in countering website spoofing for telecommunication organizations” (under approval)**: Website spoofing is a major threat for telecommunication organizations, especially operators. It is recommended for telecommunication operators to adopt counter website spoofing technologies to protect their customers and guard their reputation and revenue. This Recommendation analyses the main measures to spoof a website and recommends technologies to identify spoofed websites, which can be regarded as guidelines for protecting websites from being spoofed for telecommunication organizations. This Recommendation could be referred to by other organizations to counter website spoofing.
- **Recommendation ITU-T X.1246 Amd.1 “Technologies involved in countering voice spam in telecommunication organizations” (under approval)** introduces the feedback mechanism from the client, receiving possible spam call (with voice, sms, or mms) to its operator. It provides technical requirements for telecommunication management

systems and/or client support services to receive notifications of incoming spam calls, voice or messages (sms/mms). Scenarios of interactive interaction of clients with operators/service providers of telephone communication networks about incoming spam calls and the necessary technical measures to maintain such interaction are presented. Such interaction is based on making a call to the anti-spam number provided by the telecom operator in advance by the recipient of the spam call immediately after it is completed.

- **Recommendation ITU-T X.1247 Amd.1 “Technical framework for countering mobile messaging spam” (under approval)** introduces the feedback mechanism from the client, receiving possible spam call (with voice, sms, or mms) to its operator. It provides technical requirements for telecommunication management systems and/or client support services to receive notifications of incoming spam calls, voice or messages (sms/mms). Scenarios of interactive interaction of clients with operators/service providers of telephone communication networks about incoming spam calls and the necessary technical measures to maintain such interaction are presented. Such interaction is based on making a call to the anti-spam number provided by the telecom operator in advance by the recipient of the spam call immediately after it is completed.
- **Recommendation ITU-T X.1252 (revised) “Baseline identity management terms and definitions”** provides definitions of key terms used in identity management (IdM). The terms are drawn from many sources but all are believed to be in common use in IdM work. This Recommendation is not intended to be a huge compendium of IdM-related terms. Instead, the terms defined here are limited to those considered to constitute a baseline list of the most important and commonly-used IdM-specific terms. This Recommendation includes Annex A that explains the rationale for some of these key terms. One of the main objectives of this Recommendation is to promote a common understanding of these terms among the groups currently developing (or planning to develop) IdM-related standards. The definitions are constructed so that, as far as possible, they are independent of implementations or specific context and, therefore, should be suitable as baseline definitions for any IdM work. It is acknowledged that, in some instances and contexts, greater detail may be required for a particular term, in which case, elaboration of the baseline definition may be considered.
- **Recommendation ITU-T X.1333 “Security guidelines for use of remote access tools in Internet-connected control systems” (under approval)**: Remote access tools (RATs) are widely used on control systems for monitoring, control and maintenance to reduce maintenance costs and minimize the response time in the event of a malfunction. RATs provide the ability to manipulate control systems remotely, but at the same time, an insecure configuration of RATs and vulnerabilities in RATs could significantly increase the attack surface of control systems. The most serious problem is an interface to access a control system from the external networks that could make attackers access to control system from the Internet. The Recommendation describes a whole picture to employ RATs securely for monitoring, control and maintenance. In this Recommendation, threats to network configuration due to the use of RATs are identified and security guidelines are provided to adapt secure configuration and security measures for the use of RATs in Internet-connected control systems. Providing well-organized security controls on the use of RATs would be helpful for digital service providers operating control systems to reduce the attack surface and the threats from external networks. Moreover, it would

be beneficial to align the security levels between developed and developing countries, since this is not a local problem, but a global problem.

- **Recommendation ITU-T X.1369 “Security requirements for IoT service platform” (under approval)** specifies security requirements for IoT service platform. It assesses security threats and challenges to IoT business service platform and describes security measures that could mitigate security threats and challenges.
- **Recommendation ITU-T X.1376 “Security-related misbehaviour detection mechanism using big data for connected vehicles”** describes a security-related misbehaviour detection mechanism for connected vehicles to help stakeholders to utilize automotive data to improve vehicle security.
- **Recommendation ITU-T X.1405 “Security threats and requirements for digital payment services based on distributed ledger technology”** focuses on payment services use cases. Based on the analysis of use cases, a service model is described and security threats and challenges are analysed. Then security requirements are specified against threats and challenges.
- **Recommendation ITU-T X.1406 “Security threats to online voting system using distributed ledger technology”** identifies security threats to online voting system using DLT based on telecommunication/ICT infrastructure. It proposes a reference model of online voting system using DLT based on telecommunication/ICT infrastructure and analyzes security threats in online voting process described in the models.
- **Recommendation ITU-T X.1407 “ Security requirements for digital integrity proofing service based on distributed ledger technology” (under approval)** specifies security threats and requirements in digital integrity proofing service based on distributed ledger technology (DLT). When the original proof protected is stored off-chain and the hashed data values are stored on-chain, Recommendation X.1407 analyses security threats to such digital integrity proofing services based on DLT, namely, proof registration and proof provenance. This Recommendation then specifies security requirements that could address these security threats.
- **Recommendation ITU-T X.1408 “Security threats and requirements for data access and sharing based on distributed ledger technology” (under approval):** A distributed ledger technology (DLT) is defined as a shared digital ledger, or a continually updated list of all transactions. Data is accessed by a data controller (organization) and is possibly transferred to a data processor (organization) that will be responsible for processing the data on behalf of the data controller. A data controller should determine the purpose and the manner in which the data will be processed according to the constraints imposed by the data policy set by organizations. In this context, there is a necessity of trusted and transparent solution to enhance
 - 1) traceability of the data being accessed by data controllers and data processors directly or indirectly;
 - 2) verifiability that if the data was accessed, used, and transferred without violating the data policy set by organizations, and;
 - 3) changeability of data status in case of modification of data policy or any other cases.
 An important aspect of this solution is to enable trust and transparency on data accountability and provenance & usage tracking. It should offer transparent and

controlled data access, sharing and processing, so that unauthorized users or untrusted servers cannot process data without the authorization. This Recommendation focuses on the solution which provides a way to improve traceability of data, verifiability of data, and changeability of data status. The solution is suitable for implementation using private distributed ledger technology where data is accessed and shared less frequently. This Recommendation provides security threats and requirements for data access and sharing based on the distributed ledger technology (DLT). It describes the framework and models for data access and sharing based on DLT. It identifies entities and their roles for data access and sharing based on DLT. It also identifies security threats. In addition, security requirements that address these security threats are described.

- **Recommendation ITU-T X.1453 “Security threats and requirements for video management systems” (under approval)**: A video management system (VMS) is an important feature of physical security systems such as home and building security systems. Current and emerging VMS approaches incorporate more intelligence into their design, including video analytics and the ability to interface with access control systems. Basically, a VMS receives video from cameras and allows someone to view that video either live or recorded. As a VMS is networked, it is fully exposed to various vulnerabilities such as those faced by internet web services. Therefore, as a VMS is not inherently secure, it is easily becoming the main targets of cyberattacks. This Recommendation analyzes security threats inherent to VMSs running on an IP network. This Recommendation also specifies security requirements to counteract identified security threats.
- **Recommendation ITU-T X.1470 “Security guidelines of web-based online customer service” (under approval)**: Web-based online customer service is an important service for operators. It contains the user's important data and provides critical operational functions of the user's services. It is the operators' responsibility to provide security to web-based online customer service. This Recommendation analyses the security threats of web-based online customer service to operators in view of three aspects: network security, system security, service security, and provides security guidelines of web-based online customer service and the test procedures to the security measures. This Recommendation can help the operators to ensure their web-based online customer services' security and protect the users' benefits.
- **Recommendation ITU-T X.1643 “Security guidelines for container in cloud computing environment” (under approval)** analyses security threats and challenges on container in cloud computing environment, and specifies security guidelines and reference framework for container in cloud.
- **Recommendation ITU-T X.1712 “Security requirements and designs for quantum key distribution networks - key management” (under approval)** specifies security threats and security requirements for key management in quantum key distribution networks (QKDNs), and then it specifies security measures of key management to meet the security requirements. This Recommendation provides support for design, implementation, and operation of key management in QKDN with approved security.
- **Recommendation ITU-T X.1752 “Security guidelines for big data infrastructure and platform” (under approval)** analyses security threats and challenges on big data

infrastructure and platform, and specifies a reference framework to mapping security guidelines against threats for big data infrastructure and platform.

- **Recommendation ITU-T X.1770 “Technical guidelines for secure multi-party computation” (under approval)**: Multi-party computation (MPC) could build trust and security in data collaboration and big data analysis related areas. Data has become one of the most important assets in ICT area. MPC plays a very important role in balancing data usage and data protection. The purpose of this recommendation is to provide technical guidelines for MPC, and provide technical and standard basis for ICT stakeholders to use MPC to protect data in data collaboration and big data analysis scenarios. It also describes applications on what MPC can be used for and how to use MPC. It can provide reference for ICT stakeholders to develop MPC applications. The content of the Recommendation includes:
 - Technical framework of MPC: defines the elements in MPC and the work flow between the elements;
 - Security levels of MPC protocols: analyse and define the security model and threshold;
 - Applications of MPC: describe different use cases of MPC, including scene description, processes, etc.
 Based on this recommendation, standards for MPC applications in different fields can be defined.
- **Recommendation ITU-T X.1811 “Security guidelines for applying quantum-safe algorithms in 5G systems”** identifies threats raised by quantum computing to fifth generation (5G) systems through assessing the security strength of currently used cryptographic algorithms. This Recommendation briefly reviewed quantum safe algorithms, including both symmetric and asymmetric types, and provides guidelines for applying quantum safe algorithms in 5G systems.
- **Recommendation ITU-T X.1812 “Security framework based on trust relationship for IMT-2020 ecosystem” (under approval)** identifies the stakeholders in the IMT-2020 ecosystem, analyses the trust relationships amongst them, identifies threats and clarifies security responsibilities for each stakeholder, defines the security boundaries between stakeholders, and establishes a security framework based on the trust relationships.
- **Recommendation ITU-T Y.3056 “Framework for bootstrapping of devices and applications for open access to trusted services in distributed ecosystems”** provides a concept of bootstrapping of devices and applications by network operators who can share the network security capabilities with users and providers of new devices and services. It describes the requirements to be fulfilled by the entities of the ecosystem such that they may benefit from the bootstrapping capabilities. Based on the requirements, a reference model as well as a functional architecture is provided, which together describe the elements, functions and reference points needed for provisioning of the bootstrapping capabilities. Finally, the Recommendation provides the information flows required to enable the bootstrapping capabilities.
- **Recommendation ITU-T Y.3057 “A trust index model for ICT infrastructures and services” (under approval)** describes a trust index model for ICT infrastructures and

services. In order to provide a commonly applicable way for evaluating trust that covers different characteristics, trust index is a key concept for trust provisioning by considering trust value chain in ICT environment. This Recommendation identifies trust indicators that represent fundamental criteria for evaluating trust of entities in ICT environments. To represent characteristics of trust, trust indicators are categorized into two parts: objective trust indicators and subjective trust indicators. A list of trust indicators and an application of trust index are introduced.

- **Recommendation ITU-T Y.3802 “Quantum key distribution networks - Functional architecture”** defines a functional architecture model of quantum key distribution (QKD) networks. In order to realize this model, it specifies detailed functional elements and reference points, architectural configurations and basic operational procedures of QKD networks (QKDN).
- **Recommendation ITU-T Y.3803 “Quantum key distribution networks – Key management”** provides help for design, deployment, and operation of key management of QKDN. Overall structure and basic functions of QKDN are first reviewed along with Recommendation ITU-T Y.3800, requirements of QKDN are second reviewed along with Recommendation ITU-T Y.3801, and then functional elements and procedures of key management are described in this Recommendation.
- **Recommendation ITU-T Y.3805 “Quantum Key Distribution Networks - Software Defined Networking Control” (under approval)** specifies the requirements, functional architecture, reference points, hierarchical SDN controller and overall operational procedures of SDN control.
- **Recommendation ITU-T Y.3806 “Quantum key distribution networks - Requirements for QoS assurance” (under approval)** specifies the high-level and functional requirements of QoS assurance for quantum key distribution networks (QKDN). The functional requirements include QoS planning, QoS monitoring, QoS optimization, QoS provisioning, QoS protection and recovery.
- **ITU-T X.Suppl.36 “Supplement 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: Critical security controls for telecommunications organizations information and network security management” (under publication)** describes the Critical Security Controls (CSC) to supplement the implementation of ITU-T X.1051. The CSC are a prioritised set of actions that collectively form a defense-in-depth set of best practices that mitigate the most common attacks as part of the organization's information and network security management. These controls are developed by a community of IT experts who apply their first-hand experience as cyber defenders to create a globally accepted security best practices and to include multiple sectors including retail, manufacturing, healthcare, education, government, defense and others.
- **ITU-T Technical Report “Security considerations for quantum key distribution network”** only studies the perspective of QKD. Although QKD technologies have been developed for several decades, there is a need to develop a QKD framework to satisfy requirements from the telecom network's perspective.

- **ITU-T Technical Report TR-USM “Unified Security Model (USM) - a neutral integrated system approach to Cybersecurity”** offers a one stop place, as a live document, to regroup all the related work conducted.
- **ITU-T Technical Report TR.XAASL “Framework for security standardization for virtualized service” (under publication)** is a document for discussion regarding the development of standards considerations, requirements and frameworks for virtualized services. These services are often known by the words “as a Service” – as in, Network as a Service. The architecture for these virtualized services comes from work done in ITU-T Study Group 13. However, this discussion is around the security implications and considerations for those services which is within the mandate of ITU-T Study Group 17.

94. 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). Information related to Futuristic mobile technologies foresee “IMT for 2020 and beyond” can be found on the website.

(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))

95. Till date, ITU has organized 30 CyberDrills involving more than 110 countries. During September-December 2020, ITU has organized and executed the ITU 2020 Global CyberDrill through several online events consisting of regional dialogues, technical and policy webinars, tools use and skills development trainings, as well as a regional CyberDrill for the Pacific Islands and one national CyberDdrill for Esswatini. The 2021 Global CyberDrill is currently ongoing and is taking place in the period of September-November 2021. This set of events includes 3 interregional meetings that cover all 6 ITU regions, 2 webinars, 6 training sessions and 6 scenario-based exercises. Also, the publication of the “Operational framework and guidelines for the planning and execution of ITU regional CyberDrills”is planned for Q3 of current year.

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(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))

97. BDT 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.

98. The process of updating [the Guide to Developing a National Cybersecurity Strategy \(NCS\)](#) is underway and expected to end in October 2021. Currently there are more than 20 organizations including Intergovernmental and International Organisations, the private sector, as well as academia and civil society contributing to the update. A dedicated website will be launched to support the new edition of the guide. Technical assistance activities on NCS have commenced with Fiji, Liberia and Chad, and there are ongoing discussions with other Member States that need assistance. ITU also finalized and made available the online training "[Lifecycle, principles and good practices of national cybersecurity strategy development and implementation](#)" available at ITU Academy.
99. Through the [ITU Academy](#), the ITU Centres of Excellence (CoE) continue to deliver training activities and workshops in various areas of the cybersecurity domain.
100. To address cybersecurity challenges during the COVID-19 pandemic and to [support Member States' health infrastructure with timely information on cyber threats](#), the ITU sector member BitSight provided access to its cybersecurity scoring platform for ITU Member States. This activity is under further development and is planned to resume in the coming months.
101. The fourth edition of the [ITU Global Cybersecurity Index](#) (GCI) Report has been [released on June 29th](#) 2021. This edition of the index covers 193 Member States and the State of Palestine, with 169 countries' contributions to the data. The work on an updated questionnaire for the GCI has already started and the new set of documents is planned to be virtually presented to ITU-T Study Group 2 Question 3 in October 2021.
98. To promote the involvement of young people in the field of cybersecurity and to address the field's worldwide workforce shortage in the field, ITU is launching the Youth4Cyber initiative. Youth4cyber is an initiative aiming to develop a global network of student-led associations in universities that organize activities related to cybersecurity, with the assistance of ITU and relevant partners. Youth4Cyber aims to introduce and expose young people to the cybersecurity field, to stimulate their interests in the field, and to help them learn about cybersecurity in engaging ways, thus ultimately encouraging young people to take on the cybersecurity challenges of tomorrow.
As a one of the first steps in this domain ITU conducted the [workshop called "Why we need a more inclusive Cybersecurity"](#) on 14 April in the framework of WSIS 2021.
After a period of consultation with partners, the programme is ready to launch in October 2021 on the occasion of Cybersecurity awareness month, with a first competition selecting young leaders who will kickstart the global network. Students worldwide will be invited to submit contributions for innovative projects centring around the topic of "the future of cybersecurity"; and the competition will culminate at the ITU Generation Connect Youth Summit in 2022.
99. ITU [successfully has completed the first edition of the Women in Cyber Mentorship Programme](#) targeted at building the capacity of junior women professionals who wish to enter or thrive in the field of cybersecurity. The first edition of the Women in Cyber Mentorship Programme launched on March 8th 2021, on the occasion of International Women's Day, and concluded on August 2021. Targeting to junior women professionals in Arab and Africa regions, the core mission of the programme is to remove

the barriers around gender inclusion in cybersecurity. Based on a holistic three-fold approach (INSPIRE, TRAIN and EMPOWER), the WiC Mentorship Programme is designed to equip participants with the tools needed to advance with confidence and succeed in their cybersecurity journey. The programme has enabled 70 mentees to build relationships with an international network of women in senior roles in cybersecurity, allowing the participants to receive guidance and advice on how to best navigate the field. In addition, mentees took part in a total of 10 inspirational talks and trainings (on both technical and soft skills development) through a targeted curriculum that aims to encourage women to discover different opportunities that the field of cybersecurity offers and to develop the skills needed to thrive in it.

(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))

100. ITU is developing relationships and partnerships with various regional/international organizations and initiatives, including Commonwealth Cybercrime Initiative, ENISA, INTERPOL, ECOWAS, the World Bank, FIRST, and regional CSIRT/CERT associations, such as AP CERT, AFRICA CERT, and OIC CERT.
101. Following the instructions of the 2019 session of Council, the Secretary-General will submit for the next session of Council (1) a report explaining how the ITU is currently utilizing the GCA framework and (2) with the involvement of Member States, appropriate guidelines developed for utilization of the GCA by the ITU for Council's consideration and approval. As per the process set out by Council 2019 for developing the draft Guidelines, and following the first online open consultation held on 23 April 2020 for all WSIS stakeholders to provide comments on the draft Guidelines, a second online open consultation will be held for all WSIS stakeholders on 1 March 2021.
102. As the lead facilitator for WSIS Action Line C5, ITU organized a dedicated cybersecurity track comprising several sessions at the WSIS Forum 2021, including an Action Line C5 facilitator session on "Cybersecurity : Multidimensional cybersecurity measures- Current opportunities and challenges in using indices to understand cybersecurity", a Second Open Consultation on the draft Guidelines for utilization of the GCA, and a High-Level dialogue on "AI Readiness Check: Policy Impact, Opportunities and Challenges".

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

103. 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.
104. 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.
105. Released in 2020, the new ITU Child Online Protection (COP) Guidelines, a comprehensive set of recommendations for for policy-makers, industry, parents and educators as well as children of different age groups (under 9 year olds, 9-12 year olds and 13-18 year olds), have seen broader implementation among relevant stakeholders. A multi-stakeholder expert working group, consisting of more than 50 organizations and individual

experts from different sectors, reviewed the four sets in a multi-stakeholder joint effort. The new guidelines were re-designed from the ground up to reflect the significant shifts in the digital landscape in which children find themselves, such as the Internet of Things, connected toys, online gaming, robotics, machine learning and artificial intelligence. The [global launch of the new Guidelines](#) was followed by [regional launching events](#) to discuss opportunities for implementation at regional and national levels.

106. Child online protection was incorporated as one of the key elements into the fourth pillar in the ITU and UNICEF joint project Giga.
107. ITU has also signed a collaboration agreement with the SCORT Foundation on COP. ITU has contributed to many discussions such as the Safer Internet Day 2021 and the 15th European Football for Development Conference.
108. In Africa, the first training for policy-makers on COP was held in both English and French prior to the launch of the Guidelines in the region. In the CIS region, an [Online Safety Course](#) was developed by ITU Regional Office for CIS jointly with the A.S. Popov Odessa National Academy of Telecommunications. In the Asia-Pacific region, assistance was provided for the development of national COP strategies and related frameworks to six small island and developing countries, building upon the COP Guidelines, in coordination with other partners, through a joint project with the Department of Communications and Arts (DoCA) in Australia. In the Americas, discussions have started with Colombia, Costa Rica, Brazil and Paraguay on the development and implementation of national strategy frameworks. The roll out of the COP Guidelines advanced significantly in Europe, where numerous activities took place, as part of the regional initiative on enhancing trust and confidence in the use of ICTs.
109. [The Kingdom of Saudi Arabia and ITU signed an agreement](#) to implement a three-year global programme on ‘Creating a safe and empowering cyber environment for children’, which focuses on both the policy assistance for governments and the development of digital skills and literacy with end-users. The [implementation of the global program](#) started in Q3 2021. The ITU-led program, with activities in all ITU regions, focuses on capacity building and policy assistance among others through e-learning trainings, COP related campaigns, children’s participation, as well as the development of distinct national child online protection strategies. The focus of this project – fostering a culture of child online safety – will contribute to the ITU mission of ensuring cybersecurity at the international level. As a result, ITU Member States will benefit from child online protection policies based on the new 2020 resources developed by ITU and COP Partners.
110. ITU has also contributed to the adoption of the General Comment 25 on children’s rights in relation to the digital environment by the UN Committee on the Rights of the Child: UN Inter-agency working group on child online protection, which was composed by the Committee on the Rights of the Child and the vibrant community of child online protection experts, both within the UN system and from civil society.
111. A report on the '[Status of national child online protection ecosystems in South Eastern Europe](#)' was published and followed by numerous events and fora, which were (co-)organised on the issue of protecting children online in Europe.

112. ITU celebrated Safer Internet Day 2021 through various communications, including a [blog](#) post on the application of the Child Online Protection mascot “Sangophone”, in a national drawing competition in Hungary. The COP mascot, which has been a [great success](#) in several ITU member states, is used to work with children on COP related issues. It furthermore [announced a collaborative project with Eni and Deloitte Italia](#) to raise awareness and build capacity on online safety with children. This Online Safety course with Sango for young children under 13 years was launched with a [trailer](#) at the [Online Safety Moment](#) of the Girls in ICT’s 10th anniversary celebration, which is a series of events hosted by the ITU and its partners. Consisting of [video lessons](#), [presentations](#), a [poster](#) and a [flyer](#), the mascot helps to share monthly online safety tips with children and empower them to develop digital literacy and resilience online.

Action Line C6: Enabling Environment



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)



113. Recognizing the strong commitment of ITU’s work towards bridging the digital divide in the area of the enabling an ICT policy and regulatory environment, ITU is leading the facilitation role on WSIS Action Line C6 Enabling Environment as the sole facilitator building upon its regular work carried out within the framework of the [ITU-D Objective 3: Enabling environment: Foster an enabling policy and regulatory environment conducive to sustainable telecommunication/ICT development](#).
114. The 16th Action Line C6 Facilitation Meeting was held as an integral component of the WSIS Forum 2021, on Wednesday 17 March 2021. The theme of this year was: “**Digital transformation acceleration - connectivity in the post COVID world**”. This session addressed critical questions ICT policy makers, regulators and stakeholders need to fast forward digital connectivity for sustainable development.
115. The COVID-19 pandemic highlighted the existing digital divide in the world, showing how some areas are not covered, especially rural and remote areas. Digital connectivity and digital inclusion must be a priority for all governments as to provide affordable access to information technologies.
116. As a main outcome of this session, it was noted that people and communities that are connected are empowered. They can access information, online health, education services, and life-saving disaster warnings. They can pay for goods and services via mobile phones, stay in touch with loved ones, increase productivity or perform better-paid jobs that require digital skills. With resilient, affordable and safe information and communication technology (ICT) infrastructure and services, supported by digital literacy and skills, individuals and businesses can participate/contribute to the digital economy. This, in turn,

allows countries to increase their overall economic well-being and competitiveness. The details of the meeting are available [here](#).

117. Globally, the ICT industry has proved to be essential in reducing the negative impacts of this crisis on economies and societies, as evidenced through the ITU #REG4COVID platform. The analysis of the information collected from the REG4COVID was launched during this session with the [ITU report Pandemic in the Internet age - From second wave to new normal, recovery, adaptation and resilience](#). It contains key insights on the main issues that countries must tackle to prepare the recovery and provide with relevant policy and regulatory actions.
118. This session on Action Line 6 was mostly linked to the SDG 9 and SDG 11.
119. The WSIS Prizes 2021 Winner for the Action Line C6 is [A programme of practice-focused training in cybersecurity, the Central Bank of the Russian Federation \(CBR\), Russian Federation](#).



Bank of Russia

A programme of practice-focused training in cybersecurity that builds on the experience of leading digital economy companies has been developed as part of the national programme Digital Economy of the Russian Federation. The Programme includes modules of lectures on the following topics:

- information security methodology;
- the main trends in the information security in a digital economy;
- interaction between the state, business and citizens on information security in a digital economy.

The Programme combines the latest theoretical problems of information security and international and Russian practices from the best experts in the field, including lectures, discussions, case studies and analysis of best practices, which involve international experts.

1,400 Bank of Russia employees and 920 representatives of law enforcement agencies, such as the Federal Security Service of Russia, the Interior Ministry of Russia, the Federal National Guard Troops Service, the Investigation Committee of the Russian Federation and the Prosecutor General's Office have completed the training. The training is conducted in online format, and more than 100 training events have been held. The programme is particularly relevant, given the growing scale of fraudulent transactions in the credit and financial sector and the development of new information technologies. The programme implementation significantly contributes to combating fraud, improving cyber security, which will definitely have a beneficial impact on the development of the financial system and society, as well as

enhancing and strengthening digital immunity which will result in a quicker response to information security incidents.

The Bank of Russia will continue to implement the Programme. In Q1 2021, the training will be provided to organisations of the credit and financial system; in Q2, the training is planned for faculty at higher education institutions in the field of information security; it is planned to provide training to leading digital economy companies.

Project website

<http://www.cbr.ru/eng/press/event/?id=8337>

Sustainable development goals related to this project

- Goal 9: Industry, innovation and infrastructure

120. 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 is to provide the platforms and tools for effective policy, legal and regulatory frameworks to support regulators and policymakers in driving inclusive and cross-sectoral collaboration so that all stakeholders have their voices heard and create a virtuous dynamic for the digital transformation.
121. ITU-D provides knowledge exchange tools and platforms to enable inclusive dialogue and enhanced cooperation to help countries leap forward, and achieve a more inclusive digital society and to raise national and regional awareness about the importance of an enabling environment.
122. ITU-D continues providing direct assistance to countries and regions on an enabling environment for digital connected societies.
123. ITU-D provides knowledge exchange tools and platforms such as the [Global Symposium for Regulators \(GSR\)](#), [Regional Regulatory Roundtables](#) and [Regional Economic Dialogues \(RED\)](#) to enable inclusive dialogue and enhanced cooperation to help countries achieve a more inclusive digital society and to raise national and regional awareness about the importance of an enabling environment.
 - The annual [Global Symposium for Regulators \(GSR\)](#) provides a neutral platform for ITU members to share their views on major issues facing the ICT sector and concludes with the adoption by regulators of a set of regulatory [GSR Best Practice Guidelines](#).
 - Over the years, the GSR Best Practice Guidelines have shaped a regulatory evolution towards an open, collaborative and innovative approach. For example, since the 2004 guidelines on broadband, the number of countries with a National Broadband Plan quadrupled, from a dozen in 2007 to 168 in 2019. Other precursing guidelines include VoIP in 2007, infrastructure sharing in 2009 or regulatory openness mentioned in 11 editions of the guidelines.

- The GSR-21 Programme (GSR+), was held virtually as a series of interconnected regional and virtual events across all regions from April to June 2021 to discuss regional regulatory and economic perspectives, challenges and innovative solutions in the lead up to core global sessions from 21 to 25 June 2021, held under the theme Regulation 4 digital transformation: Accelerating inclusive connectivity, access and use. The core sessions (GSR-21), held online from 21 to 25 June, attracted 637 participants, including 439 delegates representing 115 Member States countries, that included Government Ministry officials, Heads of Regulatory Authorities and C-level industry executives. the 2021 GSR was fully aligned and integrated into the lead up to WTDC-21, with its traditional Leadership Debate becoming a stop on the Road to Addis.
124. ITU-D has its “[eye](#)” on ICTs and is recognized around the globe as the leading provider of timely and comprehensive telecommunication/ICT indicators as well as regulatory and tariff policies statistics, profiles and trends. ITU data, research and analysis and tools support stakeholders 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.
- The [ICT Regulatory Tracker](#) is a composite metric based on a total of 50 indicators grouped into four clusters: 1. Regulatory authority (focusing on the functioning of the separate regulator), 2. Regulatory mandates (who regulates what), 3. Regulatory regime (what regulation exists in major areas) and 4. Competition framework for the ICT sector (level of competition in the main market segments). The Tracker covers between 190 and 193 countries and economies over the period 2007 – 2020. To help analyse the evolution of ICT regulation worldwide, identify progress areas as well as gaps and measure those, the countries included in the Tracker are split into score thresholds that relate to generations of regulation, for any given year. Generation 1 (G1) to Generation 4 (G4) presents the evolution in telecommunication and ICT regulation, starting from the command-and-control regime typically associated with state-owned monopolies, through privatization and liberalization, the need to encourage investment, and the shift to meeting socio-economic objectives.
 - The 2021 [G5 Benchmark](#) covers 193 countries and calibrates data on 70 indicators against four pillars: 1. National Collaborative Governance; 2. Policy Design Principles; 3. Digital Development and 4. Digital Economic Policy Agenda. While a sizable group of countries have reached leading and advanced G5 Benchmark scores (67 countries or 34 per cent of the sample), most countries still need to fulfil the conditions required for those levels of readiness for digital transformation.
125. ITU-D provides Membership with innovative tools and assistance to help countries leap forward.
- The [G5 accelerator](#) provides high-value tools and resources offering practical step-by-step support for countries already embarked or planning to embark

on their digital transformation journey, and the [ICT Policy Impact Lab](#) explores the impact of policies and regulations on ICT investment.

- ITU and the World Bank have been collaborating since 2000 to support countries with these rapid changes and have launched the [Digital Regulation Handbook and Platform](#) to provide the latest information on developments of regulation strategies, best practices, and case studies. The thematic sections, regularly updated, tackle new regulatory aspects and tools to consider when making regulatory decisions to harness the benefits of the digital economy and society.
- The Global ICT Regulatory Outlook (GIRO) series lays out a broad canvas of how regulation and digital markets are interacting – and advocates for collaborative regulatory reform in delivering meaningful connectivity and inclusive digital markets. It is this series which explores the evolution of ICT regulatory trends and first set out the ITU concept of five ‘generations’, sharing unique, focused research and offer both evidence and practical advice to support regulators embarked on their journey to fifth generation collaborative regulation.
- With the [REG4COVID](#) platform, ITU has been leading research efforts into the telecommunication/ICT sector response to COVID-19, bringing together more than 500 measures taken by the regulatory community, private sector and civil society, and showing how we can come together as a community and how collaboration can help countries in challenging situations. With this research, the confirmation of the [economic contribution of ICTs throughout 2020](#) and the assessment of the value of broadband in mitigating economic disruption caused by the pandemic provide support for the measures taken so far by policy makers and regulators to accommodate the resulting changes in sector dynamics.
- A series of expert reports quantified the positive economic impact of broadband, digital transformation and the interplay of ICT regulation both at [regional and global levels](#). The main outcomes from the econometric modelling by region suggest that an increase of 10 per cent in mobile broadband penetration would yield an increase in 2.46 per cent in GDP per capita in the [Africa region](#), while the increase in GDP per capita would be of 1.73 per cent in the [Americas region](#), 1.82 per cent in the [Arab States region](#), 0.51 per cent in the [Asia-Pacific region](#), 1.25 per cent in [CIS region](#). In the Europe region, countries would enjoy an increase of 2.1 per cent. The new [2020 Report on How broadband, digitization and ICT regulation impact the global economy](#) sets out six powerful and concrete steps which will maximize the economic impact of strategic ICT investment decisions, as well as concrete recommendations designed to boost economic impact.
- A new 2021 Report on [The impact of policies, regulation, and institutions on ICT sector performance](#) uses econometric modelling to pinpoint the impact of the regulatory and institutional frameworks on the performance of the ICT sector and its contribution to national economies. The modelling has allowed

to capture fresh insights backed by authoritative data on the evolution of ICT regulation since 2007, the ICT Regulatory Tracker, and a global dataset on ICT markets economics.

- A new 2021 ITU Report on [Financing Universal Access to Digital Technologies and Services](#) provides guidance on the policy and regulatory frameworks needed to attract greater private sector participation in financing universal connectivity, access and uptake, and explores business models for deploying supply and demand side projects and initiatives in the digital era.
126. ITU-D continues to implement a 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 these countries through the preparation of draft country assessment reports, research on issues relating to ICTs for Digital Financial Inclusion, workshops on collaborative regulation, security and Quality of Service (QoS), and is working with the countries to define further priority areas of leveraging ICTs for DFI as part of the Financial Inclusion Global Initiative.
127. ITU web portals bring together in one place information on [International Mobile Roaming \(IMR\) Resources](#), [Quality of Service](#), [the Digital Ecosystem](#), [Infrastructure and Connectivity Development Frameworks](#). In addition, the [Regional Regulatory Associations Portal](#) is continually updated 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.
128. ITU-D provides training and capacity development for regulators and other stakeholders to address digital policy, regulation as well as economic and market developments and collaborative regulatory approaches for digital transformation.
- ITU, USTTI, and World Bank Group (WBG) collaborated to conduct a regulatory best practice training in Nairobi, Kenya, for officials from Eswatini, Ethiopia, Kenya, Somalia, South Sudan, and Sierra Leone. With important support from the Communications Authority of Kenya and the African Telecommunications Union (ATU). The three-day programme addressed the role of an independent communications regulator, licensing frameworks and regulatory best practices that spur investment.
 - Ahead of the celebrations of the 20th edition of GSR (in 2021), USTTI and ITU teamed up to provide a behind the scenes look at the work taking place to prepare for the deployment and usage of emerging technologies. Experts provided regulators with information on the technological underpinnings of emerging technologies and the spectrum planning that is taking place to enable these new services. The GSR-21 joint ITU-USTTI training provided regulatory officials with information and insights on how emerging technologies can accelerate the digital transformation process, and how such smart technologies and innovation have so far strengthened digital resilience.

This training session saw experts further discuss how these emerging technologies interact with key policy and regulatory trends.

- ITU is developing training materials for regulators jointly with the World Bank as part of the [Digital Regulation Handbook](#) and [platform](#). These training resources consist of a series of self-paced e-learning modules on regulatory governance, spectrum management, access for all, competition and economics, and consumer affairs, to be made available in the 4th quarter of 2021. An online training programme on digital regulation was developed with CITC Saudi Arabia for delivery in two phases. Phase 1 focusing on regulatory governance and collaborative regulation took place on 29 and 30 March 2021, phase 2 will take place in December 2021.
- ICT infrastructure is the basis of today's digital economy and offers enormous potential to advance progress towards the UN Sustainable Development Goals (SDG) and improve people's lives in fundamental ways. Deploying broadband in big towns and cities happens almost naturally. But deploying these networks to rural and remote areas is markedly more challenging. ITU launched the [ICT Infrastructure Business Planning toolkit](#) and training to support regulators in designing optimal broadband network that can respond and adapt to a wide range of infrastructure deployment projects.

129. **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.
130. 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>).
131. Additional 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>>.
132. International mobile roaming remains an important area of work for ITU-T SG3.
133. ITU also provides support, assistance and training to developing countries with the aim of bridging the standardization gap (BSG) 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 and Closing plenaries benefit from full interpretation.

134. 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. Regular BSG trainings are also organized in collocation with Study Group meeting in order to equip delegates from developing countries with right skills to contribute to the standards development process at the ITU.
135. ITU-T study groups developed the following Recommendations and other texts on the network aspects of IMT-2020:
 - **Recommendation ITU-T L.1383 “Smart energy solutions for cities and home applications” (under approval)** focuses on smart energy solutions in different application scenarios basically on energy saving and carbon emission reduction. Besides their application in the field of ICT, such as base stations, data centers and telecom centers, smart energy solutions have eventually been applied in cities and homes as the advanced update of ICTs. Cities play a different role in different parts of the world. With the development of smart energy technologies, in cities is possible to answer key issues worldwide due to the urgent necessity of GHG emissions reduction. This Recommendation includes specific smart energy applications in cities and homes such as energy sources, energy management functions, etc.
 - **ITU-T K.Suppl.26 (revised) to ITU-T K-series of Recommendations “Analysis of electromagnetic compatibility requirements and test methods of 5G Active Antenna System base station” (under publication)** proposes the special electromagnetic compatibility test methods for 5G AAS base station. It included the following technical requirements. Test conditions for 5G AAS base stations are described; exclusion bands for radiated immunity test, performance assessment such as throughput or EVM and performance criteria for immunity tests are also described.
 - **ITU-T L.Suppl.43 to ITU-T L-series of Recommendations “Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption”** explores how network energy saving technologies that have emerged since the 4G era, such as carrier shutdown, channel shutdown, symbol shutdown etc., can be leveraged to mitigate 5G energy consumption. It also analyses how enhanced technologies like deep sleep, symbol aggregation shutdown etc., have been developing in the 5G era. This report aims to detail these fundamentals. This Supplement could help achieve the most energy-efficient network with good performance and lower operating expense (OPEX) for the mobile network operators (MNOs).
 - **Recommendation ITU-T G.8310 “Architecture of the metro transport network”** describes the functional architecture of the metro transport network (MTN) using the

modelling methodology described in Recommendations ITU-T G.800 and ITU-T G.805. MTN is primarily intended to support transport of distributed radio access network (D-RAN) and cloud radio access network (C-RAN) traffic. The MTN functionality is described from a network level viewpoint, taking into account the client characteristic information, client/server layer associations, networking topology, and layer network functionality that provide multiplexing, routing and supervision of the digital clients. MTN consists of two non-recursive layers, the MTN path layer, and the MTN section layer. The MTN path layer uses the MTN section layer as its server layer. The MTN path layer provides configurable connection-oriented connectivity. The server layer for the MTN section layer is provided by 50GBASE-R, 100GBASE-R, 200GBASE-R, and 400GBASE-R Ethernet interfaces.

- **[Recommendation ITU-T G.8312 “Interfaces for the metro transport network”](#)** describes a transport technology for metro networks (MTNs), including transport of distributed radio access network (D-RAN) and centralized radio access network (C-RAN) traffic. This technology leverages existing and emerging pluggable Ethernet modules and reuses flex Ethernet (FlexE) implementation logic.
- **[Recommendation ITU-T Q.5023 “Protocol for managing intelligent network slicing with AI-assisted analysis in IMT-2020 network” \(under approval\)](#)** specifies protocol for managing intelligent network slicing with AI-assisted network analysis function in IMT-2020 networks. It describes architectural concept of intelligent network slicing APIs and management system, reference points among relevant functional elements, signalling flows over each reference point, and message formats with detail information.
- **[Recommendation ITU-T X.1811 “Security guidelines for applying quantum-safe algorithms in 5G systems”](#)** identifies threats raised by quantum computing to fifth generation (5G) systems through assessing the security strength of currently used cryptographic algorithms. This Recommendation briefly reviewed quantum safe algorithms, including both symmetric and asymmetric types, and provides guidelines for applying quantum safe algorithms in 5G systems.
- **[Recommendation ITU-T X.1812 “Security framework based on trust relationship for IMT-2020 ecosystem” \(under approval\)](#)** identifies the stakeholders in the IMT-2020 ecosystem, analyses the trust relationships amongst them, identifies threats and clarifies security responsibilities for each stakeholder, defines the security boundaries between stakeholders, and establishes a security framework based on the trust relationships.
- **[Recommendation ITU-T Y.3077 “Framework for interworking of heterogeneous application domain connected objects through information-centric networking in IMT-2020”](#)** specifies the framework, functions, and procedures for ICN device registration and discovery in distributed directory system functions collocated in gateways of each application domain and interworking of the directory system functions of various application domains by extending the ICN approach. It also specifies the communication procedure for interworking of devices within and across heterogeneous application domains for device management as well as accessing data and services provided by the devices.
- **[Recommendation ITU-T Y.3109 “QoS assurance-related requirements and framework for virtual reality delivery using mobile edge computing supported by IMT-2020”](#)**

specifies Quality of Service (QoS) requirements and a framework for virtual reality delivery using mobile edge computing in IMT-2020. It first provides an introduction on virtual reality delivery using mobile edging computing supported by International Mobile Telecommunications (IMT) 2020 network. It then specifies QoS requirements and a framework. The classification of VR services and the detailed VR service factors that become a basis for identifying requirements are specified in Appendix I and II. The typical VR user cases and guidelines for deployments of VR services are described in Appendix III and VI.

- [**Recommendation ITU-T Y.3113 “Requirements and framework for latency guarantee in large-scale networks including the IMT-2020 network”**](#) specifies requirements and a framework for latency guarantee in large-scale networks, including the IMT-2020 network, as follows:
 - 1) the requirements for achieving latency guarantee in large-scale networks including the IMT-2020 network;
 - 2) overall framework and functional entities, and their interworking to achieve latency guarantee, effectively and efficiently.
- [**Recommendation ITU-T Y.3135 “Service scheduling for supporting FMC in IMT-2020 network”**](#) specifies the requirements of service scheduling (e.g., traffic scheduling, access selection, etc.) for supporting Fixed-mobile Convergence (FMC) in IMT-2020 network. Based on the requirements of Fixed-mobile Convergence Service Scheduling (FMC-SS), it defines the functional framework and corresponding reference points. And it also provides service scheduling procedures and security considerations.
- [**Recommendation ITU-T Y.3157 “IMT-2020 network slice configuration”**](#): The network slicing has been definitely regarded as a key technology to successfully deploy the IMT2020 network. The concept of network slicing and use cases in the IMT-2020 network are introduced in ITU-T Recommendation Y.3112. This Recommendation specifies network slice configuration in order to dynamically create and manage a network slice instance in the IMT-2020 network. Detailed topics are: how to create a network slice instance, how to provide QoS to the network slice, and how to associate application services of UE with the network slice instance.
- [**Recommendation ITU-T Y.3177 “Architectural framework of artificial intelligence-based network automation for resource and fault management in future networks including IMT-2020”**](#) specifies an architectural framework of artificial intelligence (AI)-based network automation for resource management and fault management for the purpose of improving network efficiency and performance by continuously monitoring the network and promptly deciding about appropriate actions for resource adaptation and fault recovery with the help of AI including machine learning.
- [**Recommendation ITU-T Y.3178 “Functional framework of AI-based network service provisioning in future networks including IMT-2020”**](#) specifies a functional framework of artificial intelligence (AI)-based network service provisioning in future networks, including IMT-2020. This Recommendation addresses the following aspects:
 - Business role-based model for AI-based network service provisioning;
 - High-level requirements for the roles and their interactions from an AI-based operational perspective;

- Functional components and their interactions for AI-based operations for network service provisioning.
- **Recommendation ITU-T Y.3179 “Architectural framework for machine learning model serving in future networks including IMT-2020”** provides an architectural framework for machine learning (ML) model serving in future networks including IMT-2020, i.e., preparing and deploying ML models in different deployment environments to enable the application of ML model inference to ML underlay networks. The framework includes high-level requirements, and a high-level architecture description covering the definition of architectural components and reference points.
- **Recommendation ITU-T Y.4421 “Functional architecture for unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks” (under approval)** provides a functional architecture for UAVs and UAV controllers using IMT-2020 networks and functionalities defined in application layer, service and application support layer, and security capabilities. The motivation of this Recommendation is to solve the issues of civilian UAVs accessing and communicating in IMT-2020 networks using its transmission capabilities.
- **Recommendation ITU-T Q.5023 “Protocol for managing intelligent network slicing with AI-assisted analysis in IMT-2020 network”** specifies protocol for managing intelligent network slicing with AI-assisted network analysis function in IMT-2020 networks. It describes architectural concept of intelligent network slicing APIs and management system, reference points among relevant functional elements, signalling flows over each reference point, and message formats with detail information.

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

- **Recommendation ITU-T X.1643 "Security guidelines for container in cloud computing environment" (under approval)** analyses security threats and challenges on container in cloud computing environment, and provides the security guidelines and reference framework for container in cloud.
- **Recommendation ITU-T Y.3653 “Big data driven networking - functional architecture”** specifies a functional architecture for big data-driven networking, which includes: an overview of functional architecture, functional architecture for a big-data plane, functional architecture for a network plane and functional architecture for a management plane.
- **Recommendation ITU-T Y.3526 “Cloud computing - Functional requirements of edge cloud management” (under approval)** provides requirements for edge cloud. It introduces the overview of edge cloud management including advantages of edge cloud management and relationship with global management in distributed cloud. It describes the edge cloud management local functions and mode. Additionally, this Recommendation provides edge cloud management functional requirements derived from use cases.
- **Recommendation ITU-T Y.3527 “Cloud computing - End-to-end fault and performance management framework of network services in inter-cloud”** provides framework and functional requirements of end-to-end(E2E) fault and performance management of network services (NSs) in inter-cloud. The functional requirements are derived from the

corresponding typical use cases. In particular, a predictive model for fault and performance issues detection and localisation is presented.

- **Recommendation ITU-T Y.3606 “Big data - deep packet inspection mechanism for network big data” (under approval)** specifies mechanism of deep packet inspection applied in network big data context. This Recommendation specifies overview of big data processing procedure, relationship between deep packet inspection and big data related technologies, data classification mechanism using deep packet inspection for network big data, data pre-processing mechanism using deep packet inspection for network big data, coordination processing mechanism of deep packet inspection in network big data context and interfaces between deep packet inspection and the upper-layer big data related methods.

137. ITU-T study groups developed Recommendation and other texts in the context of Action Line C6:

- **[ITU-T Y.Suppl.60 \(revised\) “Interpreting ITU-T Y.1540 maximum IP-layer capacity measurements”](#)** provides information on interpreting ITU T Y.1540 maximum IP-layer capacity measurements as described in Annex A and Annex B of the Recommendation. This Supplement also provides useful information for those who measure various technologies.
- **Regional Recommendation ITU-T D.608R “OTT Voice Bypass” (under approval):** OTT voice bypass is now widely recognised as a form of traffic bypass and a growing source of losses for international inbound voice revenues. The regional Recommendation will focus on national and regional collaboration between member states and operators to deal with the OTT voice bypass issue.
- **Recommendation ITU-T D.1102 “Customer redress and consumer protection mechanisms for OTTs” (under approval)** proposes possible customer redress and consumer protection mechanisms related to the provision and consumption of OTTs.
- **[Recommendation ITU-T J.481 “Requirements of cable network for RF and IP secondary distribution of television programmes”](#)** defines the requirements and architecture of a cable television system able to provide video services in both RF and IP formats. This Recommendation is expected to support cable operators to continue their current cable television business during the transition to IP and in mixed RF and IP environments.
- **[Recommendation ITU-T J.482 “Requirements of RF/IP switching system”](#)** defines the requirements of a radio frequency (RF)/Internet protocol (I/IP) video switching system.
- **[Recommendation ITU-T J.1301 “The specification of cloud-based converged media service to support IP and Broadcast Cable TV – Requirements”](#)** describes functional requirement of the Cloud-Based Converged Media Service to support IP and Broadcast Cable TV.
- **[Recommendation ITU-T J.1302 “The specification of cloud-based converged media service to support IP and Broadcast Cable TV - System Architecture”](#)** defines the system architecture of the cloud-based converged media service to support IP and broadcast cable TV.

- **Recommendation ITU-T J.1611 “Functional requirements for Smart Home Gateway”** defines the functional requirements for a smart home gateway from both hardware and software point of view to ensure secure interoperability among consumers, businesses and industries by delivering a standardized communications platform and allowing devices to communicate cross operating system, service provider, transport technology or ecosystem.
- **Recommendation ITU-T J.1631 "Functional requirements of E2E network platform for Cloud-VR services" (under approval)** describes functional requirement of the end-to-end (E2E) network platform to deliver 360°/Virtual Reality (VR) video services from the video cloud to the terminal devices. Cloud VR is a new cloud computing technology for VR services. This Recommendation specifies the network requirements of Cloud VR services.
- **Recommendation ITU-T Y.3109 “QoS assurance-related requirements and framework for virtual reality delivery using mobile edge computing supported by IMT-2020”** specifies Quality of Service (QoS) requirements and a framework for virtual reality delivery using mobile edge computing in IMT-2020. It first provides an introduction on virtual reality delivery using mobile edging computing supported by International Mobile Telecommunications (IMT) 2020 network. It then specifies QoS requirements and a framework. The classification of VR services and the detailed VR service factors that become a basis for identifying requirements are specified in Appendix I and II. The typical VR user cases and guidelines for deployments of VR services are described in Appendix III and VI.
- **Recommendation ITU-T Q.5053 “Mobile device access list audit interface”** defines the methodologies and interfaces between mobile device access list audit system (MDALAS) and mobile network operators' equipment identity register (EIR) to audit and reconcile whether the mobile network operators (MNOs) are complying with the defined mobile device access list requirements. This Recommendation proposes different types of methodologies and interfaces to check and reconcile the mobile device access list used by the MNOs to comply with the regulations for the mobile device access list audit system (MDALAS).
- **ITU-T Q Supplement 73 “Guidelines for permissive versus restrictive system implementations to address counterfeit, stolen and illegal mobile devices”** provides guidelines for permissive versus restrictive system deployments that should be considered when deciding what approach to employ in order to address the issues of counterfeit, illegal and stolen mobile devices.
- **ITU-T Q Supplement 74 “Roadmap for the ITU-T Q.5050-series – Combat of counterfeit ICT and stolen mobile devices”** provides an overall index and relation of the ITU-T Q.5050-series of Recommendations. Additionally, it provides a cross-reference of the macro-process for combating counterfeit ICT and stolen mobile devices with the related Recommendations, Technical Reports and Supplements.

138. Internet of Things (IoT) standardization progressed and numerous ITU-T Recommendations and other texts were developed:

- **ITU-T Y.Suppl.58 “Internet of things and smart cities and communities standards roadmap”** presents the Joint Coordination Activity on Internet of Things and Smart

Cities and Communities (JCA-IoT and SC&C) roadmap, which contains a collection of standards and ITU-T Recommendations related to Internet of things (IoT), smart cities and communities (SC&C), network aspects of identification systems, including RFID (NID) and ubiquitous sensor networks (USNs).

- **[ITU-T Y.Suppl.68 “Framework for Internet of Things ecosystem Master Plan”](#)** describes a framework to support Member States to define their IoT ecosystem Master Plan, based on vertical domain assessment and identification of technical aspects to support the selected verticals. It also presents some actions to support the Master Plan deployment.
- **[ITU-T Y.Suppl.69 “Web based data model for IoT and smart city systems and services”](#)** provides a web-based data model for Internet of things (IoT) and smart cities. More specifically, this Supplement covers the following:
 - Suggestions for generic considerations of data format;
 - Necessity for a new type of metadata for interoperability;
 - Necessity and importance for a common data model for bridging existing data models;
 - Necessity, importance, and adequacy of microdata formats for data management in web environments;
 - Fundamental concepts and background of current web environments and microdata formats in terms of structuring and managing data in detail;
 - A new category of metadata, called procedural metadata, and its basic principles.
- **[Recommendation ITU-T X.1368 “Secure firmware/software update for Internet of things devices”](#)** specifies: 1) basic models and procedures for securely updating firmware/software (FW/SW) of Internet of things (IoT) devices; and 2) requirements and capabilities for updating IoT FW. A common secure update procedure is specified with general requirements. This procedure allows common IoT SW/FW updates to be securely implemented among stakeholders in the IoT environment, such as IoT device developers and IoT system/service providers. This Recommendation focuses on updating FW, but it is applicable to updating any other SW of IoT devices.
- **[Recommendation ITU-T Y.4122 “Requirements and capability framework of edge computing-enabled gateway in the IoT”](#)**: The gateway is an important component of IoT systems, enabling IoT devices to connect to communication network. Edge computing technologies can benefit the IoT providing computation, storage, networking and intelligence in proximity to IoT devices. Compared with the common gateway [ITU-T Y.4101], the edge computing-enabled gateway in the IoT (EC-enabled IoT gateway) has additional capabilities supporting service layer interworking, and application layer interworking among IoT devices, IoT platforms and IoT application servers. In addition, the EC-enabled IoT gateway supports data transmission capabilities for IoT applications sensitive to time, latency, jitter and packet loss. Based on common requirements and capabilities of a gateway for Internet of things applications [ITU-T Y.4101] and IoT requirements for support of edge computing [ITU-T Y.4208], additional capabilities and capability framework of the edge computing-enabled gateway in the IoT are specified. Examples of applicability of the edge computing-enabled gateway in the IoT are also given.

- [**Recommendation ITU-T Y.4211 “Accessibility requirements for smart public transportation services”**](#) specifies accessibility requirements for smart public transportation services.
- [**Recommendation ITU-T Y.4419 “Requirements and Capability Framework of Smart Utility Metering \(SUM\)”**](#) specifies requirements and capabilities for the support for smart utility metering (SUM). Smart Utility Metering (SUM) can provide remote data collection for utility metering, device maintenance in real time and can support a variety of applications.
- [**Recommendation ITU-T Y.4420 “Framework of IoT based monitoring and management for Lift”**](#) describes a framework of IoT based monitoring and management for lift with a protocol and data model to solve these problems.
- **Recommendation ITU-T Y.4421 “Functional architecture for unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks” (under approval)** is to solve the issues of civilian UAVs accessing and communicating in IMT-2020 networks using its transmission capabilities.
- [**Recommendation ITU-T Y.4471 “Functional architecture of network-based driving assistance for autonomous vehicles”**](#) defines a reference functional architecture of network-based driving assistance (NDA) for autonomous vehicles. It clarifies the concept of NDA, specifies key functional entities and defines reference points between entities. The use cases and operational procedures are also provided in an informative appendix. For improvement in the driving of autonomous vehicles, coordination between vehicles and infrastructures need to be improved with network technologies to provide the increasing transportation services and application requirements. NDA can improve the safety and efficiency of automated driving with capabilities of cooperative perception and decisions.
- [**Recommendation ITU-T Y.4476 “OID-based resolution framework for transaction of distributed ledger assigned to IoT resources”**](#) describes the concepts, functional requirements, architecture and procedures of an OID-based resolution framework by using DLT.
- [**Recommendation ITU-T Y.4559 “Requirements and functional architecture of base station inspection services using unmanned aerial vehicles”**](#) describes requirements and functional architecture of BSI services using UAVs. It focuses on how to effectively provide inspection services for the base station using BSI-dedicated UAVs (BSI-UAVs).
- **Recommendation ITU-T Y.4809 “Unified IoT Identifiers for Intelligent Transport Systems” (under approval)** defines field formats for identifying road signs/signals and identifies specific values for identifiers of such signs/signals.
- [**Recommendation ITU-T Y.4908 “Performance evaluation frameworks of e-health systems in the IoT”**](#) addresses this need for effective performance evaluation frameworks of e-health systems in the IoT and includes:
 - A classification of e-health services in the IoT
 - A non-exhaustive set of non-functional performance evaluation factors applicable to the e-health systems in the IoT
 - Performance evaluation frameworks for e-health systems in the IoT.

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”. ITU-T Study Group 20 is working on transposing the technical specifications from TMForum as follows: draft Recommendation ITU-T Y.TM.DM-API “IoT Device Management API REST Specification” and ITU-T Y.TM.SM-API “IoT Service Management API REST Specification”.

139. An ITU-T Global Portal is maintained with special focus on activities in the Africa, Asia Pacific, Arab, and Americas regions.
140. 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.
 - Updated and localized On-line self-paced training on Web Accessibility: The Cornerstone of an Inclusive Digital Society (English, French, Russian and Spanish (2020));
 - 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.
 - 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 for intelligent user interfaces and services) 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 (IRG-AVA) 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 includes:
 - [**ITU-T Technical Paper HSTP.ACC-UC "Use cases for inclusive media access services"**](#) describes use cases for multimedia accessible system. This Technical paper describes an experiment of IPTV services with accessibility functions based on ITU-T Recommendation about accessibility profiles for IPTV systems.
 - [**Recommendation ITU-T Y.4211 “Accessibility requirements for smart public transportation services”**](#): The concept of accessibility in public transportation services has been mainly concerned with eliminating physical barriers such as adopting accessible trains and buses that allows a wheelchair accessibility by mechanical lowering-entrance floors. In smart public transportation services, the

use of Internet of Things, when properly designed, may increase accessibility of public transportation services by providing access of information and physical accessibility. The Internet of Things can be used to create tools for persons with many types of disabilities and specific needs, including physical, visual, hearing and cognitive disabilities. In order for the smart transportation services to appropriately provide accessible services, information of accessibility profiles must be agreed upon in advance. Such accessibility profiles should basically include information on accessibility needs while traveling on public transportation services. This Recommendation specifies accessibility requirements for smart public transportation services.

- 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.
- Webinar sessions on accessibility were organized during WSIS Forum 2021:
 - Accessible media should not need to be a right – it should be a given by the IRG-AVA on 13 April 2021
 - ITU/WHO workshop "Role of industry in making telehealth accessible for persons with disabilities", Online, 23 June 2021
 - Accessible ICT during the Covid-19 Pandemic by ITU-T JCA-AHF on 4 May 2021.

141. Additional 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 \(17.18\)](#)



142. 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 2021, 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 2021, 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 16th Action Line Facilitation Meeting of C1, C7 and C11 was held on Wednesday, 5 May 2021 on the topic of “Digital government transformation.” This meeting served as a consultation session with stakeholders to gather feedback and suggestions for the UN E-Government Survey 2022. Since its inception in 2001, the United Nations E-Government Survey has become an indispensable ranking, mapping and measuring development tool for digital ministers, policymakers and analysts delving into comparative analysis and contemporary research on e-government.

143. Concerning the outcomes of this session, they are as follows:

- As a development tool, the United Nations E-Government Survey provides policymakers with evidence-based information and policy options that help governments understand their relative and contextual strengths and challenges, and to consider options on the way forward in mobilizing e-government for implementing the 2030 Agenda.
- Globally, a continued increase in the uptake of e-government development is evident, with 65 per cent of Member States now in the high or very high EGDI group. More than 22 per cent of the countries surveyed have moved to a higher EGDI group since 2018. Progress has been especially noteworthy in countries in special situations (LDCs, LLDCs and SIDS).
- While there tends to be a positive correlation between the EGDI ranking and the income level of a country, financial resources are not the only critical factor in e-government development. Very often, a strong political will, strategic leadership, and the commitment to expanding the provision of digital services (as measured by the Online Service Index, or OSI) will allow a country to achieve a higher EGDI rank than might otherwise be expected.
- The provision of digital government services has improved significantly; more than 84 per cent of countries now offer at least one online transactional service, and the global average is 14. The most common digital services offered worldwide are registering a new business, applying for a business licence, applying for a birth certificate, and paying for public utilities. For more details on the sessions and the outcomes, please see [here](#).

144. The WSIS Prizes 2021 Winner for the Action Line C1 is [KSA Free Wi-Fi, STC, Zain ,Mobil](#), Saudi Arabia.



Providing free wi-fi services to public by having public wi-fi hotspots across the cities, with an aim to improve quality of telecom services available to public in Saudi Arabia. CITC launched in partnership with key service providers to provide 60,000 Free access points across Saudi Arabia where there is an expected impact (Direct) and (Indirect) on both consumers & operators. The objective is to provide internet access to all in Saudi Arabia and promoting better life within the Kingdom as this will increase access to information and communications technology and strive to provide universal and affordable access to the Internet within Saudi Arabia. This is also aligns with Kingdom's push to develop the country as a tourism hub, hence, by allowing visitors to access free wi-fi, it will also promote and help the tourism industry indirectly.

Project website

<https://www.citc.gov.sa/>

Sustainable development goals related to this project

- Goal 3: Good health and well-being
- Goal 9: Industry, innovation and infrastructure
- Goal 11: Sustainable cities and communities
- Goal 12: Responsible consumption and production

145. The ITU has been contributing greatly to WSIS implementation and follow-up since its inception to the present. In 2021, 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 2021.

146. ITU Telecom organizes an annual global tech event for governments, industry and SMEs to exhibit innovative solutions, network, share knowledge and use the power of technology to accelerate economic development and social good for all. [ITU Virtual Digital World](#)

[2020](#) took place online from 20 -22 October 2020, bringing together ministers, regulators and tech experts to showcase and debate the role of digital technologies and public-private sector collaboration in the COVID-19 era. The event comprised Ministerial roundtables, Forum webinar sessions and a virtual Exhibition enabling online showcasing. The ITU Digital World 2020 Virtual SME Awards and Masterclasses offered SMEs worldwide the opportunity to apply with their innovative solutions in range of different sectors. [ITU Digital World 2021](#) takes place from 01 September- 01 December, comprising Forum Webinars, Ministerial Roundtables (12-15 October), SME Programme and culminating in the event's annual ITU Digital World 2021 SME Awards. It also marks the [50th anniversary](#) of the first ITU Telecom event in 1971. Co-hosted- as in 2020- with the Government of Viet Nam, it brings together leaders of government and industry under a timely theme: "Building the digital world. Together." Read the highlights [here](#).

147. **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. In 2020, TDAG was held virtually from 2 to 5 June. (Please see <https://www.itu.int/en/ITU-D/Conferences/TDAG/Pages/default.aspx>)
- Telecommunication Standardization Advisory Group (TSAG) for the ITU-T Sector. Two virtual meetings of the Telecommunications Standardization Advisory Group took place from 11-18 January 2021, and 25-29 October2021. (Please see <http://www.itu.int/en/ITU-T/tsag/2017-2020/Pages/default.aspx>). In January 2021, TSAG endorsed the full set of Questions for the ITU-T study groups. Most of the ITU-T study groups provided a mapping of the Questions to the WSIS Actions Lines (see Table 1), and to the SGDs(see Table2).

Table 1: Consolidated mapping of all ITU-T Study Groups (Questions) to WSIS Action Lines

	AL C1	AL C2	AL C3	AL C4	AL C5	AL C6	AL C7	AL C8	AL C9	AL C10	AL C11
SG2		X			X	X					X
SG3		X									
SG5		X		X	X	X	X				
SG9^(*)											
SG11		X			X	X			X		X
SG12		X					X				
SG13	X	X	X		X		X			X	X
SG15^(*)											
SG16^(*)											
SG17					X						
SG20	X	X	X		X	X	X	X		X	X

Note: (*) no mappings were provided.

Table 2: Consolidated mapping of all ITU-T Study Groups (Questions) 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

SG2								X	X	X	X				
SG3								X							
SG5						X		X		X	X	X			
SG9^(*)															
SG11								X		X	X			X	X
SG12				X			X	X	X						
SG13							X	X		X	X	X			
SG15^(*)															
SG16^(*)															
SG17															
SG20	X														

- Radiocommunication Advisory Group (RAG) for the ITU-R. The 28th RAG meeting took place on 29 March – 1 April 2021. (Please see <https://www.itu.int/en/ITU-R/conferences/rag/Pages/default.aspx>)

148. 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".
- 9 webinars were also organized by the ITU-D Study Groups from 27 May to 29 July 2020, which shared analyses of the response to the global COVID-19 pandemic from the perspective of specific ITU-D Study Group Questions. The areas covered by the webinars were related to several WSIS Action Lines. The detailed programmes can be

found in the following link: www.itu.int/go/COVID19-dialogues. A full list of workshops and events held by ITU-D Study Groups during the 2018-2021 study period can be found in the following [link](#).

- 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 5 000 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 <https://www.itu.int/en/ITU-R/study-groups/Pages/default.aspx>).

149. 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".
- The ITU World Telecommunication Development Conference WTDC-21 will be hosted by the Government of Ethiopia. The conference will take place in Addis Ababa from 8-19 November 2021.

For additional information please see:

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

Action Line C3: Access to Information and Knowledge



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



150. In 2021, ITU held numerous webinars, conferences, events, to promote digital inclusion. See details here: <https://www.itu.int/en/ITU-D/Digital-Inclusion/Pages/Digital-Inclusion-Events.aspx>

151. UNESCO organised the WSIS Action Line Facilitation Meeting C3, which took place virtually on 5 May 2021 on the topic of “Advancing Internet Universality for responding the pandemic and supporting SDGs”. The workshop highlighted the fact that the COVID-19 pandemic has reminded the world of the importance of the Internet, as a window to education, access to information, health, culture and countless other aspects of daily life. UNESCO’s Internet Universality Indicators (IUIs) project was recognized as a holistic tool, relevant to both developed countries and global south, to help the world respond and recover from the COVID-19 pandemic and achieve 2030 Agenda for Sustainable Development Goals. For more details on the sessions and the outcomes, please see [here](#).



152. ITU continues to ensuring inclusive, equal access and use of ICTs for all by supporting: (i) Member States, sector members and academia in the formulation and implementation of policies and strategies on digital inclusion, as well as awareness raising and advocacy, sharing good practices and knowledge, building capacity and the development products/services; and (ii) specific local communities (children, youth, older persons, women, persons with disabilities and indigenous people) through multi-stakeholder partnerships, collaborations and initiatives, to implement scalable roadmaps, actions, activities, and projects, to reduce the digital divide and towards more inclusive, equal access and use of ICTs for all.
153. ITU activities and resources on ICT Accessibility aim to contribute to ITU members' efforts to accelerate the implementation of digital accessibility as a means to enable digital inclusion and ensures inclusive communication for all people – regardless of their gender, age, ability or location.
154. These resources and tools include policy guidelines, toolkits, trainings (on-line/ face to face) ICT accessibility (in country) educational programmes, video tutorials; and in-country and regional assessments. Specific resources on COVID19 response and recovery were also developed. These resources were designed, developed, and made available in several UN languages to support ITU members in the regional and global implementation of ICT accessibility. Online trainings are delivered through the ITU Academy free of charge and self-paced, with localized content and the possibility of certification.
155. All ITU-D resources on ICT accessibility are delivered in accessible formats to ensure that persons with disabilities can also benefit. Examples of these resources are:
156. The ITU toolkit “Towards building inclusive digital communities,” and interactive self-assessment for ICT accessibility implementation (English, 2021);

-
157. Self Paced online training courses such as: ICT Accessibility: the key to inclusive communication (currently available in: Arabic, English, French, Russian and Spanish), and Web Accessibility - the Cornerstone of an Inclusive Digital Society (currently available in: Arabic, English, French, Russian and Spanish). These training courses are available through ITU Academy, free of charge and provided in digitally accessible format (they can also be followed by persons with disabilities). If the knowledge acquired is successfully validated, the training courses offer ITU certification.
158. ITU video-tutorial on the development of an in-country self-assessment (ITU toolkit, 2021);
159. Video-tutorial on: ICT Accessibility: the key to achieving a digitally inclusive world (2021);
160. ITU Report on the Information and Communication Technology (ICT) Accessibility Policy Review of the Republic of Serbia (2021);
161. ITU regional assessment on ICT accessibility for the Africa Region (2021);
162. ICT accessibility assessment report for the Europe region (2021);
163. ITU guidelines on how to ensure that digital information, services and products are accessible by all people, including persons with disabilities during COVID-19 (2020, in Arabic, Chinese, English, French, Spanish, Russian). These guidelines were selected and translated by the UN COVID-19 emergency group into the 22 most spoken languages in the world;
164. ITU regional assessment on ICT Accessibility for the Asia-Pacific region (2020);
165. On-line self-paced training on: How to ensure inclusive digital communication during crises and emergency situations (2020, in English, French, Spanish);
166. Video- tutorial on: How to ensure inclusive digital communication during crisis and emergency situation (2020, in English, French, Spanish);
167. Updated and localized On-line self-paced training on ICT Accessibility: The key to inclusive communication (2020, in Arabic, English, French, Russian and Spanish);
168. For more information on the work and resources on ICT Accessibility see here: <https://www.itu.int/en/ITU-D/Digital-Inclusion/Pages/ICT-digital-accessibility/default.aspx>
169. The WSIS Prizes 2021 **Winner** for the Action Line C3 is [Comparatel: “Discover the tariff plan for telephony, Internet and Pay TV that suits you best. Compare and choose”, Telecommunications Regulatory Agency \(OSIPTEL\), Peru.](#)



The screenshot shows the 'Herramientas Disponibles' section of the Compartel website. It features four circular icons representing different services:

- TELEFONIA MÓVIL**: Shows a smartphone icon.
- INTERNET FIJO**: Shows a router icon.
- CALCULADORA DATOS MÓVIL**: Shows a mobile phone icon.
- INTERNET FIJO**: Shows a laptop icon.

Below each icon is a brief description in Spanish:

- TELEFONIA MÓVIL: "¿Quieres tener datos ilimitados? ¿Quieres pagar por minutos y tener precios?"
- INTERNET FIJO: "¿Quieres una tarifa fija? ¿Quieres que tu proveedor de servicios te devuelva el excedente de consumo mensualmente?"
- CALCULADORA DATOS MÓVIL: "¿Tienes suficientes datos para consumirlos mensualmente? ¿Tienes que pagar más al final del mes?"
- INTERNET FIJO: "¿Tienes una conexión fija? ¿Puedes pagarla?"

The tariff plans that telecommunication operators offer is wide and dynamic, generating a diverse range of tariffs and conditions that make difficult for users to determine the best choice.

In this context, and as part of the institutional policy of empowering user with information, the OSIPTEL arranged to put all updated commercial information in the market available for users, in order to compare, and thus choose the best choice.

Comparatel was developed for this purpose, as a digital tool that systematizes and arranges the current tariff plans offered, in order to be available to the public in a friendly way, allowing comparison based on what is really needed.

When you enter Compartel (compartel.pe), you have four services: Two calculators to determine mobile data consumption and home Internet speed; and two to compare tariff plans. The user must set up the tariff that plans to invest, the amount of data or the speed needed, and Compartel will present a dashboard with all current offers in the market.

Comparatel was entirely developed by the OSIPTEL, and it is constantly improving. It has been available since February 2020 and has been visited by more than 830 000 people.

Project website

[https://www.compartel.pe/](http://www.compartel.pe/)

Sustainable development goals related to this project

- Goal 9: Industry, innovation and infrastructure

170. ITU developed and is maintaining a database for following the transition from analogue to digital terrestrial television broadcasting :

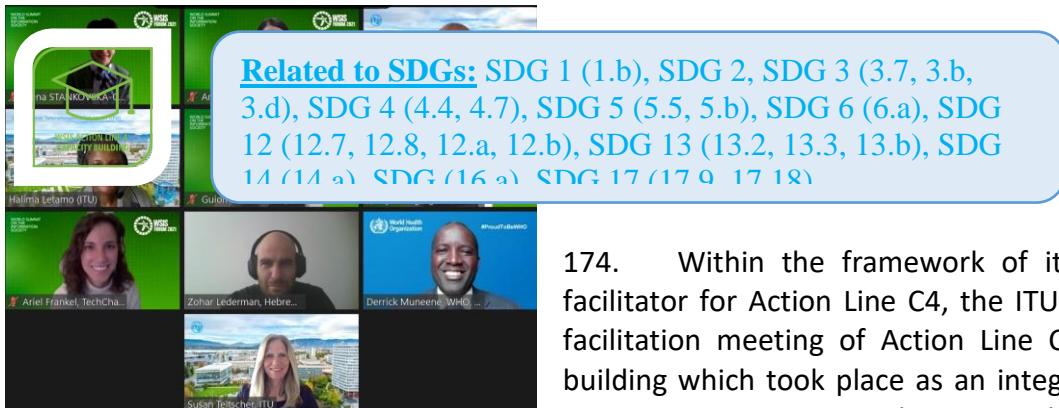
<http://www.itu.int/en/ITU-D/Spectrum-Broadcasting/Pages/DSO/Default.aspx>

171. The **World Radiocommunication Conferences (WRC)** are held every three to four years. 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 its Final Acts came into force on 1 January 2017. Further details about WRC are available here: <https://www.itu.int/en/ITU-R/conferences/wrc/Pages/default.aspx>

172. The new releases of regulatory publications are available here: <https://www.itu.int/en/publications/Pages/Newreleases.aspx>. Further details about regulatory publications can be read [here](#).
173. The ITU organizes World Radiocommunication Seminars (WRS) on a biennial basis, in complement to the cycle of Regional Radiocommunication Seminars (RRS). WRS deal with the use of the radio-frequency spectrum and the satellite orbits, and, in particular, with the application of the provisions of the ITU Radio Regulations. The WRC-20 was organised in a fully virtual format from 30 November – 11 December 2020.

Action Line C4: Capacity-Building



174. 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 2021. ITU and WHO jointly organised the meeting, which took place on Wednesday, 21 April 2021 from 13:00 to 14:00 under the theme of “Digital skills for e-health: Post COVID-19.” The session, which was virtual, was attended by 257 participants. This session discussed the role of digital skills in health with a special focus on the impact of COVID-19 on digital skills needs in the sector. The session explored the challenges and opportunities for policymakers, citizens, and medical personnel to acquire these skills. Experiences from the Digital Health Leadership training were also shared.

175. Several conclusions were reached during the meeting such as:
 - Collaboration is key to advancing digital skills in the health sector
 - More efforts are still needed to upskill health personnel as well as patients, who may lack basic digital skills or even access to information and digital services
 - Digital Innovation in medical diagnostics and teaching are increasing, saving costs, and increasing the ability of doctors to cater to more patients

- Along with the benefits of AI, some questions remain to be answered on its ethics standards, particularly in data output and compliance
- New learning methods in the era of COVID-19 have increased and more learners can be reached depending on their learning style
- New ITU/WHO training on health leadership is to be launched on the ITU Academy in May 2021

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

177. 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.

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

- AI, and technology in general, allows for better access to health care
- The pandemic has allowed for digital learning platforms to become more accessible for greater amount of people

179. The WSIS Prizes 2021 Winner for the Action Line C4 is [Talk to me, Contemporary Education Academy, Georgia.](#)



An application developed for children with mute-deaf parents. Hearing children raised by deaf-mute parents, from the very moment of their birth, suffer from severe communication problems with their family or the society. Early on, there may be thoughts of alienation. These conditions can affect the deaf-mute offspring's personality. Our innovation is unique

and significant from other apps because ours is free while for others you have to pay money, not all people can pay for things like apps, when they have many more necessary things to pay for. We reckon, that this issue is not getting as much attention as it should. We aim to create an app, that provides children alike with advanced courses to help them to develop communication skills to have contact with their parents and people of any kind. Our innovation includes both sign language and talking sessions. Talking sessions are split into 3 levels: A1; A2 and B1. Each level has different vocabulary difficulties so that the user can experience progress throughout the process. This program offers variety of techniques based on the needs of the user, this means, that the levels are divided into two parts each: basic communication and interesting communication. Sign language operates off of video lessons, which are pre-recorded. The consumer learns both types of communication skills. This app is a speaking bot, which provides the user with live experience, like talking to the children, asking them how their day went and et cetera. Basic communication section teaches general talking phrases, questions and makes the person feel appreciated and not left out.

Project website

<https://www.cea.ge/>

Sustainable development goals related to this project

- Goal 4: Quality education
- Goal 16: Peace, justice and strong institutions

180. The ITU continues to support its [**Centres of Excellence \(CoEs\)**](#). The Centres of Excellence (CoE) programme was launched by ITU at the turn of the millennium, with the aim to support capacity development in the field of information and communication technologies (ICTs) by offering continuous education to ICT professionals and executives in the public and private spheres through face-to-face, online or blended learning. The CoE initiative evolved over the years to become one of the ITU's key training delivery mechanisms. With the support from multilateral and regional organizations, CoE networks have been established in a number of 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 brought together into a single global network sharing expertise, resources and capacity-building know-how in telecommunications and ICT training/education.
181. 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 28 new Centres were selected for the 2019-2022 cycle, out of a total of 64 applications received and processed. Training activities under the Centres of Excellence have been taking place in all the 6 regions. Due to Covid-19 pandemic, all courses have been moved to online modality and CoE partners in all regions have shown great resilience, flexibility and adaptability.
182. A regional governance structure for the Centres of Excellence has been put in place in the form of regional Steering Committees which meet twice 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.

183. 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.
184. As the main ITU umbrella for training activities, the ITU Academy several courses under 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. SMTP in partnership with Afralti has been particularly successful with a growing flow of participants. SMTP is in the process of translation into French and has already been translate into Spanish. SMTP courses in Spanish are well attended with an average of about 60 participants each. A Quality of Service Training Program (QoSTP) has also been developed. In 2021, a self-paced online course on Introduction to Service Quality Regulation was launched and has rallied a large support from participants all over the world. 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.
185. ITU launched the [Digital Transformation Centres \(DTC\) initiative](#). The Initiative seeks to create a global network of centres, whose main purpose is to develop digital skills mainly at basic and intermediate level for citizens. 9 DTCs have been selected for the first phase which ran from January 2020 to end of August 2021. The 9 DTCs selected were from Africa (4), Americas (2), and Asia Pacific (3) regions. In response to the COVID-19 crisis, the Phase 1 DTC trainers were provided with tools and skills on how to conduct remote teaching. The train-the-trainers online courses were offered in collaboration with Cisco. Building on the success, and the lessons learnt, of the first phase of the Initiative, the second phase aims to increase the number of DTCs and further strengthen and scale the impact of the network. Preparations for the second phase start on 22 July 2021 with the opening of applications for new institutions wishing to join the network. The closure date for applications has been extended to September 19, 2021 and the selection process takes place in the month of October 2021.
186. 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. A steep user growth was experienced in 2020, which has also continued into 2021, largely due to COVID-19 pandemic. ITU Academy has also expanded its course offerings and now has over 150 courses promoted in the first 3 quarters of the year.

187. 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.
188. During 2021, as part of the ITU-R capacity building programme, two Regional Radiocommunication Seminars have been conducted: [RRS-21-Americas](#) (26 April – 7 May 2021) and [RRS-21-Africa](#) (5-16 July 2021), in order to foster knowledge on spectrum management, the Master International Frequency Register (MIFR), the ITU Radio Regulations, the World Radiocommunication Conference, the Radiocommunication Assembly and agenda of WRC-23. These seminars also included training on ICT tools for frequency notifications as well as information on BR and BDT spectrum management activities as well as tutorials on the use of these tools for notification procedures of terrestrial stations and space stations. Moreover, each Seminar was culminated with a Forum on topics of interest for each region.
189. A third Regional Radiocommunication Seminar is planned from 11 to 22 October 2021 for the Asia and Pacific Region ([RRS-21-Asia-Pacific](#)). The Seminar will conclude with a Forum on “Radiocommunication Trends: Opportunities and Challenges for the Asia-Pacific Region”.
190. ITU-T SG13 developed [**Recommendation ITU-T Y.2246 “Smart Farming Education Service based on u-learning environment”**](#) provides a reference architecture and service requirements for Smart Farming Education. It focuses on the farming education service about farming knowledge which includes the farming technology, farming skills, farmer's experiences and know how, etc. The information related to farming knowledge will reflect current activities, farming products and from the experience of farmers in the field. The core component of the automation process is the creation of a data store which will be a repository for this information. The farming sector will benefit immensely from the implementation of farming data in a farming contents repository which will serve as the knowledge base for the automation process. It discusses how this service may be used to develop a knowledge base intended to benefit those involved in the farming sector.

Action Line C7: ICT Applications

Action Line C7: E-Government



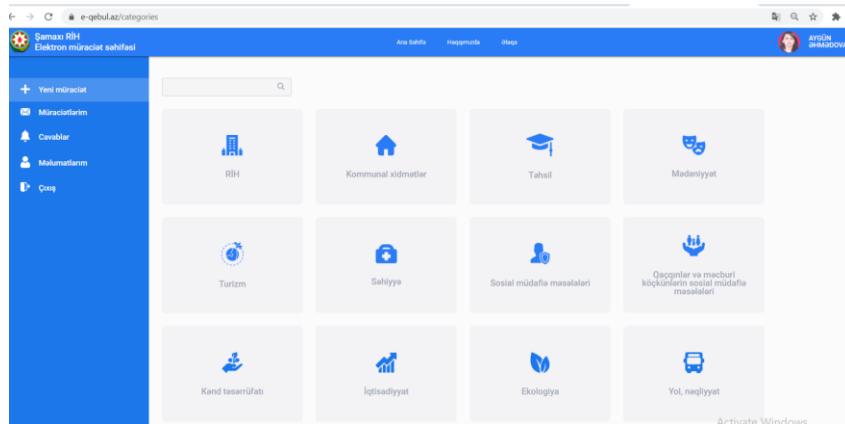
Related to the SDGs: SGD 9 (9.c), SDG 16 (16.6, 16.7, 16.10), SDG 17 (17.8)



191. The Action Line C7 E- Government Facilitation Meeting was held on Wednesday, 5 May 2021 together with the Action Lines C1 and C11. The title of this session was “Digital government transformation.” 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](#).



192. The WSIS Prizes 2021 Winner for the Action Line 7 on e-Government is "["Citizens' Electronic Appeals" system, Data Processing Center \(DPC\) of the Ministry of Transport, Communications and High Technologies, the Republic of Azerbaijan.](#)



The project has been implemented in Shamakhi region of the Republic of Azerbaijan. The population of Shamakhi region is about 10% of the country's population. The e-appeals system provides citizens living in the area with online applications, complaints, and suggestions without going to various local government agencies. The purpose of the project is to ensure the transition to digitization in the country and at the same time to minimize physical contact with government agencies in a pandemic. In addition to reducing the number of contacts, it also reduced the time of consideration of appeals. Applications previously considered for 15 days are now considered for 7 days.

Project website

<https://e-gebul.az/>

Sustainable development goals related to this project

- Goal 8: Decent work and economic growth
- Goal 9: Industry, innovation and infrastructure
- Goal 10: Reduced inequalities

-
- Goal 11: Sustainable cities and communities
 - Goal 17: Partnerships for the goals

193.ITU-Estonia-GIZ-DIAL Digital Government project : the GovStack initiative

ITU in collaboration with Estonia, GIZ/Germany and the Digital Impact Alliance have jointly launched the GovStack initiative⁴, which is an effort to accelerate governments digitalization and Transformation towards the attainment of SDG.

The initiative is an expert community-driven multistakeholder effort aimed at assisting countries to build a shared “Digital Government Services Infrastructure” or a “Government Technology Stack” that is constituted of a set of reusable common foundational digital capabilities and services – called also Building Blocks – such as Digital ID, Information Exchange, Payments Gateway, Registrations, Security, etc. that can be used by the whole-of-government through any government agency or department to build new government digital services without having to design, test and operate the underlying systems and infrastructure themselves. This “digital public services infrastructure” effectively sits ‘on top’ of the internet, is ubiquitous, available for all (i.e., as a utility) and provides the basic requirements to accelerate a sustainable digital economy. It is therefore the engine or the heart of green digital transformation. It will reduce the time and effort needed to introduce new truly green and sustainable digital services that could be scaled up and upgraded in a more agile, accelerated and cost-effective manner.

194.Smart Villages Niger

The Smart Villages project in Niger aims to transform 20 rural villages into smart villages during its first phase. It will deploy a range of ICT-enabled solutions to the villages selected by the Government of Niger based on the successful proof of concept that has been conducted earlier in two villages in Niger. It will bring about a positive change in the quality of life by providing connectivity and new ICT-enabled services to the local communities while also promoting interoperability, cooperation, and holistic demand-driven response to the SDG-related needs.

195.Smart Islands⁵

A Joint Programme (JP) was developed related to “Accelerating SDG achievement through digital transformation to strengthen community resilience in Micronesia” to be funded by the Joint SDG Fund. The programme adopts an SDG-based approach to digital transformation across Micronesian countries. Digital technologies, as experienced worldwide during the pandemic, serve as a powerful tool to facilitate the much needed social and economic transformation towards the achievement of the SDGs as Pacific Islands Countries continue to embark on the digital transformation journey. The traditional supply-side, siloed approaches to providing public goods and services do not address the problem

⁴ www.govstack.global

⁵ [Smart Islands \(itu.int\)](http://Smart Islands (itu.int))

in a holistic and sustainable manner. An SDG based integrated planning approach (policy, legislation, strategy and delivery of digital services) customized to local needs and priorities can address multiple high priority challenges experienced by the citizens through digital devices and service.

Fundamentally, two outcomes are targeted: Outcome 1: Promoting enabling policy and legislative framework that benefit communities and vulnerable groups that accelerate achieving SDGs and digital transformation (including internet development). Outcome 2: Access to resilient broadband connectivity facilitated through pilots in at least 5 remote islands and villages, one each in the 5 countries, to accelerate their digital transformation to smart islands / digital villages with access to a range of digitally enabled services that meaningfully improve: livelihoods; healthcare; the enjoyment of human rights; skills in harnessing the digitally enabled services; education and job opportunities, food availability and nutrition; digital finance and information; response to natural disasters; maritime security.

196. The project addresses the need of interventions that would help African countries to transform into digital economies and to adopt e-applications geared to sustainable development in various aspects of African economies. The project provides a model for assistance in the development of digital inclusive services and interventions specifically targeted at achieving social and economic development and inclusion through improving digital literacy and access. The project seeks to establish a model in Niger that could be replicated in other countries in the region by learning from experiences and lessons.

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)



- 197. ITU/WHO organised WSIS Action Line Facilitation Meeting C7: E-Health on Wednesday, 7 April 2021. The theme of the meeting was “Digital Health and COVID-19: Challenges, Trends, and New Opportunities”. More details on this session [here](#).
- 198. ITU/WHO organised a joint workshop on “Digital Vaccination Certificate”, 11 August 2021. More details on this session [here](#). A followup 2nd workshop on the same subject is planned toward end of 2021.
- 199. The WSIS Prizes 2021 Winner for Action Line C7 on E-Health is the [SHEFAA portal / application, Ministry of Health and Prevention \(MOHAP\), United Arab Emirates](#).



“SHEFAA” to serve the largest segment of patients of all age groups by showcasing treatment services provided by the ministry and other patient-centric services. The new platform will act as the digital communication between patients and service providers the main reference for access to medical and clinical information and the patients' medical record. This is supported by the user-centric information, through the direct connectivity with the “Wareed” system that covers all MOHAP centers and hospitals within a single network. Through the “SHEFAA” platform, users can complete their registration using the ‘UAE pass’ to get smart treatment services and notifications on the updates of the patient's file. The platform also offers health education and guidance, questionnaires and opinion polls, E-payment, vital signs, live chat, lab test reports, and results.

“SHEFAA platform comes as part of the UAE government's directions to develop public services and achieve high quality for community members in accordance with the UAE Vision. It also falls within MOHAP efforts to provide comprehensive and integrated healthcare services and implement the smart government initiative, by developing health information systems and carrying out world-class standards in managing the infrastructure of health facilities, in line with the goals of the National Agenda to implement a health system based on the highest international standards.”

The new tech-based platform “SHEFAA” aims to provide treatment services and enhance access to the medical record, including ‘vital signs, prescriptions, and vaccines, medical history, medications, allergies, doctors' visits record, lab test results, and reports.’

Project website

<https://shefaa.mohap.gov.ae/FE/Home.aspx>

Sustainable development goals related to this project

- Goal 3: Good health and well-being

200. 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.

201. 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).
202. 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](#).
203. 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 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.
204. ITU-T study groups developed the following Recommendations and other texts:
 - [ITU-T Technical Paper HSTP.CONF-H870 "Testing of personal audio systems for compliance with ITU-T H.870"](#) describes the testing of the compliance of various personal audio systems/devices to the essential/mandatory and optional features of H.870.
 - [Recommendation ITU-T H.830.17 “Conformance of ITU-T H.810 personal health system: Services interface Part 17: Personal Health Device Observation Upload \(POU\) Sender](#) includes an electronic attachment with the protocol implementation conformance statements (PICSs) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.
 - [Recommendation ITU-T H.830.18 “Conformance of ITU-T H.810 personal health system: Services interface Part 18: Personal Health Device Observation Upload \(POU\) Receiver](#) includes an electronic attachment with the protocol implementation conformance statements (PICSs) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.
 - **Recommendation ITU-T X.1080.2 “Biology to machine protocol” (under approval)** allows a medical centre remotely to monitor a patient and to retrieve information from that patient. It defines a general protocol for exchange of biometric information from a patient facility to a medical expert facility. It also allows the medical expert facility to control the sensors and other devices at the patient facility and to establish the environment for a monitor session at the patient facility. It also defines a versatile and open-ended information model that allows any type of medical and non-medical information to be transferred.
 - [Recommendation ITU-T Y.4908 “Performance evaluation frameworks of e-health systems in the IoT”](#) addresses this need for effective performance evaluation

frameworks of e-health systems in the IoT and includes:

- A classification of e-health services in the IoT
- A non-exhaustive set of non-functional performance evaluation factors applicable to the e-health systems in the IoT
- Performance evaluation frameworks for e-health systems in the IoT.

205. The Radio Regulations defines, under RR No. 1.15, the *industrial, scientific and medical (ISM) applications* (of radio frequency energy) as: “Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of *telecommunications*.” Frequencies for the use of ISM applications are identified in the Radio Regulations.

206. ITU-R Study Group 1 identified some frequency ranges for Short Range Devices (SRDs) that are used in some health applications (e.g. Assistive Listening Systems).

207. ITU-R Study Group 5 developed Recommendation ITU-R M.1076 on impaired hearing solutions.

208. In February 2021, Recommendation ITU-R M.2150-0 on “Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020)” (developed under the responsibility of ITU-R Study Group 5) was approved. Similar to previous mobile generation technologies, this work is the basis for the development of 5G systems that provides great improvements and benefits to several ICT applications, including e-health, e-agriculture, e-manufacturing, intelligent transport systems, smart cities and traffic control, etc., to facilitate the development of the digital economy.

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



209. The Action Line C7 E-Agriculture Facilitation meeting was held jointly by ITU, the Food and Agriculture Organization (FAO) and Zhejiang University entitled “E-commerce for Agriculture and Rural Development” on Friday, 7 May 2021. E-Agriculture specifically involves the conceptualization, design, development, evaluation and application of innovative tools and mechanisms to use information and communication technologies (ICT) in the rural sector, with a primary focus on agriculture. The session aimed to enhance cross-fertilization of ideas, innovation, knowledge and practices in the field of rural e-commerce that has now emerged as a tool to provide advanced technical conditions that can provide effective solutions, necessary to tackle next century’s challenges in the agri-food sector. More details on the session [here](#).



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210. During this session, the overview of the 'Digital Agriculture Report: Rural E-commerce: Experiences from China' was also presented and welcomed, as a fruit of the successful collaboration between FAO and ZJU, and which aim is to contribute further to the discussion on e-commerce for agriculture and rural development at the international community level.
211. FAO and ZJU will pursue their collaboration in digital agriculture and plan to launch a series of yearly digital agriculture reports to continue strengthening knowledge and expertise sharing in the digital agriculture sector and contributing then to the design and implementation of policy and strategy frameworks that will establish enabling ecosystems worldwide. The foreseen outcomes are to build a compact and orderly business consortium, reduce rural business costs, and expand the field of rural business, so that farmers can make the best benefit of the platform use.
212. Digital innovation has revealed to have a true 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 achieve several SDGs, particularly 1 (eradication of poverty), 2 (end hunger), 8 (decent work and economic growth), and 13 (climate action). This session also focused on youth entrepreneurship, capacity development and multi-stakeholder partnerships, which are key enablers to establish business models to produce new ideas and products, shape better policy recommendations, better use of data, better knowledge transferring, and better digital solutions aimed at contributing and achieving all the SDGs.
213. ITU in collaboration with FAO are developing a study to understand better the status of digital agriculture transformation in the sub-Saharan Africa region. The goal of the study was to assess and document the status of digital agriculture in the region; summarize the key findings on the status; and draw potential opportunities for digital agriculture transformation in Sub-Saharan Africa in the respective 47 countries. The results would enable both ITU and FAO to prioritize investments in digital agriculture but also offer other interested parties to use these results as for their own intervention. This study is desk-based research, which consulted various national, regional and international reports. Additionally, the research team also initiated an e-consultation process to gather the views and lastly consulted FAO and ITU country teams to validate each country profile. The study examined the digital agriculture transformation process through six thematic areas (Infrastructure, Digital Penetration, Policy and Regulation, Business environment, Human Capital and, Agro-innovations) supported by relevant indicators that enables a better understanding of the digital agriculture maturity at national level and regional level.
214. The WSIS Prizes 2021 Winner in category e-Agriculture is [Leveraging Information and Communication Technology for Irrigated Agricultural Information, 8villages, Indonesia](#).



Our project promotes the use of technology to reduce the face-to-face activity on the ground of the irrigated farmers in Garut (West Java) and Lombok (West Nusa Tenggara). The conventional

activities among farmers and extension worker is usually conducted by face-to-face to exchange information and extract solution from the extention workers. But since the Covid-19 Pandemic, people will reduce the conventional way of exchanging information as much as they could. In result, farmers have to find alternatives to communicate better to get needed information regarding farming.

Through our platform, it will be possible for farmers to get information not only from their designated extension workers, but also broaded from many extension workers and farmers with the similar problem with them from all over the country. It even made possible for extension workers to act as the surveyor and extract crops data from farmers without jeopardizing the health of both parties; the farmers nor the extension worker. It also has been proven that the exchange of information in the platform is more effective and more efficient than the conventional way, since we also provide information in the form of articles, videos, crop calendar, price information and so on.

Project website

<http://lisa.id/>

Sustainable development goals related to this project

- Goal 2: Zero hunger

215. The series of most recent publications documenting success stories and promising practices in e-Agriculture are available here: <https://www.itu.int/en/ITU-D/ICT-Applications/Pages/e-agriculture-in-action.aspx>.
216. 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](#).

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



217. The Action Line C7: E-Environment Facilitation Meeting was held on Friday, 23 April 2021 as an integral component of the WSIS Forum 2021. It was co-organized by WMO, ITU and UNEP. The session addressed the current challenges the climate movement is facing and where ICT could be better applied to improve connectivity and ultimately aid climate action. The session also highlighted the importance of using technologies to provide a fast



response in the aftermath of a disaster, because telecommunication network equipment can be extensively damaged or destroyed. Local access, national backhaul, and international networks can be affected. This results in disruptions and outages to telecommunication and Internet services until operators can repair or replace the network. In this absence of normal communications, emergency telecommunication networks can be deployed, typically using wireless and satellite communications equipment. ITU along with the Emergency Telecommunications Cluster (WFP) created the Disaster Connectivity Map (DCM). The concept of the DCM is to publish a map service of telecom network infrastructure and coverage, and broadband connectivity performance from a range of existing sources and geospatially display connectivity outages dynamically, using real-time connectivity data reported from the ground during disasters, which will allow first responders to support decision-making on where and when to deploy resources to restore communication services. This pilot is still under development.

218. More details on this session [here](#).
219. This session was mainly linked to the following SDGs: SDG 4, 13 and 17.
220. The WSIS Prizes 2021 Winner for the Action Line C7 on E-Environment is [Al Nawras, Ministry of Transportation and Telecommunications \(MTT\), Bahrain](#).



“Al Nawras” is a flight permission and scheduling system and the first aviation approval online system in the Middle East; completely developed and led in-house by women staff members of the Information Systems Directorate in the Ministry (MTT). The project automates the entire manual paper-based flight approval and scheduling process done by the Air Transport Directorate to an efficient, reliable, highly available, accurate, environment friendly and cost-cutting electronic system. The main goal is to simplify and streamline the aviation services offered to all airlines, agents or private aircraft owners worldwide and establish higher levels of convenience, support and access for the international aviation community. Al Nawras provides the means to apply for Flight Landing Permits, Flight Overflying Permits and Flight Scheduling Permits online from any electronic device at any time. Any aircraft landing to Bahrain, overflying through Bahrain’s flight airspace/region, or operating a seasonal flight schedule must get a flight permit through Al Nawras.

The system integrates several internal and external entities involved in the flight approval process and allows them to automate their part of the approval process, do their tasks and take decisions all through one central system saving cost, time and efforts. The internal

entities using the system are the Air Transport, Aeronautical Licensing, Air Navigation and the Financial Resources Directorates. The external entities are Bahrain Airport Company and Bahrain Airport Services. The system also provides monitoring screens for Air Traffic Controllers to monitor flights permitted to land or overfly. It currently provides services to around 1,600 users and has reduced the processing time significantly from days to minutes provided that all the needed requirements are submitted correctly. It also focuses on improving the safety and security of aviation by making sure the e-services have the checks and controls that adhere to international laws and regulations.

Project website

<https://www.fps.gov.bh/>

Sustainable development goals related to this project

- Goal 3: Good health and well-being
- Goal 8: Decent work and economic growth
- Goal 9: Industry, innovation and infrastructure
- Goal 11: Sustainable cities and communities
- Goal 13: Climate action
- Goal 17: Partnerships for the goals

221. The Development sector of the ITU has undertaken several activities falling under the Action Line c7 e- environment, in particular Emergency Telecommunications and e-waste, On the e-waste side the following activities have taken place:

1) **E-waste:**

2.1. Global E-waste Statistics Partnership

EACO Regional WEEE Data Harmonization:

As part of the Global E-waste Statistics Partnership (GESP), BDT/EET, in cooperation with the United Nations Institute for Training and Research (UNITAR), started the project on regional e-waste data harmonization in East Africa. The project aims to provide technical assistance to the 6 member states of EACO, to support the relevant strategic actions of the EACO Regional E-waste Management Strategy, in the area of data and statistics. Technical assistance provided through this project will help Rwanda, Kenya, Tanzania, Burundi, South Sudan and Uganda to track progress and to harmonize the collection of data on e-waste, also termed waste electrical and electronic equipment (WEEE), regionally. This will eventually help to sustain a central database of e-waste within the EACO secretariat.

Regional E-waste Monitors (Latin America, Western Balkans, CIS+ and Arab States):

The GESP is also developing a Regional E-waste Monitor for Latin American countries, and a Regional E-waste Monitor for the Arab States. The BDT Regional Office in Moscow is supporting the United Nations University (UNU) in the preparation of a Regional E-waste Monitor for the Commonwealth of Independent States (CIS) plus Georgia, Turkmenistan and Ukraine (CIS+). The GESP is also currently preparing a project with UNITAR which will result in the publication of a Regional E-waste Monitor for the Western Balkans.

Global E-waste Statistics Partnership:

The GESP is further improving its global e-waste statistics portal, which is a website <https://globalewaste.org/> making worldwide e-waste statistics free and publicly available. Several areas of upgrade have been underway on the website, including improving efficiency, the capacity building pages, publications, data accessibility and hosting for e-learning.

E-waste Statistics Technical Assistance:

The GESP has been continuing its delivery of technical assistance to Malawi, Botswana and Namibia in the area of e-waste statistics and data collection, through online capacity building and close support to national statistics offices and other institutions and ministries. These countries will each prepare a National E-waste Monitor, with the National Statistics Offices taking a lead in the quantification of e-waste generation, flows and importation of electronics. Starting in late 2021, the GESP will begin extending similar support to Dominican Republic and Kazakhstan.

E-waste Statistics Blended E-learning:

An e-learning course is being developed in order to transpose - in-person e-waste statistics capacity building into a self-paced online course, through the ITU Academy. The course will allow for blended instruction between online and in-person delivery. The online training will be by invitation and participants will be able to take the course over a 2 to 4-month period, allowing participants the time to gather the data they need and to become familiarized with the e-waste statistics tools prior to in-person workshops.

2.2. E-waste management awareness raising

Fourth edition of International E-waste Day in collaboration with WEEE Forum:

BDT/EET is collaborating with the WEEE Forum in promoting the fourth edition of International E-waste Day, which will take place on the 14th October 2021. Some of the areas of collaboration include joint publication of a thought paper titled Digitalization for a Circular E-waste Value Chain, which explores the current applicability and scope of digital technologies in driving circular e-waste management.

Industry collaboration on shaping a circular economy for the electronics industry:

BDT/EET is involved in the Circular Electronics Partnership (CEP) which includes almost 50 companies who have come together to develop an industry vision and roadmap until 2030 for the electronics sector. Earlier this year, an electronics industry-wide roadmap and vision were released, marking the launch of the CEP.

United Nations system-wide collaboration on tackling global e-waste challenge:

ITU (both BDT and TSB) continues to be active in the UN E-waste Coalition. In May 2021, ITU handed over the secretariat hosting of the Coalition to the United Nations Environment Programme.

2.3. Development of national e-waste management strategies, policies and regulations

Technical assistance in the development of policies:

BDT is currently providing support to Namibia, Malawi and Burundi in the development of a national e-waste management policy. A government stakeholder consultation workshop took place both in Malawi and in Burundi in May 2021 and in June 2021 respectively. Private sector stakeholder consultation workshops will take place in these countries in the Autumn of 2021. In Namibia, the draft national e-waste management policy has been approved by the National Planning Commission and is now awaiting editing before submission to the Cabinet. Implementation activities of the policy (once fully approved) will be supported by BDT. A video has been produced. BDT will begin providing support in the development of national e-waste management policies in Bahrain and in Mauritania in the Autumn of 2021.

Technical assistance in the development of regulations:

BDT is currently providing support to the Dominican Institute of Telecommunications and to the Ministry of Environment in the development of a national e-waste regulation. A government stakeholder consultation workshop took place in June 2021. A private sector stakeholder consultation workshop will take place in November 2021, including participation from producers (importers, distributors, manufacturers etc. of e-waste) to provide them with an opportunity to comment on the draft regulation.

New project on extended producer responsibility:

The project aims to provide technical assistance to Botswana, Dominican Republic, Namibia, Rwanda, The Gambia, and Uzbekistan in the development of national e-waste management strategies, policies and regulations. The project, a first step in a longer-term policy-level collaboration between ITU and UNEP, will support these countries in the application of the extended producer responsibility (EPR) principle for e-waste management – a commonly adopted policy approach.

Toolkit on policy practices for e-waste management:

ITU in collaboration with the World Economic Forum, with financial support from the Ministry of Foreign Affairs in Denmark, Danida, launched a toolkit report focussing on tools for fair and economically viable extended producer responsibility. Drawing on experiences from developing countries and emerging markets, particularly from African countries, the toolkit provides governments with a guide that outlines the system requirements for the management of e-waste. The toolkit considers the need for an all-actors approach and for the fair, inclusive and timely application of the extended producer responsibility principle.

An introduction to e-waste policy e-learning:

BDT has developed an e-learning which is available on the ITU Academy, free of charge. The e-learning is available for use by any members of the public. It is also used by BDT for public sector stakeholders as part of BDT's technical assistance to countries in the development of national e-waste management strategies, policies and regulations. It is available in English, French and Spanish and is currently being translated into Arabic.

2) Climate Change:

3.1. Projects and partnerships

UNEP-DTU

ITU (both BDT and TSB) established a memorandum of understanding with UNEP DTU Partnership to cooperate and maintain close working relation on sustainable digital transformation. This includes development and participation in joint research and projects on sustainable digital transformation and ICTs for National Determined Contributions implementation linked to Technology Needs Assessments/Technology Action Plans and for favouring local implementation of efficient solutions (e.g. smart cities) for energy efficient transition; and development and participation in outreach and knowledge sharing workshops, events or conferences.

Graduate Institute

BDT is working with a group of Master's students from the Graduate Institute of International and Development Studies, Geneva on a capstone research project on 'ICTs for Climate Change Action'. The project aims to understand how emerging digital technologies can be leveraged to mitigate the negative impact of climate change in the agricultural and energy sectors in Sub Saharan Africa, with a specific focus on the Internet of Things (IoT). Through case studies, the project also explores how knowledge and technology transfer (KTT) strategies and action advance progress of the IoT at national levels.

UNIDO-ILO

Joint UNIDO-ILO-ITU project submission to the International Climate Initiative focussed on developing an 'Integrated Climate Action Skills System in Ethiopia'. If successful, \$6 million out of a total of \$20 million would be allocated to ITU. The project would aim to innovate and provide solutions to meet the labour demand and to create new high-quality green jobs across the value chains of sectors through education and training, including using digital technologies. ITU would lead two work packages related to outreach and the development of a digital platform which promotes green skills and green games.

3.2. Initiatives

CODES

ITU is participating in the Coalition for Digital Environmental Sustainability (CODES) initiative as part of the follow-up to the SG's Roadmap on Digital Cooperation. ITU has activity participated in events, round table discussions and reviewed the 'A Digital Planet for Sustainability – Working towards an Acceleration Plan for Digital Environmental Sustainability' report. BDT is also part of the writing group.

UN4NAPs

BDT is participating in the UN-wide partnership initiative, [UN4NAPs](#), to scale up technical support to Least Developed Countries and Small Island Developing States to formulate and implement National Adaptation Plans (NAPs). BDT will support requests from Members States, especially related to using frontier technologies for adaptation assessments, planning & implementation; and accessing information/experience of other countries in applying adaptation technologies.

Climate Change Adaption Community of Practice

BDT is participating in the Climate Change Adaption Communities of Practice (CoPs) as part of the [Digital Public Goods Alliance](#). The CoP is focussing on open data for Climate & Weather Services for food security, agriculture and disaster risk reduction and is led by UNICEF and the Norwegian Ministry of Foreign Affairs. BDT is working with the DPGA Secretariat and WMO to draft a call to action around weather & climate information data sets being made openly and freely available as digital public goods.

3.3. Raising awareness on climate change and green technology

BDT/EET staff presented at the following events linked to climate change and green technology:

- [WSIS - ICTs, Youth & Environment](#), 23 April.
- UN Environmental Forum 2021, 15 June.
- [The Green Deal for a Sustainable Future: Addressing the global e-waste challenge](#), 16 June.
- [Mobile World Congress 2021 - Ministerial Programme: Tech for Climate Resilience](#), 30 June.
- [CODES 'A Digital Planet for Sustainability – Working towards an Acceleration Plan on Digital Environmental Sustainability'](#), 1 July.
- Tech for a Better Planet Symposium. [Enabling APAC green transformation to tackle climate change](#), 5 August.

COP26

BDT has submitted two Collaborative UN system side event proposals for the UNFCCC COP26. If selected, the side events will focus on: i) A Net-Zero World Requires a Circular and Low Carbon Economy; and ii) Green and Digital Skills for a Sustainable Future.

LKDF Forum 2021

BDT was invited to host a session at the UNIDO [LKDF Forum 2021](#) on 'Digital Skills for an Inclusive Future'. The session will take place on 22 September will focus on STEM education and the e-learning experiences of young people today. The session will explore how digital technologies can raise the interest of youth in green skills and equip them with the skills and education for a sustainable future, to support green technology development and a transition to a green/circular economy. The session will consist of an interactive panel with youth speakers and experts.

ICT and Climate Change Training

BDT is working with ITU Academy to review and update the ICT and Climate Change Training Programme which includes six foundational modules and 15 elective modules related to climate change and the circular economy.

Environmental Impacts of Virtual, Hybrid and Physical Events

ITU is stepping up long-standing greening initiatives. In 2020, the Management Coordination Group (MCG) approved the [ITU environmental sustainability statement](#)

[\(C20/INF/5-E\)](#), including the establishment of an Environmental Management System (EMS). In the context of the currently used boundaries of the yearly UN GHG inventory, for ITU to meet the UN-wide agreed 45% reduction target there are two major contributors to ITU greenhouse gas emissions with potential for reduction: facilities and air travel. ITU (BDT and TSB) are researching methods to estimate GHG emissions of virtual meetings and events, including opportunities to decarbonize conference and event travel through a variety of mitigation measures.

222. The Standardization sector of the ITU has undertaken several activities falling under the **action** line c7 e- environment. The following Recommendation was developed:

- [Recommendation ITU-T Q.3060 “Signalling architecture of the fast deployment emergency telecommunication network to be used in a natural disaster”](#) describes the functional elements, services and signaling architecture of emergency telecommunication network which can be rapidly deployed in a country affected by a natural disaster.

223. The ITU/WMO/UNEP Focus Group on Artificial Intelligence for Natural Disaster Management ([FG-AI4NDM](#)) was established in December 2020 to help lay the groundwork for best practices in the use of AI for: assisting with data collection and handling, improving modelling across spatiotemporal scales, and providing effective communication.

224. 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.

225. Smart Sustainable Cities and Climate Change (Past and Upcoming Events)

Events and Webinars on IoT, Smart Sustainable Cities and Data Management

- [DT4CC Episode #12: Interoperability of IoT and satellite data for Earth observation supporting sustainable development](#), 14 December 2021
- DT4CC Episode #11: Blockchain-based data management for supporting Internet of things and smart cities and communities, 8 December 2021
- DT4CC Episode #10: The role of digital technologies on aging and health, 7 December 2021
- DT4CC Episode #9: Addressing the Security Risks of Digital Transformation on IoT, 6 December 2021
- DT4CC Episode #8: Network capabilities and emerging technologies to support IoT-enabled verticals, 18 November 2021
- DT4CC Episode #7 Crowdsourced Systems: A people-led paradigm, 2 November 2021
- [DT4CC Episode #6: Smart City Platforms](#), 1 November 2021
- [DT4CC Episode #5: Smart sustainable cities maturity model and impact assessment](#), 24 September 2021
- [DT4CC Episode #4: Smart Cities: a step towards digital transformation in Latin America](#), 20 September 2021
- [DT4CC Episode #3: Smart sustainable city architectures: challenges and opportunities](#), 16 September 2021

- [DT4CCEpisode #2: IoT-based automotive emergency response system](#), 14 September 2021
- [DT4CC Episode #1: Digital twins in cities](#), 8 September 2021
- [ITU/OIER Webinar on Accelerating the Path to Cities' Digital Transformation](#), Virtual, 8 September 2021
- [Webinar series on Digital transformation for cities and communities](#), Virtual, September - December 2021
- [ITU-T SG20RG-AFR Virtual forum on "Accelerating Digital Transformation in Africa"](#), Virtual, 2 June 2021
- [Virtual Forum on "The Role of Standards in Accelerating Digital Transformation for Cities and Communities"](#), Virtual, 23 April 2021
- [WSIS Thematic Workshop on "Simple Ways to be Smart"](#), Virtual, 29 March 2021
- [Webinar on "Smart sustainable cities and frontier technologies in Latin America"](#), Virtual, 8 December 2020
- [Virtual forum on "Digital Transformation of Cities and Communities"](#), Virtual, 7 December 2020

Events and Webinars on ICTs, the Environment and Climate Change, EMFs (Past and Upcoming events)

- 10th Green Standards Week (planned), Virtual, 14-16 December 2021
- 14th Symposium on ICT, Environment and Climate Change (planned), Virtual 29 November 2021
- Dialogue on Sustainable Digital Transformation in Asia and the Pacific, Virtual, 19 October 2021
- Sustainable Digital Transformation Dialogues, Virtual 28-30 September 2021:
 - o [Sustainable Digital Transformation in Africa](#), Virtual, 28 September 2021
 - o [Sustainable Digital Transformation in the Arab region](#), Virtual, 29 September 2021
 - o [Sustainable Digital Transformation in Latin America](#), Virtual, 30 September 2021
- Session on the Emerging Technology Week 2021: Towards a sustainable digital transformation and a net-zero emission with emerging technology New, Virtual, 8 July 2021
- [VEF Side Event: Unlocking the potential of digital technologies for a sustainable energy transition](#), 6 July 2021
- [Side event: International Standards and Sustainable Green & Innovative Power Solutions to bring Broadband Internet Connectivity to Rural and Remote Areas](#), Virtual, 22 June 2021.
- [Virtual Forum on Human Exposure to electromagnetic fields \(EMFs\) due to digital technologies](#), Virtual, 10 May 2021
- In May 2021, the new version of the EMF Guide & Mobile App was launched. It provides up-to-date information and education resources on Electromagnetic Fields suitable for all communities and governments stakeholders and is available online at <http://emfguide.itu.int> or via the iOS and Google Play app stores. The latest version added information related to the EMF aspects of 5G

- A [Global Portal on Environment and Smart Sustainable Cities](#) is being maintained and highlights the latest external resources related to six distinct topics, including; smart sustainable cities; cities' actions to tackle Covid-19; energy efficient ICTs; climate change; e-waste management and circular economy; and frontier technologies (e.g. AI, IoT, blockchain). This Global Portal also provides link to ITU's IoT and SC&C Standards Roadmap.

226. 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:
 - [ITU-T L.Sup.44 “A Guideline on best practices and environment friendly policies for effective ICT deployment methods”](#) identifies best practices and opportunities for new applications using ICTs to foster environmental sustainability, identify appropriate actions and promote best practices towards implementing environmental friendly policies and practices. This document also includes a questionnaire that has been developed to gather relative information from stakeholders for use cases and key success factors, including exemplary collection of green best practices to ultimately formulate a Guideline on best practices and environment friendly policies for effective ICT deployment methods.
 - [ITU-T L.Suppl.41 to ITU-T L-series of Recommendations “Requirements on energy efficiency measurement models and the role of AI and big data”](#) unveils

the requirements for energy efficiency assessment, and the features that affect the energy demand. It attempts to define a unified assessment model for energy efficient cities.

- **ITU-T L.Suppl.43 to ITU-T L-series of Recommendations “Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption”** explores how network energy saving technologies that have emerged since the 4G era, such as carrier shutdown, channel shutdown, symbol shutdown etc., can be leveraged to mitigate 5G energy consumption. It also analyses how enhanced technologies like deep sleep, symbol aggregation shutdown etc., have been developing in the 5G era. This report aims to detail these fundamentals. However, it is far away from being enough, a revolutionized energy saving solution should be taken into consideration. In response to the requirement of an intelligent and self-adaptive energy saving solution, artificial intelligence (AI) and big data technology are introduced to form a more precise energy saving strategy based on specific site traffic and other site-related conditions, thus improving the efficiency and reducing the manpower required. More details about AI-driven smart energy saving solution will be elaborated. This Supplement could help achieve the most energy-efficient network with good performance and lower operating expense (OPEX) for the mobile network operators (MNOs). Note: The term ICT manufacturers refers to organisations which have the financial and organisational control of the design and production of ICT goods, also including software providers.
- **Recommendation ITU-T L.1024 “Effect for global ICT of the potential of selling services instead of equipment on the waste creation and environmental impacts”** utilises information compiled from stakeholders which can provide good insights into the specified potential challenge.
- **Recommendation ITU-T L.1031 (revised) “Guideline for achieving the e-waste targets of the Connect 2030 Agenda”** describes a three-step approach to achieve the e-waste targets set in the Connect 2030 Agenda. This Recommendation is intended to be utilized by relevant stakeholders to take their first step in addressing Target 3.2 of the Connect 2030 Agenda that is to increase the global e-waste recycling rate to 30% and Target 3.3 that is to raise the percentage of countries with e-waste legislation to 50%.
- **Recommendation ITU-T L.1033 “Guide for the institutions of higher learning to contribute in the effective life cycle management of e-equipment and e-waste” (under approval)** is a guide for institutions of higher learning to collaboratively contribute on key aspects of managing e-resources and e-waste. It explores how institutions of Higher learning can engage in EEE circularity by checking their effective involvement in every EEE and WEEE process.
- **Recommendation ITU-T L.1050 “Methodology to identify the key equipment in order to assess the environmental impact and e-waste generation of different network architectures” (under approval)** examines three types of network architectures and will suggest an appropriate set of equipment to be considered for each. This Recommendation supports network designers in determining the

environmental and circular performance of different network architectures. This Recommendation utilises information compiled from stakeholders which can provide good insights into the specified potential challenge.

- **Recommendation ITU-T L.1060 “General principles for the green supply chain management of information and communication technology manufacturing industry”** focuses on establishing general principles for the green supply chain management of ICT manufacturing industry. It mainly gives the general principles for the green properties including upstream and downstream suppliers, logistics, recycling and utilization based on the product whole life cycle. General requirements such as the green supply chain management strategy, implementation, green production, recycling, green information disclosure will be proposed as well.
- **Recommendation ITU-T L.1304 “Procurement Criteria for Sustainable Data Centres”** supports public authorities in purchasing data centres related products, services and items with reduced environmental impacts through establishing a set of procurement criteria.
- **Recommendation ITU-T L.1317 “Guidelines on energy efficient blockchain systems” (under approval)** explains the energy demand of blockchain, to define the blockchain energy model and to describe the energy efficiency parameters that can be calibrated in order to enhance the corresponding energy efficiency.
- **Recommendation ITU-T L.1383 “Smart energy solutions for cities and home applications” (under approval)** includes specific smart energy applications in cities and homes such as energy sources, energy management functions, etc.
- **Recommendation ITU-T L.1471 “Guidance and criteria for information and communication technology organisations on setting Net Zero targets and strategies” (under approval)** guides ICT organisations in clarifying the meaning of Net Zero in the context of the ICT sector and setting Net Zero targets and strategies. It also identifies actions that would lead the sector towards Net Zero according to the trajectories described in [ITU-T L.1470].
- 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 or agreed:
 - **ITU-T K.Suppl.1 (revised) to ITU-T K-series Recommendations “ITU-T K.91 – Guide on electromagnetic fields and health”** answers questions commonly posed by the public on the electromagnetic field (EMF) phenomenon and to address related concerns. This Guide on electromagnetic fields and health aims to:
 - Provide electromagnetic field (EMF) information and education resources suitable for all communities, stakeholders and governments.
 - Support clarification of the science by referencing the World Health Organization (WHO) and other stakeholders (see NOTE) that provide information that is particularly useful in helping to clarify scientific uncertainties e.g., in the

areas of radio frequency (RF) technology, infrastructure implementation, usage and consequential EMF exposure.

NOTE – The primary reference on EMF and health is the World Health Organization (WHO). The primary reference on EMF assessment methods is the International Telecommunication Union (ITU) and the International Electrotechnical Commission (IEC).

- [**ITU-T K.Suppl.21 \(revised\) to Recommendation ITU-T K.21 “Rationale for setting resistibility requirements of telecommunication equipment installed in customer premises against lightning”**](#) provides technical information (rationale) for setting the resistibility requirements against lightning contained in [ITU-T K.21]. This information should be referred to in the case of revision of [ITU-T K.21]. The rationale described in this Supplement is mainly quoted from past contributions and other documents discussed in ITU-T SG5 at the stage of establishment and revision of [ITU-T K.21]. This is a living document in that the rational justifying any future changes in Recommendation ITU-T K.21 testing should be added to this Supplement. This Supplement references the tables, test numbers and test conditions found in [ITU-T K.21]. Rational information for the [ITU-T K.21] test values originates from various events, surveys, standards and ITU-T SG5 contributions.
- [**ITU-T K.Suppl.22 to Recommendation ITU-T K.45 “Rationale for setting resistibility requirements of telecommunication equipment installed in the access and trunk networks against lightning”**](#) provides technical information (rationale) for setting the resistibility requirements against lightning in Rec. ITU-T K.45. This information should be referred on the case of revision of Recommendation ITU-T K.45, the rationale described in this Supplement mainly quoted from past contributions and other documents discussed in SG5 on the stage of establishment and revision of Rec. ITU-T K.45. Also, this supplement intends that rationale for revision of Rec. ITU-T K.45 is added on the case Rec. ITU-T K.45 is revised.
- [**ITU-T K.Suppl.23 to Recommendation ITU-T K.147 “Ethernet port surge voltages and currents”**](#) simulates Ethernet port voltages and currents due to magnetic and direct surge coupling.
- [**ITU-T K.Suppl.24 to ITU-T K-20 series Recommendations “Rationale for setting resistibility requirements of telecommunication equipment installed in a telecommunication centre against lightning”**](#) includes the technical information (rationale) for setting the resistibility against lightning in K.20 is based on, from past contributions and/or other documents discussed in SG5.
- [**ITU-T K.Suppl.25 to ITU-T K-series of Recommendations “ITU-T K.117 – Long reach single twisted-pair Ethernet resistibility testing”**](#): Short distance single pair Ethernet (SPE) is well established in the automotive industry. The evolved 10 Mb/s SPE, with up to 1 km or more of link length, is aimed at industrial, building and security applications. This relatively new Ethernet variant is still being standardised and a full set of preferred implementation components are not widely available. The first part of this Supplement overviews the SPE system before proposing possible SPE surge protective device (SPD) test circuits.

- [**ITU-T K.Suppl.26 to ITU-T K-series of Recommendations “Analysis of electromagnetic compatibility requirements and test methods of 5G Active Antenna System base station”**](#): AAS known as active antenna system is widely spread within communication systems and vertical industries with its benefit of higher beam-forming gain which can overcome the high path loss of higher carrier frequency. For the introduction of AAS especially the integrated antenna array, corresponding electromagnetic compatibility test configuration and measurement methods should be paid to special attention. Radiated immunity as an example will increase dramatically as the antenna array gain cannot be distinguished. Other technical issues such as radiated immunity test, communication link establishment, performance assessment, EMF exposure problem for test personnel, etc. are also proposed.
- [**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 field (EMF) 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 surroundings.
- [**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.145 \(revised\) “Assessment and management of compliance with radio frequency electromagnetic field exposure limits for workers at radiocommunication sites and facilities”**](#) includes guidance on the protection of workers against radio frequency electromagnetic fields (RF-EMFs) exposure in their working environments. Radio frequency (RF) workers range from installation engineers and tower climbers to R&D personnel and laboratory testing engineers. This Recommendation provides minimum general safety guidance for telecommunication RF workers around the world.
- [**Recommendation ITU-T K.148 “Multiservice surge protective device application guide”**](#) guides on MSPDs explains their uses, required performance parameters and usage consequences.

- [**Recommendation ITU-T K.149 “Passive intermodulation test methods of array antenna systems in mobile communication systems”**](#) specifies methods for measuring passive intermodulation level of array antenna systems in mobile communication systems, including test equipment and test procedures. This Recommendation covers the following frequency ranges, but not limited to the following ranges: LTE 700, APT 700, LTE 800, Cellular 850, E-GSM 900, DCS 1800, PCS 1900, AWS 1700/2100, UMTS 2100 and LTE 2600 operating bands.
- [**Recommendation ITU-T K.150 “Information of semiconductor devices required for design of telecommunication equipment applying soft error mitigation measures”**](#) describes characteristic parameters and functions of semiconductor devices that a telecommunication equipment designer needs when implementing soft error mitigation measures. This Recommendation describes kinds of information expected to be supplied from semiconductor device vendors to designers for telecommunication equipment.
- [**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. Major changes compared with Recommendation Recommendation ITU-T K.20 (2017) include:
 - DC insulation resistance test;
 - revised test exemption for internal short cables;
 - renaming of some test titles for clarity;
 - screened cable exemptions;
 - addition of test 7.10, a twisted pair port transverse/differential test, to Table 7.
- [**Recommendation ITU-T K.34 \(revised\) “Classification of electromagnetic environmental conditions for telecommunication equipment - Basic EMC Recommendation”**](#) defines electromagnetic environmental classes for telecommunication equipment covering all relevant electromagnetic environmental parameters. This Recommendation applies to telecommunication equipment installed in telecommunication centres, outdoor locations and customer premises. This is a basic EMC Recommendation for telecommunications.
- [**Recommendation ITU-T K.35 \(revised\) “Bonding configurations and earthing at remote electronic sites”**](#) proposes bonding configurations, earthing, and the type of power distribution for equipment located at remote electronic sites, which are intended to promote harmony of installation and equipment configurations while providing for personnel safety and electromagnetic compatibility.
- [**Recommendation ITU-T K.52 \(revised\) “Guidance on complying with limits for human exposure to electromagnetic fields”**](#) helps with compliance of telecommunication installations and mobile handsets or other radiating devices used against the head with safety limits for human exposure to electromagnetic fields (EMFs). It presents general guidance, a calculation method and an installation assessment procedure. The assessment procedure for telecommunication installations, based on safety limits provided by the

International Commission on Non-Ionizing Radiation Protection (ICNIRP), helps users determine the likelihood of installation compliance based on accessibility criteria, antenna properties and emitter power. The IEC Standard for the compliance measurement of mobile handsets is recommended.

- **Recommendation ITU-T K.56 (revised) “Protection of radio base stations against lightning discharges”** presents the techniques applied to a telecommunication radio base station in order to protect it against lightning discharges. The need of protection is obtained from the methodology contained in IEC 62305-2, which is used to determine the relevant lightning protection level (LPL) for the installation. The protection techniques for the external area cover the lightning protection system (LPS), bonding procedures, earthing and the installation of surge protective devices (SPDs) at the power meter station. This Recommendation also provides guidelines in order to achieve adequate protection of the telecommunication equipment based on the coordination between equipment resistibility, SPD protection level and installation characteristics.
- **Recommendation ITU-T K.70 (revised) “Mitigation techniques to limit human exposure to EMFs in the vicinity of radiocommunication stations”** defines techniques which may be used by telecommunication operators to evaluate the cumulative (total) exposure ratio in the vicinity of transmitting antennas and to identify the main source of radiation. It offers guidance on mitigation methods which allow reduction of radiation level in order to comply with exposure limits. It also provides guidance on procedures necessary in the environment (on site) in which, in most cases, there is a simultaneous exposure to multiple frequencies from many different sources. This Recommendation includes an electronic attachment with an EMF-estimator software that implements the methodology it describes. Amendment 2 adds Appendix I with distinct 32-bit and 64 bit versions of the EMF estimator software. As Microsoft Access 32-bit and 64-bit versions cannot be served by the same software package, two versions of this software are proposed. More exactly two separate install procedures are required in order to run this software depending on the Microsoft Access version installed on user PC. The "save" procedures were also substantially improved in these versions, and the antenna library was also reorganized and expanded. The new software package is in the attached zipped file.
- **Recommendation ITU-T K.78 (revised) “High altitude electromagnetic pulse immunity guide for telecommunication centres”** specifies the radiated and conducted immunity requirements against a high altitude electromagnetic pulse (HEMP) for equipment installed in telecommunication centres for functions such as switching, transmission, radiocommunication, and power distribution. The requirements consist of immunity test methods and levels for telecommunication equipment in each installation condition. The telecommunication system can be more robust by applying surge protective devices (SPDs) for surge mitigation and electromagnetic screening to the building and/or equipment enclosures.
- **Recommendation ITU-T K.90 Amd.1 (revised) “Software “EMFACDC” v 2.0”**: The software “EMFACDC” in Appendix II of ITU-T Recommendation K.90 was revised

in 2019. In the new version v.2.1 of the EMFACDC software, some bugs that cause problems with reading and writing data to a *.csv file have been fixed.

- **Recommendation ITU-T K.90 Amd.1 (revised) "Software "EMFACDC" v 2.0"**: In the new version v.2.1 of the EMFACDC software, some bugs that cause problems with reading and writing data to a *.csv file have been fixed. This supplement is necessarily predictive on resistibility requirements. Once 10 Mb/s, 1 km SPE is widely deployed and field data is available, resistibility requirements can be based on such data and incorporated in the appropriate K Recommendations. Certain sections are still under study.
- ITU-T Study Group 5 created the Focus Group on "Environmental Efficiency for Artificial Intelligence and other Emerging Technologies" (FG-AI4EE). The FG-AI4EE identifies 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 develops technical reports and technical specifications to address the environmental efficiency, as well as water and energy consumption of emerging technologies. The FG-AI4EE has already approved six technical reports or specification as follows:
 - Technical specification on Key performance indicators for small and medium enterprises to assess the achievement of the sustainable development goals.
 - Technical report on A method for intuitive human interaction with data model (Machine Learning & AI etc.).
 - Technical report on Requirements on energy efficiency measurement models and the role of AI and big data.
 - Technical specification on Guidelines on energy efficient blockchain systems.
 - Technical report on Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption.
 - Technical report on Guidelines on the environmental efficiency of machine learning processes in supply chain management.

A Global Portal on Environment and smart sustainable cities highlights the latest external resources related to six distinct topics, including; smart sustainable cities; cities' actions to tackle Covid-19; energy efficient ICTs; climate change; e-waste management and circular economy; and frontier technologies (e.g. AI, IoT, blockchain).

Action Line C7: E-Science



[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 \(17.6, 17.7 \)](#)



227. UNESCO organised the WSIS Action Line Facilitation Meeting C7:E-Science on 7 May 2021 under the topic of “Revisiting Openness for Science and Sustainable Development”. More details of the session [here](#).



228. The WSIS Prizes 2021 Winner for the Action Line C7 on E-Science is [Epidemiological Surveillance 4.0, Ministry of Science and Technology \(MCyT\), Argentina](#).



Epidemiological Surveillance 4.0 is a platform that gathers all this information in one place, organizing it and allowing it to be consulted in real time. Doctors report cases in the app, biochemists upload test results, epidemiologists, and senior managers interact on the platform to manage this information. It also makes it possible to record the traceability of the close contacts of each case and for health personnel to follow up on positive cases at home through teleconsultation. It also incorporates as a distinctive fact the participation of the citizen, who can report compatible symptoms through the app, upload their close contacts and receive the results of their tests. The possibility of registering the vaccination status for COVID19 of the person and thus monitoring the vaccination coverage of the population is also added.

It has a dashboard with the main statistics and maps with cases for panoramic analysis. To date, 67,940 citizens (15% of San Luis inhabitants) downloaded the app and 16% used it to report symptoms to the Health System. Of these, 57% were classified as suspect for COVID and the corresponding follow-up began. The platform has managed 91,211 case reports, of which 15,965 were positive per laboratory for COVID and more than 20,000 close contacts were identified and followed up.

Project website

<https://agentessanitarios.sanluis.gob.ar/>

Sustainable development goals related to this project

- Goal 3: Good health and well-being

229. 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/>).

Action Line C7: E-Learning



[Related to the SDGs: SDG 4](#)



230. As the co-facilitor of Action Line C7 on E-Learning, UNESCO organised a WSIS Action Line Facilitation Meeting entitled “Showcasing how collective commitment and multilateralism can offer an innovative framework for EdTech interventions” at the WSIS Forum 2021. Details of the session is available [here](#).



231. During this session, UNESCO presented the Coalition, its different missions and some context data, and then gave the floor to representatives of different partners of the Global Education Coalition, who shared their work in these 3 missions and how ICT has been used to benefit students and adults involved in their initiatives.
232. The WSIS Prizes 2021 Winner for the Action Line C7 on E-Learning is [Our Girls Our Future, Yielding Accomplished African Women \(YAA.W\), Ghana.](#)



Yielding Accomplished African Women is a non-profit organization on an ambitious mission. They aim to bridge the gender economic gap in Africa by providing a college to career pipeline for young African women. They are building the largest community of African female technologists and financial analysts for the continent. Yaa W. has created Africa's first professional STEM sorority. In 2019, they hosted Africa's first and only Women In Machine Learning Conference that trained a 100 young women from all over Africa in foundational skills and knowledge in Machine Learning and Artificial Intelligence. They also had yoga sessions, personal development sessions and community development sessions. Their flagship program, which has been run annually since the organization's inception is dubbed "Our Girls Our Future". This is a career accelerator program that trains cohorts of ladies in tech and finance streams through a series of classes, assignments, seminars, interviews and internships. At the end of the intensive training, the ladies are equipped with a gender-specific professional toolkit encompassing skills in personal branding,

professional etiquette, MS Office, financial markets and analysis, macro/microeconomics, product design, programming skills, software development life cycle amongst others. They're also bolstered with a solid network of influential female professionals. They are then matched to top tech and finance companies for internships and jobs.

Our Girls Our Future had been run as an in-person training till the COVID-19 pandemic hit. YAA.W has been able to move their training online, despite the various time zones across Africa, with the use of Online Challenges eg. "Think for the Future" which rewarded the winning ladies with up to \$1000 dollars cash prizes, career and mentorship support. They also organized daily "Eureka Moments" quizzes where winners received Internet data bundles for continued access to the online programs.

Project website

<http://www.accomplishedafricanwomen.org>

Sustainable development goals related to this project

- Goal 4: Quality education
- Goal 5: Gender equality
- Goal 8: Decent work and economic growth

233. As the lead agent for all ITU capacity building activities, the ITU Academy continues to produce publications as part of its main deliverables. Some activities on curriculum development are available on the following link: <https://academy.itu.int/index.php/main-activities/curriculum-development>.

234. ITU-T SG13 developed **Recommendation ITU-T Y.2246 “Smart Farming Education Service based on u-learning environment” (under publication)** provides a reference architecture and service requirements for Smart Farming Education. It focuses on the farming education service about farming knowledge which includes the farming technology, farming skills, farmer's experiences and know how, etc. The information related to farming knowledge will reflect current activities, farming products and from the experience of farmers in the field. The core component of the automation process is the creation of a data store which will be a repository for this information. The farming sector will benefit immensely from the implementation of farming data in a farming contents repository which will serve as the knowledge base for the automation process. It discusses how this service may be used to develop a knowledge base intended to benefit those involved in the farming sector.

Action Line C7: E-Employment



[Related to the SDGs: SDG 4 and SDG 8](#)



235. The Action Line C7 E-Employment Facilitation Meeting, co-organized by the ILO, was held on Thursday, 22 April 2021. The topic of the meeting was “Digital jobs in the future of work”. Details of the session are available [here](#).
236. The WSIS Prizes 2021 Winner in category e-Employment is [Kahramaa Mobile Application - Employee Section, Qatar General Electricity & Water Corporation "KAHRAMAA", Qatar](#).



Know Your AL Balance
 Apply for Leaves and Duty Resumption
 Request Salary Certificate
 Request to Whom it May Concern Letters
 View Salary Details and Attendance
 Request Qatari Bonus
 Generate Leave Notification

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Qatar General Electricity & Water Corporation " Kahramaa" has made employee life much easier by providing most of human resources services in their hand. The aim is to increase the user experience by creating smarter solutions and automotive services. An employee can submit many request through his phone such as: leave request, certificate request, exit permit, and loan requests. In contribution to WSIS action line C3 " Access to information and knowledge" , this solution provide accessing to data like latest deals and offers, employee directory. Kahramaa employees have the advantage of looking into their data history such as leave history, attendance report, and pay slip records.

Project website

<https://apps.apple.com/qa/app/kahramaa/id595448187>, <https://play.google.com/store/apps/details?id=com.vipera.dynamicengine&hl=ar&gl=US>

Sustainable development goals related to this project

- Goal 8: Decent work and economic growth

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)

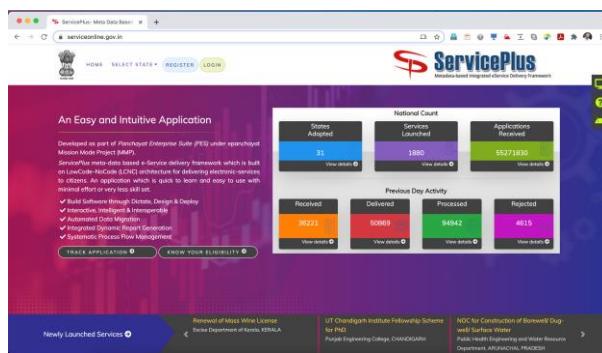


237. The Action Line C7 E-Business Facilitation Meeting was held on Thursday, 6 May 2021 as an integral component of the WSIS Forum 2021. The topic of the meeting was “Global and regional implications of COVID-19 on e-commerce”. It was held in cooperation with the UNCTAD (United Nations Conference on Trade and Development), the ICT (International Trade Centre) and the Universal Postal Union (UPU). This session presented findings from the eTrade for all study on e-commerce global review and 4 regional reports that have been published highlighting the main efforts and trends affecting the various developing regions to address the challenges brought forward by the COVID-19 pandemic and propose some mid and long-term policy avenues to be taken into consideration in the recovery phase. For more details on this meeting please see here.



238. The novel coronavirus COVID-19 is having a profound impact on the economy and the businesses that drive it. With countries in various stages of lockdown, it is becoming clear that the virus has also impacted small and medium-sized enterprises (SMEs). There is a need to step up efforts to help SMEs go digital and make supply chains more open and inclusive. Disruptions to the Postal infrastructure and services forced rapid innovation to allow it to continue to provide services essential to connect and enable businesses and citizens during this lockdown.

239. The WSIS Prizes 2021 Winner for the Action Line C7 on E-Business is [ServicePlus - A metadata based eService Delivery Framework, National Informatics Centre \(NIC\), India.](#)



ServicePlus is a versatile application which acts as a framework for ensuring integrated eService Delivery. It offers exclusive platforms for service definition and service consumption. Being a low-code/no-code (LCNC) development platform, it allows the service owner to dynamically generate various forms, process and combine them together to generate an end-to-end service.

ServicePlus is a visual integrated development environment (IDE) which augments the service definer to customize and organize the application components, connect them together and create a web/mobile application. This modular approach allows the stakeholders who are not software developers, to build, test and launch applications quickly. It

can be categorized as a generic, configurable, metadata-based framework. It offers multi-tenancy wherein each tenant (the department or local self government) can configure their services as per their requirement. ServicePlus ensures the highest degree of scalability, reliability and flexibility.

It is a powerful tool that strengthens good governance and empowers the citizen to avail services online. It reduces the gap between service provider and service seeker by facilitating information exchange wherever required. ServicePlus promotes transparency and accountability in the working of service providers as well as service seekers.

Project website

<https://serviceonline.gov.in>

Sustainable development goals related to this project

- Goal 1: No poverty
- Goal 2: Zero hunger
- Goal 3: Good health and well-being
- Goal 8: Decent work and economic growth

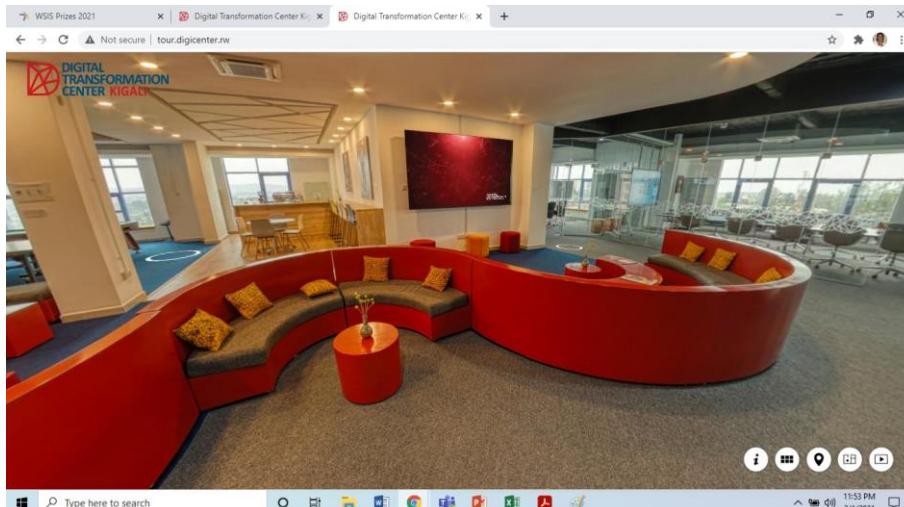
Action Line C8: Cultural diversity and identity, linguistic diversity and local content



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)



240. The WSIS Prizes 2021 Winner for the Action Line C8 is [Digital Transformation Center - Rwanda Information Society Authority \(RISA\), Rwanda](#).



Digital Transformation Center (DigiCenter) is a project unit of the Digital Solutions for Sustainable Development Program (DSSD). It is implemented by the German Development Cooperation (GIZ). The purpose of the DigiCenter is to support digital transformation in Rwanda through developing digital solutions by Africans for Africans. DigiCenter commenced its program from 2018 as a space which focuses to rethink and redesign processes and interactions between the government and its citizens by leveraging technologies to work in new ways and solve problems. Through the development of digital innovations, the center plays important role to drive cultural change across the government. Furthermore, the center supports the local digital ecosystem and create linkages between the government, private sector and civil society. Under its initiative, an innovation space with makerspace is being built that will bring together social innovators to innovate solutions that would solve myriad of social challenges with local stakeholders and civil societies.

Project website

<https://digicenter.rw>

Sustainable development goals related to this project

- Goal 9: Industry, innovation and infrastructure
- Goal 17: Partnerships for the goals

241. Since 2005, the ITU-D Digital Inclusion group has developed a capacity building programme for indigenous communities. Developed in collaboration with El Fondo para el Desarrollo de los Pueblos Indígenas de América Latina y El Caribe (FILAC), the objective is to empower indigenous people and communities through technology and thus support their educational, social, and economic development, and to contribute to the self-sustainability of indigenous communities and their cultural legacy. Several training programmes have been organised, which benefited more than thousands of indigenous leaders from Latin America and the Caribbean. Many communities have benefited from trainings on innovative communication tools for strengthening ICT knowledge of indigenous communities - with a special focus on how to develop, manage and operate an indigenous community radio network, and other blended trainings such as the Training Programme for Technical Promoters in Indigenous Communities for the Generation, Development and Maintenance of Communication and Broadcasting Network Technologies. More information is available here: <https://www.itu.int/en/ITU-D/Digital-Inclusion/Indigenous-Peoples/Pages/default.aspx>.

242. ITU-T SG16 developed [Recommendation ITU-T F.740.2 “Requirements and reference framework for digital representation of cultural relics/artworks using augmented reality”](#). It describes the requirements, application scenarios and reference framework for the digital representation of cultural relics and artworks using augmented reality (AR), which is known as an augmented reality cultural service system (ARCSS). This Recommendation describes the AR digital presentation requirements, cultural connotation interpretation requirements, cultural venue tour guide requirements, platform management requirements and performance requirements for ARCSSs. This Recommendation describes a reference framework of an ARCSS with an AR cloud creation platform, AR cloud

management platform and mobile devices. Procedures of augmented reality cultural service are provided in this Recommendation including an AR content creation procedure, AR service management procedure and AR content display procedure.

Action Line C9: Media



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



243. The Action Line C9: Media meeting was held on Friday, 30 April 2021 organised by UNESCO. The topic of the meeting was “Countering Digital Disinformation while upholding Freedom of Expression”. This session addressed challenges in mitigating the 'disinfodemic' and shared perspectives on how stakeholder responses can sustain freedom of expression and reinforce trust in science and facts. In addition, the session was an occasion to highlight the 30th anniversary of the 1991 Windhoek Declaration for the Development of a Free, Independent and Pluralistic Press. More information of the session [here](#).



244. The WSIS Prizes 2021 Winner for the Action Line C9 is [CMHS Radio Caibarién | La Voz de la Villa Blanca - CMHS Radio Caibarién \(ICRT\), Cuba](#).



This project has as a general objective: to inform, to spread the material and immaterial culture, the history and the human values of the municipality of Caibarien, Cuba and the World. Among the results achieved, the most valuable is the condition of Champion Project of The World Summit on the Information Society 2020, the OX Awards for spanish-american websites, several awards from the Ministry of Science, Technology and Environment (CITMA), awards for hypermedia journalism granted by the Cuban Institute of Radio and Television (ICRT) and the Union of Journalists of Cuba (UPEC), among others. At 2019, our project received 110529 visits to the page, from 43938 users.

Project website

<http://www.radiocaibarien.icrt.cu>

Sustainable development goals related to this project

- Goal 8: Decent work and economic growth
- Goal 11: Sustainable cities and communities
- Goal 13: Climate action
- Goal 14: Life below water
- Goal 15: Life on land
- Goal 16: Peace, justice and strong institutions

245. 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.
246. 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.
247. ITU-T Study Group 16 approved the following standards:

- [**Recommendation ITU-T H.222.0 | ISO/IEC FDIS 13818-1 \(revised\) “Information technology - Generic coding of moving pictures and associated audio information: Systems”**](#) includes three amendments and a corrigendum of the previous 7th edition. By the first amendment, which is already published, support for the carriage of data encoded according to ISO/IEC 21122-1, also known as JPEG XS, has been added. The corrigendum, which has also been published, corrects a conflicting stream_type value for Timeline and External Media Information (TEMI) streams. Further amendments will not be published separately, but only integrated in this new edition. These amendments define how VVC (ISO/IEC 23090-3) is carried over MPEG-2 systems, how EVC (ISO/IEC 23094-1) is carried over MPEG-2 systems, how compatible profile sets for MPEG-H 3D Audio (ISO/IEC 23008-3) are signalled in MPEG-2 systems, and extend the semantics for the ISO 639 language descriptor.
- [**Recommendation ITU-T H.264 \(revised\) “Advanced video coding for generic audiovisual services”**](#) adds additional SEI messages for annotated regions and shutter interval information, and also includes corrections to various minor defects in the prior content of the Specification. This Recommendation was developed jointly with ISO/IEC JTC 1, Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information, 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 SC 29 in technical alignment with a not-yet-published edition of ISO/IEC 14496-10.

- **Recommendation ITU-T H.265 | International Standard ISO/IEC 23008-2 “High efficiency video coding” (revised)** represents an evolution of the existing video coding Recommendations (ITU-T H.261, ITU-T H.262, ITU-T H.263 and ITU-T H.264) and was developed in response to the growing need for higher compression of moving pictures for various applications such as Internet streaming, communication, videoconferencing, digital storage media and television broadcasting. It is also designed to enable the use of the coded video representation in a flexible manner for a wide variety of network environments. The use of this Recommendation | International Standard allows motion video to be manipulated as a form of computer data and to be stored on various storage media, transmitted and received over existing and future networks and distributed on existing and future broadcasting channels. This revision adds an additional SEI message for shutter interval information, and also includes corrections to various minor defects in the prior content of the Recommendation. This Recommendation was developed jointly with ISO/IEC JTC 1, Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information, 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 SC 29 in technical alignment with a not-yet-published edition of ISO/IEC 23008-2.
- **Recommendation ITU-T H.273 (revised) “Coding-independent code points for video signal type identification”** defines various code points and fields that establish properties of a video (or still image) representation and are independent of the compression encoding and bit rate. These properties may describe the appropriate interpretation of decoded data or may, similarly, describe the characteristics of such a signal before the signals compressed by an encoder that is suitable for compressing such an input signal. This revision includes the addition of a figure to illustrate example usage, a code point for chroma sampling grid alignment indication for the 4:2:0 colour format, correction of the range of values specification for sample aspect ratio indication, correction of the equations for the ICTCP colour representation for the hybrid-log-gamma (HLG) transfer function specified in Rec. ITU-T BT.2100 2, and correction of the equations for the transfer function for the sYCC colour representation specified in IEC 61966-2-1. This Recommendation was developed jointly with ISO/IEC JTC 1, Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information, and Rec. ITU-T H.273 is maintained as technically aligned twin text with ISO/IEC 23091-2. The technical changes in this edition were developed in a joint collaborative team with SC 29 in technical alignment with a not-yet-published edition of ISO/IEC 23091-2.
- **Recommendation ITU-T T.801 | ISO/IEC 15444-2 (revised) “Information technology – JPEG 2000 image coding system – Extensions”** extends the capabilities of Rec. ITU-T T.800 | ISO/IEC 15444-1 ("JPEG 2000"). The 1st edition of this Recommendation | International Standard dates to 2004. It has since then been supplemented by amendments and corrigenda, several of its normative references have been obsoleted, and industry practices have evolved. This 2nd edition addresses these shortcomings

without modifying its scope. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and is common text with ISO/IEC 15444-2. This second edition cancels and replaces the first edition, which has been technically revised. The main changes compared to the previous edition are as follows:

- Annex N ("JPX file format extended metadata definition and syntax") is deprecated;
- the Registration Authority specified in M.7, which was never created or used, is cancelled;
- signalling for HTJ2K codestreams, as specified in Rec. ITU-T T.814 | ISO/IEC 15444-15, is added;
- the RLT marker segment is added;
- references have been revised to their currently in-force editions;
- signalling for codestreams that conform to ISO/IEC 21122-1 is added;
- parameterized colourspace is added to the Colour Specification box;
- outstanding amendments and corrigenda are consolidated; and
- the definition of the CAP marker segment is removed, having been moved to Rec. ITU-T T.800 (2019) | ISO/IEC 15444-1:2019.

- [**Recommendation ITU-T T.803 \(2021\) | ISO/IEC 15444-4:2021 \(revised\) “Information technology – JPEG 2000 image coding system: Conformance testing”**](#) provides the framework, concepts, and methodology for testing and the criteria to be achieved to claim compliance to either or both of Rec. ITU-T T.800 | ISO/IEC 15444-1 and Rec. ITU-T T.814 | ISO/IEC 15444-15 (HTJ2K). This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and corresponds as common text with ISO/IEC 15444-4. This third edition cancels and replaces the second edition, which has been technically revised. The main changes compared to the previous edition are as follows:
 - Annex B is augmented with procedures for testing HTJ2K decoder compliance.
 - Annex C is augmented to describe test codestreams for HTJ2K decoders and allowable errors for compliant HTJ2K decoders.
 - Annex E is augmented with decoder implementation compliance statements that are suitable for HTJ2K decoders.
 - Annex F is augmented to include features specific to HTJ2K codestreams.
 - Annex G is augmented with JPH file format reader compliant testing procedures.
 This Recommendation | International Standard contains a normative electronic attachment with the codestreams used in the application of the procedures described in the Recommendation..
- [**Recommendation ITU-T T.804 | ISO/IEC 15444-5 \(revised\) “Information technology – JPEG 2000 image coding system: Reference software”**](#) provides three independently created software reference implementations of Rec. ITU-T T.800 | ISO/IEC 15444-1, in order to assist implementers of Rec. ITU-T T.800 | ISO/IEC 15444-1 in testing and understanding its content. The packages are JASPER, JJ2000 and OPENJPEG. This Recommendation | International Standard also provides an independently created software reference implementation of Rec. ITU-T T.814 | ISO/IEC 15444-15, which 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, in order to assist implementers of Rec. ITU-T T.814 | ISO/IEC 15444-15 in testing and understanding its content. The package is TT. This Recommendation | International Standard additionally

provides an independently created software reference implementation for parsing of a JP2 file format specified in Rec. ITU-T T.800 | ISO/IEC 15444-1 and a JPH file format specified in Rec. ITU-T T.814 | ISO/IEC 15444-15. The package is Codestream-parser. This Recommendation | International Standard does not define any additional part of the JPEG 2000 image coding system. Each version of the J2K reference software contains source code, which can be compiled to provide the following functionality:

- Transcoding from selected, widely available image formats into a JPEG 2000 codestream.
- Transcoding from selected, widely available image formats into the JP2 file format.
- Selection of a wide range of JPEG 2000 encoding options (as documented in each reference software).
- Decoding from a JPEG 2000 codestream to a range of selected widely available image formats.
- Processing of a JP2 file to extract a JPEG 2000 codestream for decoding and conversion to a range of selected widely available image formats.
- The ability to extract metadata from a JP2 file, including the contents of the Image Header box and the colour space.
- The decoding of JP2 files that use the three-component matrix-based form of the restricted ICC method for the specification of colour space and the conversion of the decoded image data to the sRGB colour space for display, including limited upsampling of all decoded components to the same resolution.
- The decoding of JP2 files that use the monochrome form of the restricted ICC method for the specification of colour space and the conversion of the decoded image data to the sRGB based greyscale space as defined within the JP2 file format.
- The decoding of JP2 files that use the sYCC colour space and the conversion of the decoded image data to the sRGB colour space for display, including upsampling of all decoded components to the same resolution.
- Some additional tools to help with evaluation and testing.

The TT HTJ2K reference software contains source code, which can be compiled to provide the following functionality:

- Decoding from a HTJ2K codestream to a range of selected widely available image formats.

The codestream-parser reference software contains source code, which can provide the following functionality:

- Parsing of JP2 file format;
- Parsing of JPH file format.

The reference software is intended for use as a testing and validation tool for other implementations of JPEG 2000, and to help in the understanding of Rec. ITU-T T.800 | ISO/IEC 15444-1 and Rec. ITU-T T.814 | ISO/IEC 15444-15. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and corresponds as common text with ISO/IEC 15444-5. This third edition cancels and replaces the second edition, which has been technically revised. The main changes compared to the previous edition are as follows:

- A software reference implementation of Rec. ITU-T T.814 | ISO/IEC 15444-15 is added.
- A software reference implementation for parsing of a JP2 and a JPH files is added.

- **Recommendation ITU-T T.815 | ISO/IEC 15444-16 (revised) “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. This second edition cancels and replaces the first edition, which has been technically revised. The main changes compared to the previous edition are as follows:
 - the encapsulation of Rec. ITU-T T.802 | ISO/IEC 15444-3 image sequences is deprecated, and replaced by the encapsulation of Rec. ITU-T T.800 | ISO/IEC 15444-1 image sequences;
 - adds support for quality and resolution layers;
 - the syntax and semantics of the JPEG 2000 header item property are clarified; and reader conformance requirements are removed.
- **Recommendation ITU-T T.873 | ISO/IEC 10918-7 (revised) “Information technology – Digital compression and coding of continuous-tone still images: Reference software”**: To simplify the use of the JPEG format (Rec. ITU-T T.81 | ISO/IEC 10918-1), this Recommendation | International Standard provides two reference software implementations that provide guidance how to implement Rec. ITU-T T.81 | ISO/IEC 10918-1. Rec. ITU-T T.81 | ISO/IEC 10918-1 is in wide use worldwide. It provides a compressed representation of continuous tone digital images. This Recommendation was developed jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG), and corresponds as common text with ISO/IEC 10918-7. This second edition cancels and replaces the second edition, which has been technically revised. The main change in this second edition are updates of Reference Software A to release 1.59, and of Reference Software B to release 2.0.x, fixing multiple minor technical defects that have been identified over the last years. No other functional changes have been made.
- **ITU-T H-series Supplement 19 (revised) “Usage of video signal type code points”** provides information on video signal property description code points and their combinations that are widely used in production and video content workflows. This H-series supplement was developed collaboratively with ISO/IEC JTC 1/SC 29 and corresponds with ISO/IEC TR 23091-4 as a technically aligned twin text.

248. 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.

249. 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.
250. In addition, 5 other countries in Latin-America were assisted within the BDT Operational Plan.
251. 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.
252. 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.
253. 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.
254. ITU participated in the EBU (2016 June) and ABU (2015 October) Technical Assembly meetings.
255. ITU-ABU organized Pacific Media Partnership Conference 2015: Partnering for Broadcasting, Apia Samoa, 25-27 August 2015, Apia, Samoa (50 participants from 20 countries)
256. 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.
257. 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>

258. ITU Membership outreach:
259. 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 Bureaus and

Sectors, the ITU regional and area offices and the relevant international organisations and national authorities. Recently approved ITU-R outputs are available here: https://www.itu.int/dms_pub/itu-r/oth/0a/0e/ROA0E0000E80001PDFE.pdf

260. 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:

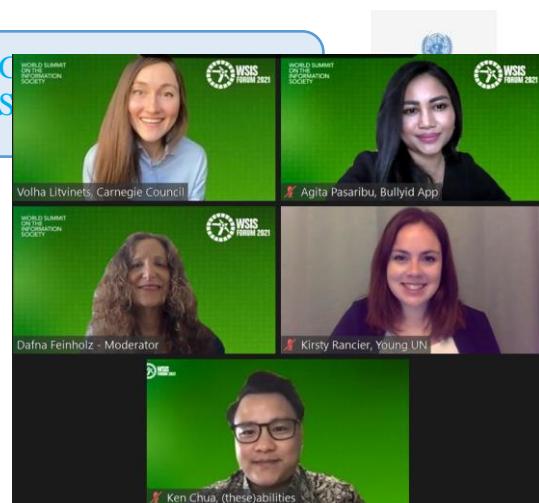
- 193 ITU Member States, which constitute the Union, set its mandate and contribute to the work of ITU as a whole;
- Around 900 ITU Sector Members, Associates and Academia bers (which participate in the work of a defined Sector (R, T or D)) and ITU Associates (which work within the framework of a specific 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.

261. 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, SDC, SDG 5, SDG 8, SDG 9, SDG 10, SDC 12, SDC 16, SDC 17



262. UNESCO organised a WSIS Action Line C10 session “Youth Approaches to an Ethical Solution for AI Challenges” on 3 May 2021. The session looked at what is the role of the youth on how to move forward with the tools that we have and that are about to be developed. Speakers shared their perspectives on the latest policy developments focusing on the ways that young people can contribute towards beneficial development and application of AI technologies and successful mitigation of the inherent risks. They shared their particular stories of how they contribute to that in practical terms. Details of the session are available [here](#).

263. The WSIS Prizes 2021 Winner for the Action Line C10 is [Digital Community Center Project - Office of the National Digital Economy and Society Commission \(ONDE\), Thailand.](#)

Digital Community Center (DCC) is a learning center for community to use and take advantage of digital technology. With the intention to reduce inequality, create economic and social value through digital technology. Its target groups are all groups of people, including the elderly, the disabled, children and youth, women and the disadvantaged or residents in remote areas.

In addition, DCC also a one-stop service center for people in community which integrate collaboration of government agencies, both central, regional, and local. It provides internet connectivity and service point for the government sector, providing business and career knowledge via online system as well as being a center for economic and social activities in areas such as education, agriculture, health care, trade, services, tourism, social welfare etc.

At present, DCC are located in all regions, 77 provinces, a total of 2,277 centers located in various rural areas such as temple, educational, local government organizations, communities, professional development centers, district office, community product center, etc.

From the results of operations, DCC can create 6,000 community entrepreneurs within 1 year and can create value in online merchandising for people in the community of over 7 million USD. This is a good starting point for the development of community entrepreneurs. This will bring a reflection to the overall strong economic development of the country.

Currently, it is in the process of upgrading the ICT community learning center to DCC. By adjusting the location and equipment to be more modern and be able to fully support the use of the people in the area. The center will not just be a computer room, it will be the center of the community to learn to trade products online through e-commerce which will be on Thailand Post mart website extending the economic and social development.

Project website

<http://digicommune.net/index.php>

Sustainable development goals related to this project

- Goal 1: No poverty
- Goal 3: Good health and well-being
- Goal 4: Quality education
- Goal 5: Gender equality
- Goal 8: Decent work and economic growth
- Goal 9: Industry, innovation and infrastructure
- Goal 10: Reduced inequalities
- Goal 16: Peace, justice and strong institutions

Action Line C11: International and Regional Cooperation

264. The Action Line C11 Facilitation Meeting was held on Wednesday, 5 May 2021 together with the Action Lines C1 and C7:E-Government. The title of this session was “Digital government transformation.”
265. The WSIS Prizes 2021 Winner for the Action Line 11 International and Regional Cooperation is [Digital Villages - American Tower Corporation \(ATC\), United States of America.](#)



The reach and benefits of the internet remain limited in many developing countries due to cost, scalability, power outages and educational barriers. To help alleviate this problem, American Tower Corporation is using its communications infrastructure in an innovative way by building Digital Villages near tower sites.

Digital Villages are computer-equipped learning centers that use the uninterrupted power supply and broadband connection from ATC’s tower sites to enable internet access and provide local communities with free education and training in ICTs. The goal of the Digital Villages program is increase digital literacy and create digitally empowered societies to help countries address some of the most pressing challenges, including reduction of poverty, unemployment, economic inequality, access to quality education and achieving gender equality, as aligned with the WSIS Action Lines and the Sustainable Development Goals.

As at year end 2020, ATC has established 241 Digital Villages across its international markets with over 71,000 students enrolled onto ICT training courses and more than 64,000 graduates since inception. ATC intends to expand the deployment of Digital Villages in other markets where ATC owns tower infrastructure.

The following video provides a visual overview of the Digital Village project:
<https://vimeo.com/464228795/77e56655c7>

Project website

<https://www.americantower.com/corporate-responsibility/society.html>

Sustainable development goals related to this project

- Goal 4: Quality education
 - Goal 5: Gender equality
 - Goal 8: Decent work and economic growth
 - Goal 17: Partnerships for the goals
266. Healthy liaison has continued between ITU R Study Groups and other organizations, with due reference to Resolution ITU R 9, where required. The Bureau continued to maintain close cooperation with international and regional organizations with the following objectives:
- 1) promote dialogue amongst bodies having common interests;
 - 2) improve coordination leading to more effective preparation for events such as WRCs; and
 - 3) keep ITU R abreast of relevant activities in other organizations for a more strategic planning of work programmes.

267. The Bureau continues its close collaboration with:

- international and regional organizations dealing with the use of spectrum, including the Regional Telecommunication Organizations recognized by the ITU for regional coordination (APT, ASMG, ATU, CEPT, CITEL and RCC); broadcasting organizations (ABU, ASBU, EBU and HFCC); and those focused on the use of specific radiocommunication systems and services (e.g., ITSO, ESOA, GSMA).
- 3GPP and IEEE, as well as several regional standardization organizations, given their importance and relevance to the work of ITU-R Study Group 5. Other notable areas of liaison with Study Groups activities include those with the World Meteorological Organization (WMO), the World Health Organization (WHO), ISO and IEC (including CISPR).
- the International Maritime Organization (IMO), the International Mobile Satellite Organization (IMSO), Bureau International des Poids et Mesures (BIPM), the International Telecommunications Satellite Organization (ITSO), COSPAS-SARSAT, the International Committee of the Red Cross (CICR), the International Civil Aviation Organization (ICAO) with regard to the application of ITU treaty texts. BR experts also participated in various meetings of these organizations.

(d) WSIS Implementation at the Regional Level

268. 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.
269. UN Regional Commissions are working towards Regional WSIS Implementation and Review at the Regional Level.

270. 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 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.



271. The WSIS Regional Review for Asia and the Pacific meeting was held virtually on 11 August 2020, jointly co-organised by UNESCAP and ITU. The meeting highlighted the implementation of the WSIS Action Lines in the region for the achievement of the SDGs. Outcome document of this meeting is available here: <https://www.unescap.org/sites/default/files/Outcome%20document%2C%20final.pdf>

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



272. 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.
273. UNESCO took over the Chairmanship of UNGIS for period 2021-2022. The Vice-Chairs are ITU, UNCTAD, UNDP, and UN ESCWA.
274. At the request of its members, UNGIS has initiated the [repository](#) of projects by UNGIS members on digital transformation that will be used as a reference guide and repository for UN Agencies to display different implemented initiatives/activities showing the direct impact of the WSIS Action Lines on SDGs.
275. As the current Chair of UNGIS, UNCTAD has initiated a *Dialogue on the Role of Digitalization in the Decade of Action* to raise awareness of both the importance of digitalization in achieving the SDGs and of the unique opportunity that UNGIS presents for more effective collaboration in this area within the UN System.
276. 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)

277. In 2019-2020, 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 45th edition of the Yearbook of Statistics, and the 26th (July 2020) edition of

the World Telecommunication/ICT Indicators database (WTID), available for both Windows and Mac users.

278. ITU is an active member of the Partnership on Measuring ICT for Development⁶ and one of the three members of its Steering Committee, together with UNCTAD and UN DESA. 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.

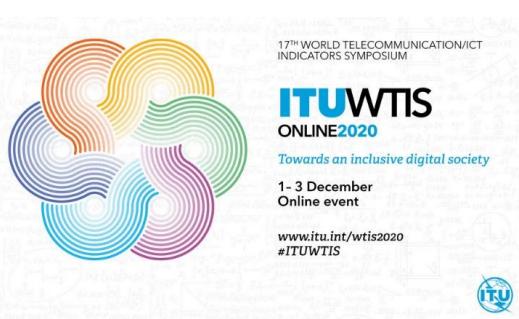
279. The Partnership is actively engaged in monitoring the Sustainable Development Goals. The 2030 Agenda for Sustainable Development recognizes that “the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the 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.
280. The Partnership has also developed 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. This list was presented during the 2019 WSIS Forum, and finalized after the WSIS Forum 2019, upon receiving feedback from stakeholders.
281. During the WSIS Forum 2021, the Partnership organised a session on “Measuring the information society using new data sources”, that was held on 6 May 2021. The session sought answers to the questions on how statistical offices can collect data in innovative ways? In particular, the session included presentations on the use of mobile phone data to calculate the two SDG indicators; i) 9.c.1 – Percentage of population covered by mobile network: 2G, 3G and 4G and above (administrative data) and ii) 17.8.1 – Percentage of population using the Internet (household survey data). The session also showcased the

⁶ 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, UN DESA, UNESCO Institute for Statistics (UIS), ILO, UNEP-SBC, UNU-ViE SCYCLE, World Bank, UNECA, UNECLAC, UNESCAP, UNESCWA, EUROSTAT and OECD.

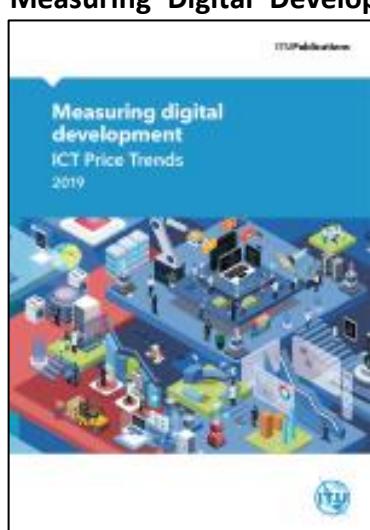
importance of using new data sources/big data to complement or supplement existing data particularly in measuring digital economy.

282. The 11th Meeting of the Expert Group on Telecommunication/ICT Indicators (EGTI) and the 8th Meeting of the Expert Group on ICT Household Indicators (EGH) took place back-to-back in virtual format, from 14 to 18 September 2020. 378 participants from national statistical offices, ministries, regulators, international and regional organizations, and the private sector attended these meetings. The topics covered during the EGH meeting included the measurement of ICT skills, and how to measure the number of Internet users accurately. The [ITU Manual for Measuring ICT Access and Use by Households and Individuals, 2020 Edition](#) was formally launched. The EGTI meeting covered the following topics: launch of the [Handbook on Telecommunication/ICT Indicators, 2020 Edition](#) indicators; indicators for measuring 5G; international roaming indicators; future work; and the EGTI/EGH joint session on ICT statistics in times of COVID-19.

283. The **17th World Telecommunication/ICT Indicators Symposium (WTIS)** will take place in virtual format from 1 to 3 December 2020. The theme of the WTIS-20 is "Towards an inclusive digital society", and will feature high-level debates relevant to the theme of the symposium. The work of the Expert Group on Telecommunication/ICT Indicators (EGTI) and the Expert Group on Household Indicators (EGH) will be presented for adoption by WTIS-20.



284. **Measuring Digital Development: ICT Price Trends** 2019 was launched in 2020. The publication monitors the affordability of ICT services by analysing and comparing price data for mobile-voice services, mobile data and fixed broadband for analysts, telecom operators, policy-makers and economists. The report provides analysis in terms of dollar price, exchange-rate adjusted prices and affordability for mobile-voice, mobile and fixed broadband according to internationally agreed baskets for services, including bundled services. It also provides information on countries' progress towards achieving the Broadband Commission for Sustainable Development's target for 2025, according to which entry-level broadband services should be made affordable in developing countries at a level corresponding to less than 2 per cent of monthly GNI per capita.



285. The 2020 edition of **Measuring Digital Development: Facts and Figures** will be launched during the 17th World Telecommunication/ICT Indicators Symposium. The publication will offer a snapshot of the most important ICT indicators, including estimates for the current year.

(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).



286. 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 14,000 entries and a growing community of 450,000 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.
287. 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).
288. The United Nations Economic and Social Council [ECOSOC Resolution 2020/12](#) 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.
289. ITU is pleased to invite you to update and submit new entries online at www.wsis.org/stocktaking. Submitted activities were reflected in the **WSIS Stocktaking Report 2021**, that was released at the WSIS Forum 2021.

(h) Emergency Telecommunications (Para 91 of TAIS)

BDT o events

1. BDT and the United States Telecommunication Training Institute (USTTI) jointly organized a public webinar on "[Building Disaster Resilience through Emergency Telecommunications](#)". This webinar which took place on 15 and 16 December 2020, from 9h00 to 12h00 EST (15h00-18h00 CET), highlighted the role of emergency telecommunications for disaster risk reduction and management, and discussed best practices for increasing ICT resilience and capacity for saving lives and limiting the impact of natural and manmade hazards, including pandemics. This event was attended by over 100 participants from all over the world on both days.

2. During a virtual event that took place the 20th of January 2021, the Emergency Telecommunications Division launched [three new online training modules](#) to allow ITU to build capacity and increase knowledge on the topic of emergency telecommunications and to continue to build disaster resilience, even in times of the current pandemic. These modules cover the development of NETPs (based on the ITU Guidelines on NETPs), guidelines on organizing tabletop simulation exercises (based on the guide jointly developed with ETC) and information on the Tampere Convention and its benefits. The online event was attended by 162 participants from all over the world. **By 04 Oct. 2021, the number of participants that have taken the courses were the following: TTX = 143; 23 have earned the badge. Tampere = 147; 49 have earned the badge. NETPs = 293; 84 have earned the badge.**
3. BDT organized an online event to highlight the key findings indicated in the report [Women, ICT and Emergency Telecommunications: Opportunities and Constraints](#). This event took place on the 8th of March 2021 and brought together different experts who discussed how closing the digital gender divide can help to save more lives when disasters or emergencies strike.
4. As part of the WSIS 2021 Action Line C7 on e-environment, ITU jointly with WMO organized a session on "[Innovation in Data and Technology for Climate Action](#)", which took place on the 23 April 2021. This session highlighted that data along with technology are some of the most important tools to combat climate change and for helping countries to face extreme weather events which cause disasters. It showcased innovative examples from WMO, private sector companies and ITU on how data and technology are being applied for climate action and disaster risk reduction. The session took place on 23 April 2021.
5. During the World Summit on the Information Society 2021, ITU in partnership with UNDRR, WMO and WBU, organized a High-Level Dialogue on "[Disaster Risk Reduction Media Hub](#)", a toolkit for news media professionals reporting on disasters and resilience, which took place on the 26 April 2021. The session emphasized the role and capacity of TV and radio technologies as the most trusted sources of information, and highlighted the crucial role that broadcast media organizations play in the early warning chain to deliver accurate and timely early warning messages to end-users before disasters strike. Panel discussions examined the importance of having access to safety information early enough and prior to a disaster, and the critical role that ICTS play in delivering early warnings and alerts. Panelists highlighted that collaborative efforts made by different agencies and stakeholders can accelerate action for saving lives and livelihoods.
6. On the 29th April 2021, during the Humanitarian Networks and Partnerships Week, ITU together with IFRC and WMO announced the [Call to Action on Emergency Alerting](#). The goal is that all countries, by 2025, are able to enhance their emergency alerting by leveraging the Common Alerting Protocol (CAP). CAP is the international (ITU) standard format for exchanging all-hazard emergency alerts and warnings over all kinds of networks, including digital media. With increased risks of extreme weather and disasters, the public needs to have an even greater awareness of the risks they face. Information shared at the right time, in an understandable format, by trusted sources, can be the most effective life-saving tool in the event of an emergency. Early warning systems have improved over the years, but people continue to perish and suffer from hazard threats because, too often, early warning messages arrive too late, are not understandable enough, or do not provide clear guidance. The adoption of CAP is an important step for better disaster management.
7. On July 6th, EET partnered with ITU-TSB's Focus Group on [AI for Natural Disaster Management \(FG-AI4NDM\)](#) to host a 60-minute session during the Emerging Technology for Connectivity week (5 to 9 July 2021). Speakers included senior representatives from ITU-BDT,

ITU-TSB, WMO, WFP, and the University of Oregon. This session, attended by over 140 participants, discussed new applications of emerging technology, or novel use of existing technology, in the context of ICTs for disaster management. The event presented a number of initiatives that use emerging technologies to advance disaster forecasting and response, including AI and ML, drones, satellites, big data, and 3D printing, with particular focus on least developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing states (SIDS). The session also introduced the concept of a new repository of case studies and subject matter experts that ITU would like to build to connect relevant stakeholders from industry, the public sector, and academia.

8. The ITU Arab Regional Office in collaboration with the Telecommunications Regulatory Authority (TRA) of the Sultanate of Oman organized a [training workshop on the Common Alerting Protocol \(CAP\)](#) that took place on the 7th of July, 2021. The workshop highlighted the benefits of using the Common Alerting Protocol (CAP) as an ITU standard for exchanging all-hazard emergency alerts and public warnings over all kinds of ICT networks and enable national authorities to deliver early warnings and alerts to all people and communities at risk in a timely manner. The workshop was attended by over 110 participants from Oman's ICTs sectors, national disaster committee, national NGOs, meteorological organizations, public and private sector involved in disaster management in Oman, including academia. Once again, the number of participants that were able to join the virtual workshop from different parts of Oman, shows the benefits of moving to virtual meetings. Virtual gives the opportunity for more people to benefit from this type of trainings as no travel needs to take place.
9. The ITU America's Regional Office, in collaboration with EET Division, organized a [Regional Workshop on the use of ICTs for disaster management and risk reduction](#), which took place from 14 to 16 September 2021. This event presented and discussed how ICT solutions and digital technologies can be used for disaster management and risk reduction in the region, the importance of National Emergency Telecommunication Plans, the value of the Tampere Convention, the benefits of emerging technologies for risk reduction, as well as early warning for early action, the role of simulation exercises and the importance of gender inclusion on the use of ICTs for disaster management. During the workshop, participants and speakers had an opportunity to exchange experiences, views and best practices on the use of modern technologies for humanitarian purposes. The regional event was provided in Spanish & English and had 68 participants from the region.

ITU's support to develop NETPs.

10. BDT continues aiding the following countries to develop their NETPs: Afghanistan, Saint Lucia, Somalia, Sudan, Solomon Islands, Ecuador, Peru and Dominica and Grenada. Countries that have requested assistance on the development of the plans are Fiji, Kiribati, and Tonga. NETPs that have been concluded are Guatemala, Bolivia, Vanuatu, Samoa, and Papua New Guinea. Several online meetings have been organized with national stakeholders in order to ensure that the plans are developed through a multi-stakeholder approach involving different organizations working on disaster management, such as the national disaster management authorities, meteorological and hydrological organizations, humanitarian entities, ICT government and private sector, academia, civil society and customs authorities. This will guarantee that the plans are developed based on each countries' real needs.
11. To further support countries in developing NETPs, ITU started to undertake baseline assessments, which will help to identify the availability of national laws, regulations and

policies governing emergency telecommunications within the Arab, Pacific Islands and Americas Member States. The ongoing assessments will also help to track ITU's Strategic Goals and in particular the Target 3.5, which reads: By 2023, all countries should have a National Emergency Telecommunication Plan as part of their national and local disaster risk reduction strategies; assess the levels of maturity and preparedness for each country in terms of the resilience of the telecommunication sector and the way it can support the countries' disaster risk reduction and management efforts. So far, two assessments have been concluded, Bahrain and Perú. These assessments are based on a template that was developed for this task.

ITU's Disaster Response

12. [ITU provided support](#) to the Government of Haiti after the devastation caused by a 7.2 magnitude earthquake that struck the county on 14 August 2021, by providing 20 satellite phones and 10 Broadband Global Area Network (BGANs) terminals. This equipment is currently being used by national humanitarian first responders to help communities that were severely impacted with recovery and reconstruction efforts. During this emergency, ITU and the Emergency Telecommunications Cluster (ETC) also used the Disaster Connectivity Map (DCM) to assist planning for the response efforts and determine connectivity gaps in the impacted areas. DCM is a mapping platform to help first responders determine the status of telecommunications network infrastructure, coverage, and performance before and after a disaster. Since the earthquake, the DCM mapped over 12,000 connectivity data measurements and compared them to baseline measurements to find gaps that can be filled with emergency telecommunications, saving lives and connecting the people affected by this deadly event.

Disaster connectivity map

13. The [Disaster Connectivity Map](#) (DCM) was built in 2020. The DCM is a joint initiative between ITU and Emergency Telecommunications Cluster (ETC) and input from GSMA, which consists of a live map that can provide information on the type, level, and quality of connectivity available on the ground during times of disasters. In December 2020, the DCM prototype was implemented and hosted onto an upgraded ITU web server with defined access control restrictions on third party DCM content based on different data licensing, rights and permissions. ITU and ETC have tested the DCM twice in the last six months, once in Fiji and once in the Caribbean. The first test was in response to cyclone Yasa, which flattened entire villages as it tore through Fiji in mid-December 2020. In this case, the DCM was used to compare baseline data and ICT infrastructure data to actual connectivity measurements during the event to estimate which cell sites and other ICT infrastructure were online and which might be offline while power was restored, and which areas may be offline longer term. Based on this, and in conjunction with broader coordination efforts, ETC worked with partners in the region to supplement communications gaps with additional satellite equipment in the short term, and for work on temporary cell sites to fill gaps while longer term recovery was in progress. The second test was in response to the La Soufrière volcano, situated on the main island of St. Vincent and the Grenadines. On April 9th 2021, an explosive eruption occurred, forming a plume of volcanic ash that affected St. Vincent as well as neighboring islands including Barbados. Based on requests to confirm internet outages, we

started a connectivity measurement campaign from April 15th through April 22nd, where we collected over 32,000 connectivity measurement datapoints and updated the DCM at hourly intervals. When analyzing these measurements compared to baseline connectivity data, we observed short-term geographic outages during the event that were restored by the end of the campaign.

Emergency Telecommunications Roster

14. To respond to the increasing demand for support in delivering emergency telecommunication equipment and services when disasters strike, the ITU has established an internal emergency telecommunication [roster](#). Suitable ITU staff has been selected and are being trained on the deployment process and use of the current (and future) ITU telecommunication equipment. So far, the roster staff has received trainings on travel safety and personal security, social media in crisis situations and how to write impact stories. This team is also being trained to support the Emergency Telecommunications Cluster work on the ground, by liaising with national authorities and stakeholders on importation and licensing requirements of telecommunication equipment.

Collaboration with other UN entities

15. ITU contributed to a training project on Early Warning Systems for broadcasters. This project is a special collaboration between UNDRR, WMO, IOC-UNESCO and EBU, and focuses on using public service broadcasting technologies, such as TV and radio, to deliver early warning alerts to communities at risk. The purpose of this project is to train broadcasters on disaster management and on reducing risks by sending the correct message for impending hazards to end users. This project is already ongoing, and from December 2020 to April 2022, there are 36 training sessions that have been schedule in 29 countries, involving 46 organisations and more than 675 media professionals. Training sessions taking place: 10 in Africa , 16 in Asia Pacific, 10 in Caribbean. So far, trainings have been delivered in Caribbean and Asia Pacific.

16. ITU is working very closely with WMO and IFRC to participate in the Expert Team on the Global Multi-hazard Alert System Framework (ET-GMAS). GMAS is a framework for substantially increasing and enhancing the availability of authoritative warnings and information related to extreme and/or potentially high-impact weather, water and climate events – regionally and globally. Several meetings have been organized and a concept note to include the component of early warning systems is in the process of being finalized.

17. On 29 April 2021, ITU along with the International Federation of Red Cross and Red Crescent Societies (IFRC) and the World Meteorological Organization (WMO) endorsed the "[Call to Action on Emergency Alerting](#)", which states that by "2025 all countries have the capability for effective, authoritative emergency alerting that leverages the Common Alerting Protocol" . So far, 12 other organizations have also endorsed the call to action.

18. As a follow up activity to the Call to Action on Emergency Alerting, ITU along with the International Federation of Red Cross and Red Crescent Societies (IFCR), is supporting the World Meteorological Organization (WMO) to establish a CAP HelpDesk, which aims at

supporting country level implementation of CAP through information, methods, and tools to inspire coordination and build a community of support to scale CAP implementation worldwide. Moreover, it will serve as an important contribution to WMO's ongoing Global Multi-hazard Alert System (GMAS) development, where ITU is also part of.

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

290. ITU-T Study Group 3 continues to study this subject through its current work items. 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.



291. 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

292. World Telecommunication Day has been celebrated annually on 17 May since 1969, marking the date of the signing of the first International Telegraph Convention and the founding of ITU 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, the World Summit on the Information Society 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).
293. 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.

294. 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.



295. The theme for WTISD-2021, "Accelerating digital transformation in challenging times", emphasise the critical role of telecommunication/ICTs in the resiliency of societies, by showing how ITU membership stepped up and engaged in activities that have proven essential in saving lives and sustaining economies. It also highlighted the role of digital transformation to build back better while addressing future challenging times. More details are available here: <https://www.itu.int/en/wtisd>
296. WTISD-2021 took place in a fully virtual format during the last week of the WSIS Forum 2021. The event brought together ITU members and partners to showcase how telecommunication/ICTs continue to respond to the COVID-19 outbreak since it was announced in March 2020. How ICTs can accelerate the achievement of the SDGs, and how ICT-driven innovation and strategies are making digital transformation happen today, while thinking of the society and the economy of the future.
297. By presenting how they use the technology on the ground, different stakeholders showed how they help ensure business continuity during this period, while highlighting the potential of ICTs as enablers of development, as well as the importance of enhancing collaboration and cooperation across countries and sectors.

(k) Bridging the standardization gap (BSG)

298. The BSG Programme is structured around five 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.

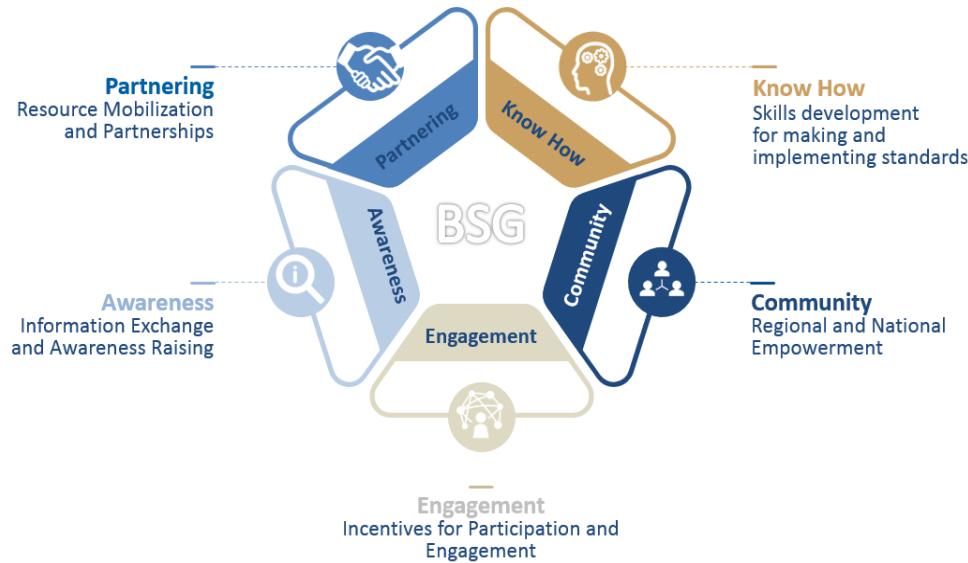


Figure 1: Pillars of the BSG programme

299. **BSG Engagement** is directed towards facilitating participation in standards development. This includes fellowships, mentorship programmes and tools for remote participation.
300. 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.
301. 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.
302. 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.
303. 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.
304. These BSG training sessions have welcomed 104 delegates in first quarter of 2021. Considering the shift to fully virtual ITU-T meetings in response to COVID-19, 12 virtual BSG training sessions have been organized since May 2020 and additional trainings are being planned for the remaining quarter of 2021.
305. **BSG Community** is dedicated to 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.

306. 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.
307. 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 2020:
- Eighth SG13 Regional Workshop for Africa "[Standardization and Future Networks: Opportunities for Africa beyond 2020](#)", virtual, 1 June 2021.
 - ITU-T SG13 developed: [**ITU-T Technical Report TR-BSG “Use of ITU-T Recommendations by Developing Countries”**](#): A standard is defined as a document established by consensus and approved by a recognized body. In the UN, the ITU-T is the recognized body for Telecommunication Standardization whose output Standards are known as ITU-T Recommendations. Countries use standards to maximize compatibility, interoperability, safety, repeatability, and quality among others. The ITU-T standardization process involves its members in the development of the standards, which they later utilize. The development of any standard is motivated by a present need to solve a problem or a future need to solve future problems. The expectation is that all countries on either side of development, to actively participate in both the production and utilization of the standards. There is however a perception that there is less utilization of the ITU-T standards by Developing Countries. This document presents the analysis and interpretation of the results of the questionnaire on use of ITU-T Recommendations in Developing Countries.

308. 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 management⁷; ITU publications concerning the use of telecommunications/ICTs for ensuring

⁷ These include the ITU-R Handbooks on National Spectrum Management; Computer Aided Techniques for Spectrum Management; and Spectrum Monitoring.

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

ITU-R Recommendations

The ITU-R Recommendations constitute a set of international technical standards developed by the Radiocommunication Sector (formerly CCIR) of the ITU. More details are available online: <https://www.itu.int/pub/R-REC>

ITU-R Reports

Free online access to all current ITU-R Recommendations & Reports is available at: <https://www.itu.int/pub/R-REP>

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

The ITU-R documents database search facility was developed to make ITU-R documents (ITU-R Recommendations, ITU-R Questions, ITU-R Reports, ITU-R Resolutions and ITU-R Handbooks) more accessible. It helps to search ITU-R documents by providing search functions and filtering criteria such as document number, radio category, radio service, frequency range and approval year - <https://extranet.itu.int/brdocsearch>

(I) Internet Governance Forum (IGF)

309. The 16th annual meeting of the IGF will be hosted by the Government of Poland in Katowice from 6-10 December, under the overarching theme: Internet United. The IGF 2021 hybrid process will also feature a preparatory component or phase which will include build-up sessions on the IGF 2021's issue areas, development of the intersessional work as well as a series of capacity development activities. The overall plan for the preparatory phase will be announced soon. WSIS will organise its first meeting of the WSIS Forum 2022 Open Consultation Process on 8 December 2021 during the IGF 2021.

(m) Follow up on the UN Secretary-General's Roadmap for Digital Cooperation

310. In June 2020, the UN Secretary-General released the new Roadmap for Digital Cooperation ([A/74/821](#)), which includes a set of recommended actions for the international community to help ensure all people are connected, respected, and protected in the digital era. It builds on recommendations made by the Secretary-General's High-level Panel on Digital Cooperation, and input, received through the eight Roundtable groups convened by the

office of the UN Secretary-General, from Member States, the private sector, civil society, and the technical communities and other stakeholder groups.

311. ITU is collaborating with the office of the UN Secretary General, specifically the office of the UN Secretary-General's Special Envoy on Technology in the implementation of the Roadmap on Digital Cooperation. ITU is co-leading two Roundtable groups, namely on Global Connectivity and Capacity Building, together with UNICEF and UNDP, respectively, and participating other Roundtable groups, for rest the subjects, such as Digital Inclusion, Digital Public Goods, Trust and Security, Artificial Intelligence and Digital Cooperation Architecture, to implement and support key actions outlined in the Roadmap.

(IV) 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

312. 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.

(V) Forums, innovative initiatives and future actions

(a) WSIS activities in response to COVID-19

313. In collaboration and at the request of stakeholders, WSIS has initiated a number of activities in response to COVID-19 pandemic, as follows:

a. WSIS TalkX

In April 2020, WSIS organised a regular weekly virtual WSIS TalkX for the WSIS stakeholders to interact, connect and collaborate. This initiative continues to explore an aspect of the global response to COVID-19, providing WSIS stakeholders with a platform to create partnerships for on-the-ground action. Read more in section (d) below [here](#).

b. The Coronavirus (COVID-19) Response – ICT Case Repository

As part of the WSIS Stocktaking ongoing efforts to promote the good use of ICTs in making social impact, and in order to provide useful, replicable and actionable information to all WSIS community and beyond, *the Coronavirus (COVID-19) Response – ICT Case Repository* was initiated for collecting projects and activities on how ICTs are assisting stakeholders in their everyday life, work, and combating challenges caused by this extraordinary pandemic.

The call for submissions invited the stakeholders to describe how are they using ICTs to help communities respond to COVID-19, ensuring an impactful use of the WSIS Action Lines in advancing SDGs, and to list projects and activities introduced during

COVID-19 to enable efficient continuation of efficient work while creating social impact. The aim of this repository is to help individuals and communities around the world to continue to partner, collaborate and implement in these exceptional pandemic circumstances through the use of information and communication technologies.

The submitted projects were reviewed and featured on the WSIS Stocktaking Platform and promoted through various channels including the WSIS Flash newsletter, WSIS TalkX podcasts and social media channels. The expected impact is to witness the submitted good ICT practices being replicated elsewhere and thus join the collective effort in responding to COVID-19 pandemic and advancing SDGs. A draft zero version of the special [ICT Case Repository: The Coronavirus Response](#) is now available.

c. Workshops at WSIS Forum 2021

More than 70 workshops organised by various stakeholders highlighted issues and efforts related to the topic of COVID-19 at the WSIS Forum 2021. Many emphasised the importance of ICTs, in particular internet access and connectivity for all during the COVID-19 pandemic.

(b) Forums

WSIS Forum 2021 Event and its outcomes:

314. 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.

315. The WSIS Forum 2021 garnered a lot of interest and excitement worldwide – with a cumulative attendance of over 50,000 attendees (*zoom room, zoom recording, Facebook Live videos, YouTube, and other format*) over 185 countries from Government, Civil Society, Academia, Private Sector, the UN to exchange discourse on ICTs emerging issues to strengthen information and knowledge societies. The WSIS Forum 2021 also welcomed more than 150 high-level participants – Ministers, Deputies, Head of Regulatory bodies, etc. with an increased participation especially from the Americas region, including Ministers and Regulators from Trinidad and Tobago, Nicaragua, Uruguay, United States (Chairwoman), Jamaica, Peru and others who contributed towards the program of the Forum. In addition, more than 130 exhibitors 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.

316. The Chairman of the WSIS Forum 2021 was H.E. Mr. Maxim Parshin, Deputy Minister, Digital Development, Communications and Mass Media, Russian Federation. Policy Statements were delivered during the High-Level Policy Sessions (22-26 March 2021) of the WSIS Forum 2021 by high-ranking officials of the WSIS stakeholders community, representing the Government, Private Sector, Civil Society, Academia and International Organizations. The High-Level Track consisted of the opening segment, interactive policy dialogues, and ministerial round table.

More than **1550 participants**

joined #WSIS Forum 2021 High-Level policy sessions, from 22 to 26 March. High-Level officials representing Governments, Private Sector, International Organizations, Technical Community, Academia and Civil society shared their views on how WSIS Action Lines are advancing SDGs



317. The High-level Policy sessions were moderated by 11 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](#).

318. With the objective of strengthening the alignment of WSIS and SDG processes, the overall theme for WSIS Forum 2021 was “ICTs for Inclusive, Resilient and Sustainable Societies and Economies (WSIS Action Lines for achieving the Sustainable Development Goals)”.

319. WSIS Forum 2021 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 2021 Outcome Document: [link](#).
 2. WSIS Forum 2021 High Level Track Outcomes and Executive Brief: [link](#).
 3. WSIS Forum 2021: WSIS Action Lines—Sustainable and resilient recovery from the COVID-19 pandemic that promotes the economic, social and environmental dimensions of sustainable development: building an inclusive and effective path for the achievement of the 2030 Agenda in the context of the decade of action and delivery for sustainable development: [link](#).
 4. WSIS Stocktaking Report 2021: [link](#).
 5. WSIS Stocktaking Success Stories 2021: [link](#).
 6. WSIS Forum 2021 Photo Contest: [link](#).
 7. WSIS/SDGs Matrix – WSIS Forum 2021 Outcomes Linking WSIS Action Lines with the Sustainable Development Goals: [link](#).
 8. WSIS Stocktaking ICT Case Repository: The Coronavirus Response Special Report: [link](#).
- **Photographs:** WSIS Forum 2021 album: [link](#).

320. **WSIS Forum 2021: Key Achievements (Announcements, Launches, Agreements, Commitments)**

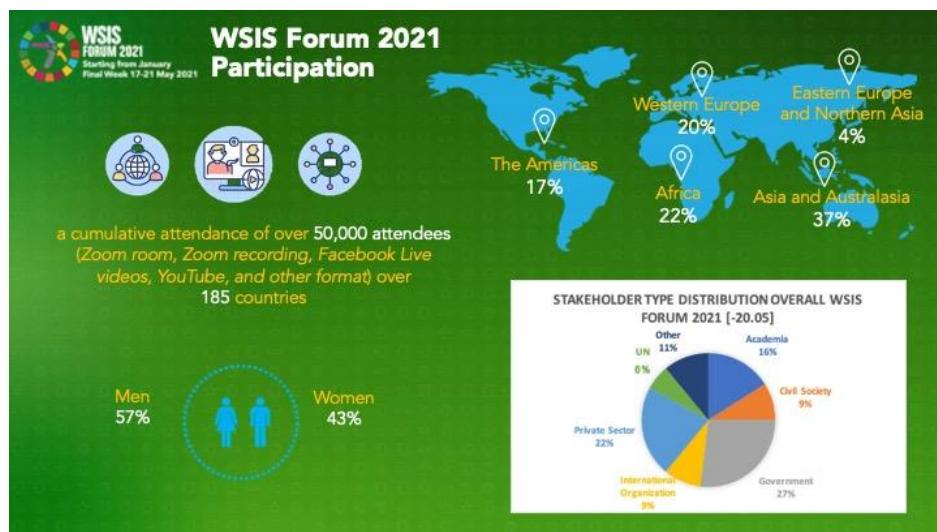
Please find below some key achievements of the WSIS Forum 2021 (full list of outcomes is available [here](#)):

- WSIS Action Lines advancing the achievement of the SDGs: UN WSIS Action Line Facilitators (ITU, UNESCO, UNDP, UNCTAD, UPU, ITC, WMO, WHO, FAO, UN DESA, UNEP) successfully held several Action Line Facilitation meetings displaying opportunities, challenges, and key trends in each Action Line.
- 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, UNESCO were appointed as the rotational UNGIS Chair for the year 2021-2022 and the Vice-Chairs are ITU, UNCTAD, UNDP and UN ESCWA.
- UN Regional Commissions committed to strengthen regional-level WSIS action through multi-stakeholder platforms and a series of regional face-to-face meetings. WSIS will be continue to be included in the UN Regional Coordination Mechanisms and WSIS4SDG will become one of the pillars of the regional SDG Forums. UNESCWA was nominated as the Chair of the WSIS Regional Commission Group for 2021-2022.
- [WSIS Forum 2021 Hackathon – Ageing Better with ICTs](#): ITU, Global Coalition on Aging (GCOA), and other stakeholders like WHO, UN DESA, etc. successfully organized the virtual hackathon on ICTs and Older Persons gathering more than 1,100 participants joining from 48 countries. The hackathon ideated ICT solutions addressing the areas of Alzheimer's disease and cognitive decline, frailty, transportation and mobility, and financial tools for longevity. Four winners from each challenge areas were awarded during a High-Level Dialogue gathering expert judges in field of technology and ageing. One winning team in each challenge area received a 6-month mentorship with the Global Coalition on Aging and their member companies as well as a \$1,000 cash prize. Learn more about the winners: <https://www.hackerearth.com/challenges/hackathon/ageing-better-with-icts/>.
 Watch our hackathon video: <https://www.youtube.com/watch?v=hBQ2INBeGsY>
- [WSIS Forum 2021 Healthy Ageing Innovation Prize](#): WSIS Forum Special Track on ICTs and Older Persons initiated a special prize this year entitled, the WSIS Healthy Ageing Innovation Prize, focused on ICTs that specifically address the needs of people 60+ to achieve and sustain an active and engaged life as they age. 12 finalists were shortlisted and the winner was Age Care Technologies (UK). More info is available at: <https://www.itu.int/net4/wsisis/forum/2021/Home/ICTsOlderPersons>
- WSIS Prizes 2021: The Forum also included the announcement of the WSIS Prizes 2021 winners and champions, which represented all seven continents and all WSIS stakeholder groups. In addition, the winning entries of the WSIS Forum Photo Contest 2021 were unveiled, highlighting how ICTs are playing a vital, enabling role on the road to achieving the SDGs.
- The Coronavirus (COVID-19) Response - ICT Case Repository: <https://www.itu.int/net4/wsisis/stocktaking/Surveys/Surveys/Submit/15863048637525604> The repository was initiated for collecting projects and activities on how ICTs are assisting stakeholders in their everyday life, work, and combating challenges

caused by this extraordinary pandemic. Several interviews were conducted with stakeholders and [A Global WSIS Response - Amid the Pandemic documentary](#) has been produced.

- WSIS TalkX: A series of WSIS TalkX were conducted with the Ambassadors and stakeholders highlighting the theme of the WSIS Forum 2021: ICTs for Inclusive, Resilient and Sustainable Societies and Economies (WSIS Action Lines for achieving the Sustainable Development Goals).
- WSIS Forum 2021 was also an opportunity for partnerships to be forged and valuable tools and initiatives to be launched. The full list of official WSIS Forum 2021 Outcomes, and the below information materials are available on the WSIS Forum 2021 website.

321. WSIS Forum 2021 Participation:



322. WSIS Forum 2021: Photo Contest

323. For the [WSIS Forum 2021 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 9 September 2020 and collected photos until 8 March 2021. During this period, people were sending photos of their projects, people, and organizations that are leveraging the power of ICTs to make difference.
324. The three winning entries in the WSIS photo contest were unveiled at the WSIS Forum 2021. A dedicated poster and other campaign materials highlighting their work were created and shared within ITU and its stakeholders.

325. WSIS Forum 2021 Photo Contest Winners:

1) ICT Use among Micro, Small, Medium Scale Enterprises

An SME operator digitizing daily purchase of items - *Wenchi, Ghana*



2) Incubating the next generation of digital leaders with Raspberry Pi

This picture shows our Learning Cascade projects in a Digital Literacy Center we sponsor in Odisha, India. Through SoCCs (Social Capital Credits), our community currency for social good, girls earn SoCCs tutoring 2 younger students who are three years or more younger than them, thrice a week - *Odisha, India*



3) Stay in contact 2

A person making a phone call outside the window -
Guadalajara, México



(c) WSIS Action Lines and SDGs Matrix

- 326. 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”.
- 327. 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.

-
328. 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.
329. 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.
330. 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).
331. 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.
332. With the newly adopted 2030 Development Agenda, the WSIS Forum may need to evolve and continues to strengthening the linkages between the WSIS Action Lines and the Sustainable Development Goals, in light of the outcomes of the UN General Assembly Overall Review of the Implementation of WSIS Outcomes.
333. 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/wsisis/sdg/>

(d) WSIS TalkX

334. The WSIS TalkX is a platform, both virtual and physical, dedicated to sharing experiences and inspirational stories about ICTs for development (implementation of the WSIS Action Lines for Development) by stakeholders all over the world. The WSIS TalkX was initiated during the WSIS Forum 2019 and is continued to be organised in a virtual format since April 2020 at the request of stakeholders. More than 30 physical and virtual sessions have been conducted, which have all been adapted to podcasts and are available to listen and download at WSIS TalkX Podcast [here](#).
335. The WSIS TalkX this year have been conducted in a virtual format where WSIS stakeholders have highlighted their linkages with the WSIS Action Lines and SDGs, in particular, in relation to the global response to COVID-19. The interactive talk series is also an

opportunity to hear from the globally recognized WSIS Prizes awardees, as well as from the partners of the WSIS Forum.

336. At the WSIS Forum 2021, a series of WSIS TalkX were conducted with the Ambassadors and stakeholders to highlight the importance aspect of ICTs COVID-19 response and the theme of the WSIS Forum 2021: ICTs for Inclusive, Resilient and Sustainable Societies and Economies (WSIS Action Lines for achieving the Sustainable Development Goals). The WSIS TalkX is also a platform for stakeholders to celebrate the UN international days. More information of the WSIS TalkX sessions during the WSIS Forum 2021 are available [here](#).

337. As part of the WSIS Forum 2021, the Radiocommunication Sector has participated in two WSIS TalkX sessions:

- A WSIS TalkX was organized in collaboration with the Radiocommunication Sector on [Improving connectivity by using \(satellite and terrestrial\) radiocommunications in small island states and developing countries](#). This panel explored the initiatives of small island states and developing countries in improving connectivity by using radiocommunications. It delved into the expansion of essential radiocommunications infrastructure and how it could be used to expand connectivity. It also examined the use of space and satellite services, as well as terrestrial, fixed and mobile, licensed and unlicensed services to build the foundations of the digital era.
In this sense, ITU-R Study Groups 1, 4 and 5 continue working hard to provide new technologies and best solutions for developed and developing countries. The most recently approved outputs produced by ITU-R Study Groups are updated on a regular basis and can be found [here](#).
- In addition, ITU-R had also participated in a WSIS TalkX on [New Technologies and Innovations for Ocean Conservation](#), on the occasion of the World Oceans Day 2021. This virtual event highlighted some examples of innovative initiatives making use of Information and Communication Technologies (ICTs) to protect oceans and to overcome challenges and strengthen efforts to mobilize and drive solutions towards the achievement of SDG 14 “Life below water”. Among the new technologies for oceans, ICTs are key awareness raising tools, they play additional significant roles in the conservation of the oceans – notably through improved monitoring and reporting which leads to increased accountability. Satellite-based monitoring delivers timely and accurate data on a global basis, while local sensors deliver on the spot updates in real-time.
ITU-R Study Group 7 continues its work to contribute to the achievement of WSIS Action Line C6 on enabling environment.
- Finally, it is also important to mention the thematic workshop on [Accessible media should not need to be a right – it should be a given](#), organized by the ITU Intersector Rapporteur Group Audiovisual Media Accessibility with the collaboration of Mr. Andy Quested, IRG-AVA Co-Chairman and Chairman of ITU-R Working Party 6C.

Discussions on further collaboration with ITU-R Study Groups and WSIS are ongoing.



WSIS TalkX

Starting in April, the WSIS Team will host a weekly virtual WSIS TalkX for the WSIS Stakeholders to interact, connect and collaborate. Preparing towards the WSIS Forum 2020, High-Level Participants, Facilitators, Workgroup Organizers, WSIS Prizes...

[Show More](#)



(e) WSIS Prizes



338. 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 2021](#) contest.

339. 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.

340. 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 2021 reflected 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.
341. Facilitated by ITU in coordination with all WSIS stakeholders, the WSIS Prizes 2021 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, 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 2021 winners and champions' dedication and commitment in the implementation of the WSIS Outcomes, while honoring the outstanding projects from the international WSIS community.
342. These highly sought-after awards recognize outstanding initiatives from governments, the private sector, civil society and academia that channel the contributions of information and communication technologies (ICTs) towards the betterment of society.
343. The 10th jubilee edition of the WSIS Prizes 2021 has received a record number of submissions this year, with over 1270 ICT projects submitted. Following the results of the online voting with 1,3 million votes cast, 90 WSIS Prizes Champions have been announced online, while 18 WSIS Prizes Winners were awarded on 18 May 2021.
344. The prizes are awarded across 18 categories, each directly linked to the [11 WSIS Action Lines](#) defined in the [Geneva Plan of Action](#).

345. ITU announced 90 Champions of the prestigious WSIS Prizes contest in February this year, while the 18 Winners, out of these 90 Champions, were recognized at a virtual ceremony during the final week of the WSIS Forum 2021 on 18 May 2021.

346. In 2021 contest, the 90 WSIS Prizes Champions were recognized through the online voting phase, with more than 1,3 million votes received from the WSIS community during the online voting phase from more than 100,000 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.

347. **Meet the winners** From open data to digital clinics, to highlighting the voices of women and youth in media, the WSIS Prizes 2021 Winners featured a wide range of impact-driven projects that leverage ICTs to improve lives, bridge digital divides, reduce inequalities and

#WSIS PRIZES 2021

#ICT4SDG PROJECTS IN FIGURES

REGIONS

1270
nominated projects



WSIS FORUM 2021
Starting from January
Final Week 17-21 May 2021

wsis.org/forum



more.

Below is the [full list](#) of the 18 winners, in the order of WSIS Action Lines:

Action Line C1 - <i>The role of government and all stakeholders in the promotion of ICTs for development</i>	Winner: KSA Free Wi-Fi, STC, Zain, Mobily, Saudi Arabia
Action Line C2 - <i>Information and communication infrastructure</i>	Winner: National Implementation of the Financial Inclusion Initiative in China, China

	Academy of Information and Communications Technology (CAICT), China
Action Line C3 - Access to information and knowledge	Winner: Compartel: "Discover the tariff plan for telephony, Internet and Pay TV that suits you best. Compare and choose", Telecommunications Regulatory Agency (OSIPTEL), Peru
Action Line C4 - Capacity building	Winner: Talk to me, Contemporary Education Academy, Georgia
Action Line C5 - Building confidence & security in the use of ICTs	Winner: Central Biometric Verification Monitoring Platform, Bangladesh Telecommunication Regulatory Commission (BTRC), Bangladesh
Action Line C6 - Enabling environment	Winner: A programme of practice-focused training in cybersecurity, the Central Bank of the Russian Federation (CBR), Russian Federation
Action Line C7 - E-government	Winner: "Citizens' Electronic Appeals" system, Data Processing Center (DPC) of the Ministry of Transport, Communications and High Technologies of the Republic of Azerbaijan. (DPC within MTCHT), Azerbaijan
Action Line C7 - E-business	Winner: ServicePlus - A metadata based eService Delivery Framework, National Informatics Centre (NIC), India
Action Line C7 - E-learning	Winner: Our Girls Our Future, Yielding Accomplished African Women (YAA.W), Ghana
Action Line C7 - E-health	Winner: SHEFAA portal / application, Ministry of Health and Prevention (MOHAP), United Arab Emirates
Action Line C7 - E-employment	Winner: Kahramaa Mobile Application - Employee Section, Qatar General Electricity & Water Corporation "KAHRAMAA, Qatar
Action Line C7 - E-environment	Winner: Al Nawras, Ministry of Transportation and Telecommunications (MTT), Bahrain

Action Line C7 - <i>E-agriculture</i>	Winner: Leveraging Information and Communication Technology for Irrigated Agricultural Information, 8villages, Indonesia
Action Line C7 - <i>E-science</i>	Winner: Epidemiological Surveillance 4.0, Ministry of Science and Technology (MCyT), Argentina
Action Line C8 - <i>Cultural diversity & identity, linguistic diversity</i>	Winner: Digital Transformation Center, Rwanda Information Society Authority (RISA), Rwanda
Action Line C9 - <i>Media</i>	Winner: Voices of Women Media, Voices of Women Media, Nepal
Action Line C10 - <i>Ethical dimensions of the Information Society</i>	Winner: Digital Community Center Project, Office of the National Digital Economy and Society Commission (ONDE), Thailand
Action Line C11 - <i>International & regional cooperation</i>	Winner: Digital Villages, American Tower Corporation (ATC), United States of America

348. Detailed descriptions of all WSIS Prizes 2021 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 multistakeholder 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.
349. 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.
350. All stakeholders are urged to encourage their networks to join the WSIS Prizes process, including the multistakeholder open consultation process for the WSIS Forum 2022, in order to ensure that all features correspond to the real needs of the WSIS implementation process towards 2025.

351. 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 Prizes 2022:

352. ITU is pleased to announce that the WSIS Prizes 2022 call, 11th 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.
353. Phase 1 will open the call for submissions in September to the contest of the WSIS Prizes 2022. During this phase, all stakeholders are invited to submit WSIS related project to the WSIS Prizes 2022 contest by end of January 2022.

(d) WSIS Stocktaking Portal

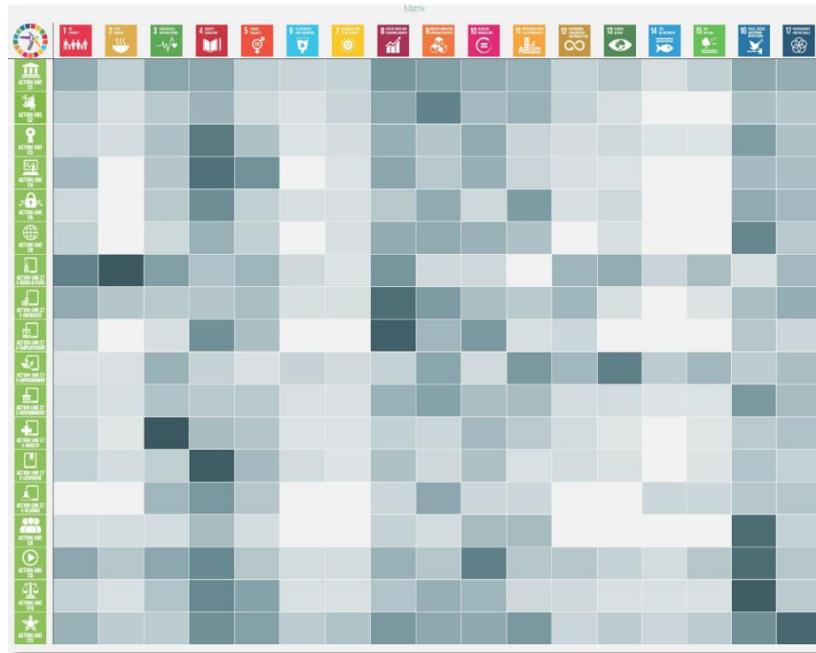


354. All stakeholders benefit from the sharing of interesting case studies, by the undoubtedly facilitation of the transfer of knowledge, experiences, and models for project implementation. The WSIS Stocktaking platform, launched in February 2010, helps to create partnerships, provide greater visibility,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

355. 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.
356. 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.
357. 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.
358. 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.
359. 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.
360. 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 2020 clearly showcase the linkage between their related action lines and the various SDGs and targets.

361. 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 close to half a million 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 14,000 entries so far. This encouraging outcome reinforces stakeholders' belief in and commitment to the WSIS Stocktaking process and their desire to share best practices.

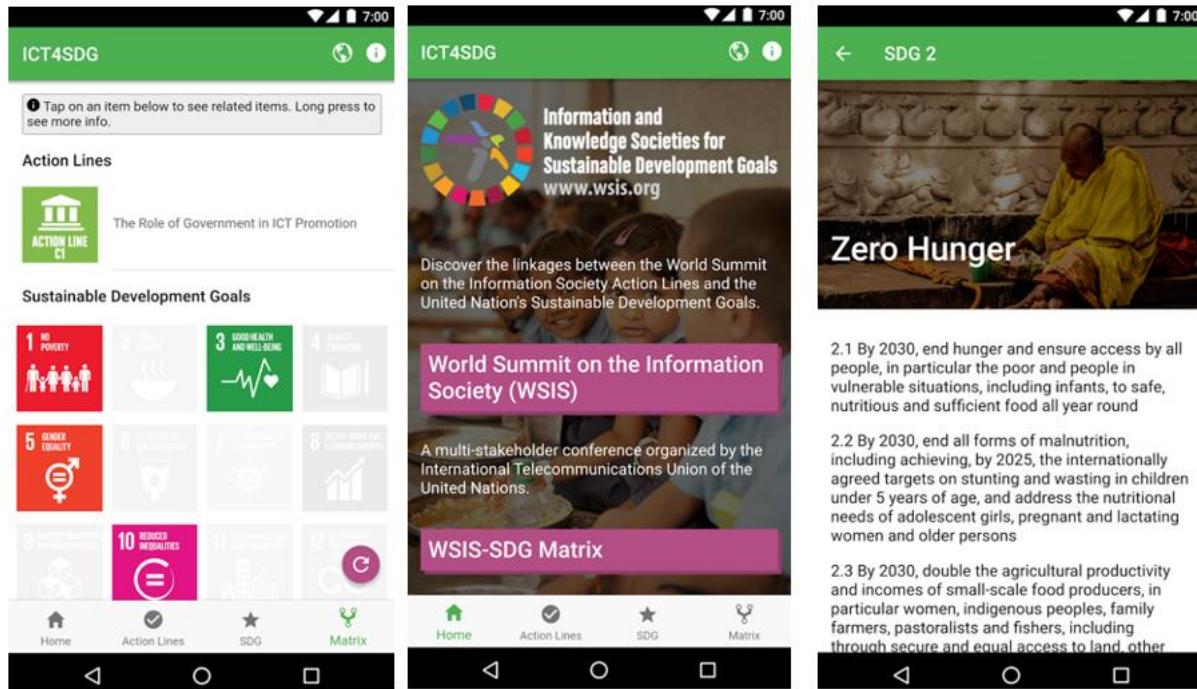
362. New WSIS Stocktaking products were introduced in 2019 with positive feedback from the WSIS stakeholders who showed much interest in using them. One such products has been designed in a form of an interactive matrix that is to be used as a graphical representation of WSIS and SDG data collected through the implementation of the WSIS Stocktaking process, where the individual values contained in a matrix are represented colorfully.



363. 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.

364. 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.



365. 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 word

366. We encourage all WSIS stakeholders to consider using 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

367.In April 2020, as a part of the WSIS Stocktaking ongoing efforts to promote the good use of ICTs in making social impact, and in order to provide useful, replicable and actionable information to all WSIS community and beyond, the WSIS Stocktaking platform became available for collecting projects and activities on how ICTs are assisting stakeholders in their everyday life, work, and combating challenges caused by this extraordinary pandemic.

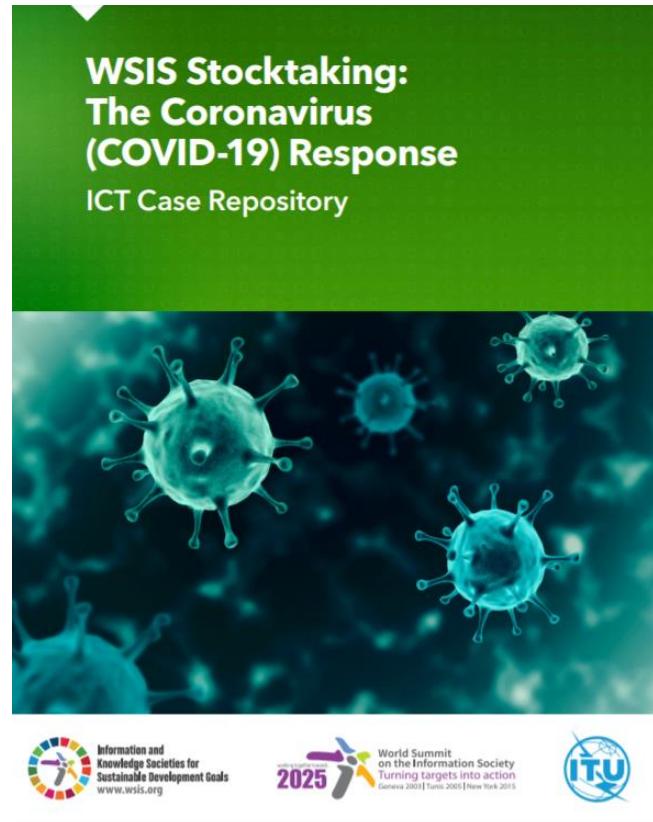
The aim of this [The Coronavirus \(COVID-19\) Response – ICT Case Repository](#) is to help you to continue to partner, collaborate and implement in these exceptional circumstances. Once received, the projects will be reviewed and will be featured on the WSIS Stocktaking Platform and promoted through various channels including the WSIS Flash newsletter, WSIS TalkX and social media channels.

In the first edition of this special report, issued in November 2020, more than 200 projects were featured. During the WSIS Forum 2021 final week (17-21 May), the [second edition](#) of this report was presented with more than 400 ICT projects and initiatives responding to COVID19.

We invite all to SUBMIT, SHARE and PROMOTE this call for innovative use of ICTs to respond to the coronavirus outbreak:

<https://www.itu.int/net4/wsisis/stocktaking/Surveys/Surveys/Submit/15863048637525604#sform>

"The year 2020 marked a milestone in the history of the World Summit on the Information Society (WSIS), a 15-year period that has seen the world undergo an unprecedented digital transformation that is accelerating social and economic progress across the globe. Never has this been more evident than during the COVID-19 pandemic where information and communication technologies (ICTs) have been essential to keeping societies and economies running everywhere. Information and Knowledge Societies have emerged as one of the main lines of defense against a virus that is still inflicting immense loss of lives and livelihoods and hampering progress towards achieving the United Nations Sustainable Development Goals (SDGs). In this report you will see how WSIS stakeholders rose to the challenge, with more than 200



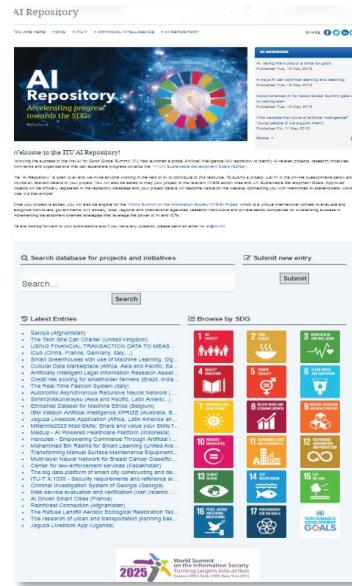
COVID-19 response case studies featuring ICT projects and initiatives from governments, private sector companies, academia, civil society, international organizations, and others. This form of crosssector collaboration and best-practice sharing is the essence of the WSIS Stocktaking process, and it is exactly what is needed to defeat COVID-19 and advance the WSIS Action Lines in support of the SDGs. The pandemic has changed our lives forever and brought the importance and potential of ICTs and emerging technologies ranging from AI to 5G to the fore. But it has also shone a light on deep digital inequalities between and within countries at a time when overall growth is slowing and worrying gaps in connectivity and access persist, especially in rural and underserved areas. It is my hope that we can use this moment to recommit ourselves to fulfilling the vision outlined 15 years ago of an Information Society where everyone can benefit from the opportunities that ICTs can offer. The WSIS Stocktaking process puts participants right at its center, and that is what makes the WSIS movement so powerful. I congratulate all those who made a submission to this report and encourage everyone to follow their example. The WSIS Stocktaking: The Coronavirus (COVID-19) Response – ICT Case Repository is a living document. The call for action is still open, and I invite you to share your projects and show the world how you are using ICTs to respond to the ongoing COVID-19 pandemic. ICTs have become the unifying thread that runs through all aspects of our societies and economies. With only ten years left to achieve the SDGs, ICTs are a key driver for global development and a central element of our efforts to build back better – for a stronger, safer, and more inclusive Information Society.” – Mr. Houlin Zhao, Secretary-General, ITU

368. In 2021, at the request of and in collaboration with the WSIS stakeholders, a new repository [WSIS Stocktaking Repository of Women in Technology](#) was launched to strengthen the ICTs and Gender Mainstreaming activities on WSIS. The aim of this repository is to identify and connect women leaders and practitioners in all sectors of the ICT industry from all regions and engage them in events, forums (e.g. WSIS Forum) and activities such as various workshops, training courses, networking events, aimed at fostering a dialogue on the use of ICTs as a means for implementing the Sustainable Development Goals.
369. Another special repository was launched to support the launch of the Healthy Ageing Innovation Prize. The WSIS Forum Healthy Ageing Innovation Prize focused on ICTs that specifically address the needs of people 60+ to achieve and sustain an active and engaged life as they age. The Prize Coordination Team has selected 12 Finalists for this year's award.
370. We are pleased to announce that the WSIS Forum Special Track on ICTs and Older Persons will be initiating a special prize this year entitled, the WSIS Healthy Ageing Innovation Prize, focused on ICTs that specifically address the needs of people 60+ to achieve and sustain an active and engaged life as they age. Calling for submissions starting from 15 February 2021. The WSIS Healthy Ageing Innovation Prize is an exceptional international recognition of WSIS Stakeholders as leaders for their excellence in supporting innovation that brings sustainable solutions for the ever-increasing global population of older people.
371. As a part of the Special Track on ICT's and Older Persons, the WSIS Forum together with the Global Coalition on Aging (GCOA) and other stakeholders have created this prize and



offer the winner a cash prize as well as recognition at the WSIS Forum. Submissions were made through the official submission form, hosted on the WSIS Stocktaking platform.

372. The winning projects showcased together with all valid submission in the special WSIS Stocktaking: ICTs and Older Persons publication, while all submitted descriptions of projects and activities will be reflected on the WSIS Stocktaking platform. We invite all WSIS Stakeholders to participate in this contest also planned to take place in 2022. 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 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 2020 contest.
373. 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.
374. 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.
375. 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 12,000 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.
376. The new call for update and new entries 2022 is expected to be launched in September 2021 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 2022 (reports, exhibitions, videos etc.) which will be released at WSIS Forum 2022 to be held March-June 2022. We look forward to receiving your responses to this call.

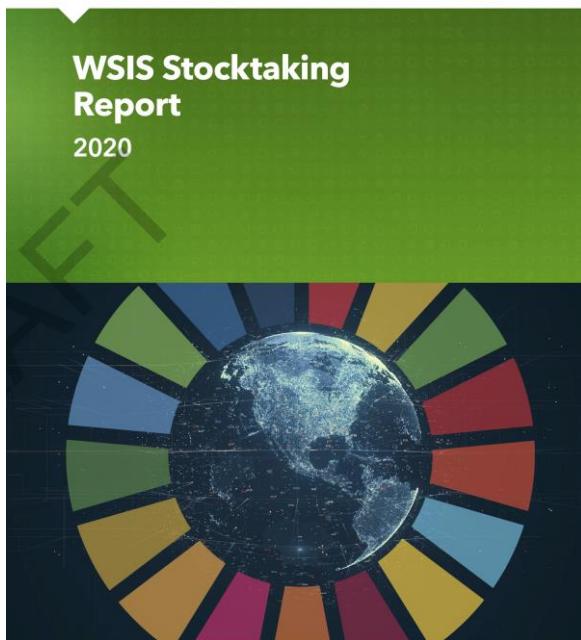


(e) **WSIS Stocktaking Publications**

377. This year, **1,260 ICT-related projects** from around the world were submitted for the Report on the WSIS Stocktaking 2021 by the WSIS Stakeholder community. The twelfth 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 final week of the virtual WSIS Forum 2021, 17-21 May 2021. 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.
378. The 2021 edition of the Report on the WSIS Stocktaking is the continuation of the series. This twelfth edition reflects 1,260 activities relating to ICTs for development, submitted to the WSIS Stocktaking Platform from 1 January to 31 March 2021, 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 2021 for Stocktaking updates and new entries. The inputs from WSIS action line facilitators and co-facilitators also contributed to the present Report.
379. Since the WSIS Stocktaking Process was established, twelve 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 2021 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.

380. WSIS-related publications, including the WSIS Stocktaking reports are available to download at the [ITU Bookshop](#).

WSIS Publications

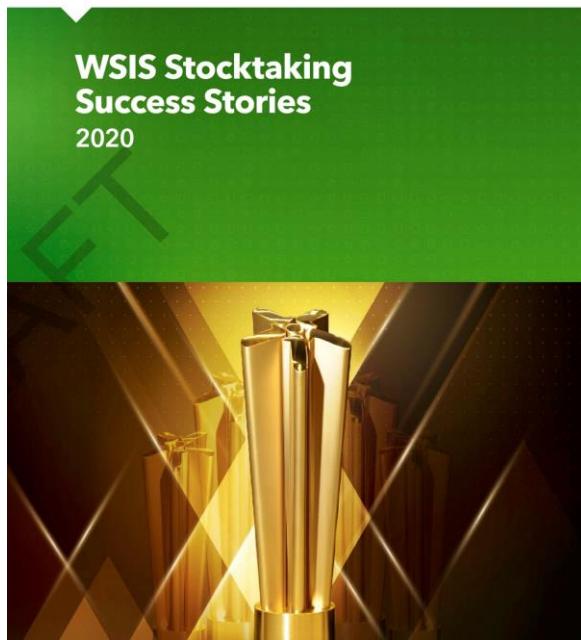


Information and
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Sustainable Development Goals
[www.wsis.org](#)

World Summit
on the Information Society
Turning targets into action
Geneva 2003 | Tunis 2005 | New York 2015



WSIS Publications

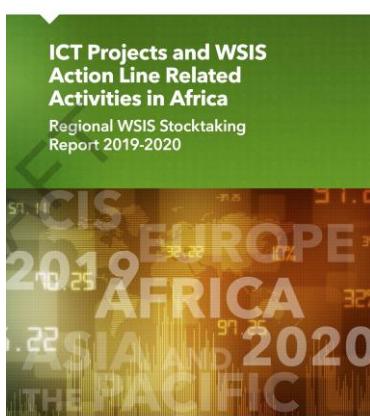


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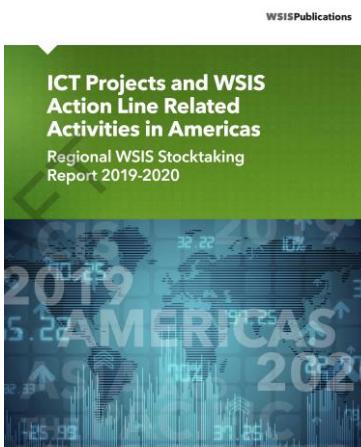


**ICT Projects and WSIS
Action Line Related
Activities in Africa**

Regional WSIS Stocktaking
Report 2019-2020

Information and
Knowledge Societies for
Sustainable Development Goals
[www.wsis.org](#)

World Summit
on the Information Society
Turning targets into action
Geneva 2003 | Tunis 2005 | New York 2015



**ICT Projects and WSIS
Action Line Related
Activities in Americas**

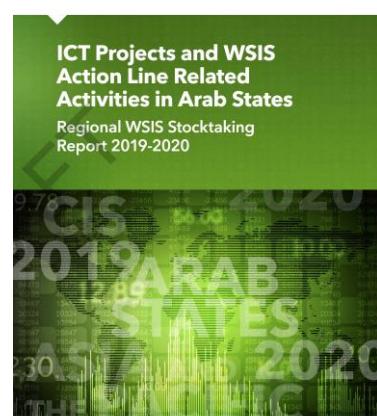
Regional WSIS Stocktaking
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WSIS Publications



**ICT Projects and WSIS
Action Line Related
Activities in Arab States**

Regional WSIS Stocktaking
Report 2019-2020

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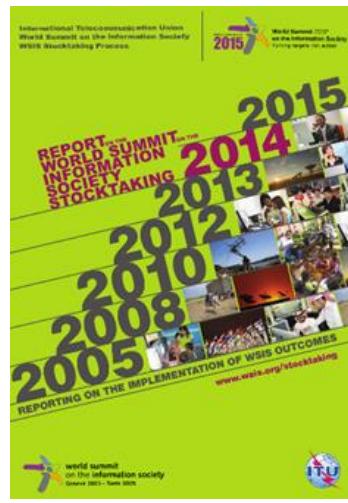
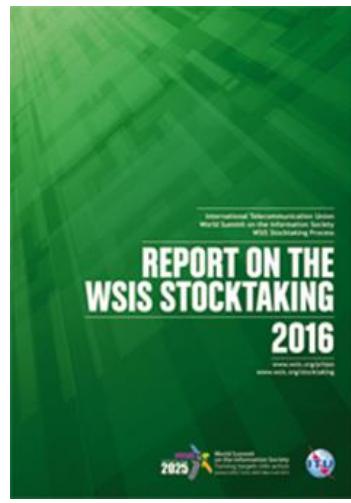
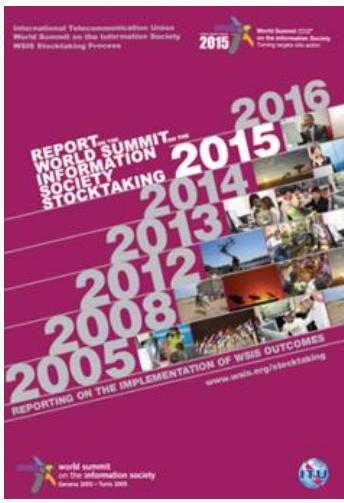
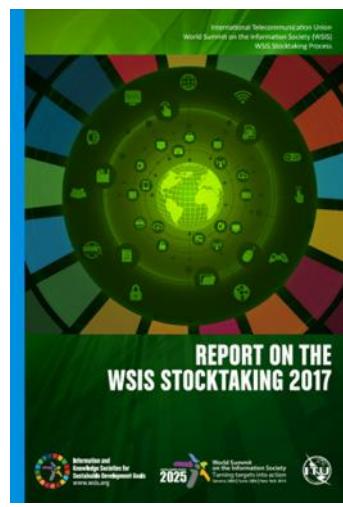
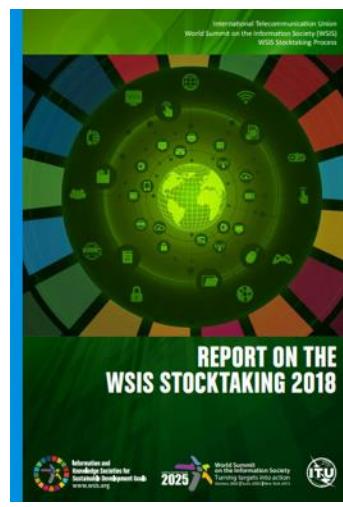
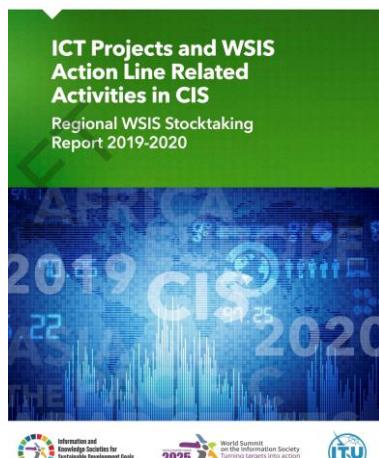
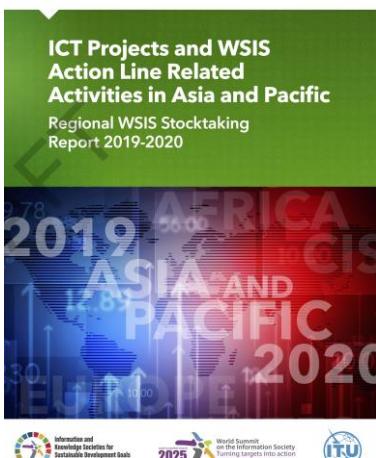
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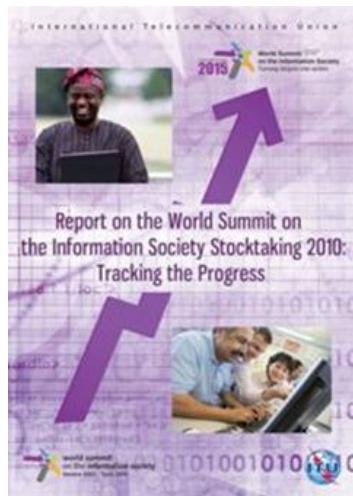
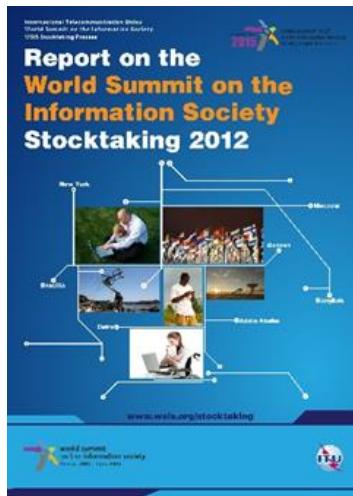
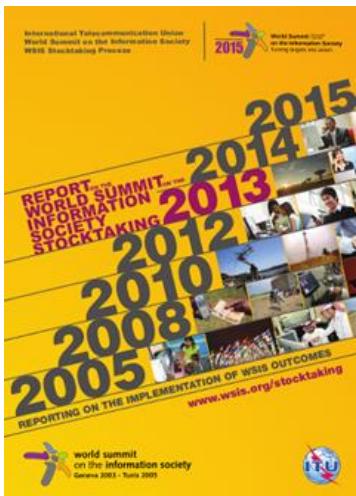


WSIS Publications

WSIS Publications

WSIS Publications





381. Following the outcomes of the United Nations General Assembly Overall Review on WSIS (Res. A/70/125) that called for a close alignment between the WSIS Process and the 2030 Agenda for Sustainable Development (Res. A/70/1), the WSIS Prizes is the unique global platform to identify and showcase success stories in the implementation of the WSIS Action Lines and SDGs.

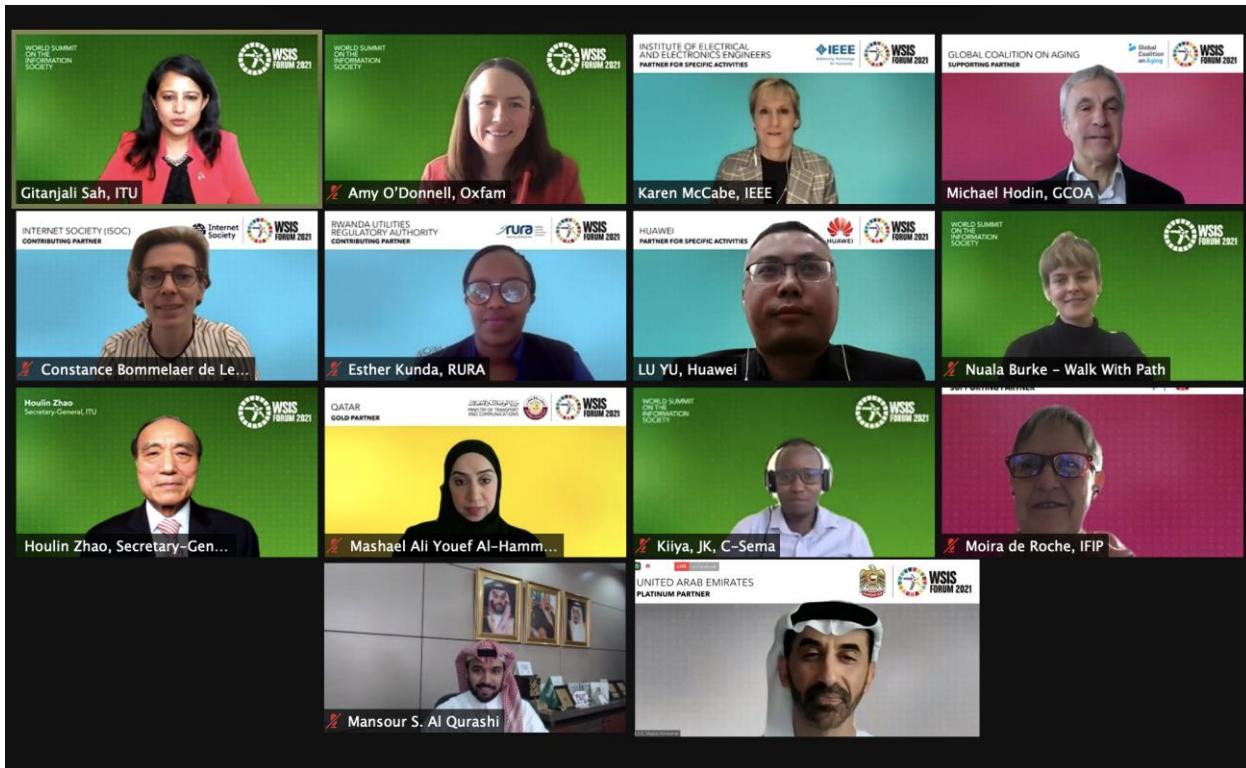
382. The United Nations Economic and Social Council (ECOSOC) Resolution 2020/12 on Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society reiterates the importance of sharing best practices at the global level, and, encourages all stakeholders to nominate their projects for the annual WSIS Prizes as an integral part of the WSIS Stocktaking process (www.wsis.org/stocktaking). 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) **WSIS Forum Photo Contest 2021**

383. The World Summit on Information Society (WSIS) Forum launched its first-ever photo contest in 2017 – 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 previous editions, we have continued 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 8 March 2021.
384. WSIS Forum invited the community to picture how ICTs are playing an enabling role in achieving the SDGs. Photographers from around the globe were invited to share photo submissions that depict the use of ICTs for development.
385. The three winning entries in the WSIS photo contest were announced at the WSIS Forum 2021. Please see here for more information:
<https://www.itu.int/net4/wsisis/forum/2021/PhotoContest>

(g) **Exhibition**

386. WSIS Forum 2021 gathered more than 130 exhibitors from Civil Society, Academia, International Organizations, Private Sector, and Governments. The virtual exhibition allowed a wide array of stakeholders to showcase their projects and the technology behind it. It provided an opportunity to share their initiatives and solutions that harness the power of ICT-enabled development to advance the achievement of the SDGs and expand our Information Society.
387. The virtual exhibition was inaugurated by the Secretary-General of ITU, Mr. Houlin Zhao, accompanied by the WSIS Forum 2021 Platinum Partner representative H.E Majed Sultan Al Mesmar, Deputy Director General of the Telecommunications and Digital Government Regulatory Authority (TDRA) of the United Arab Emirates, the WSIS Forum 2021 Gold Plus Partner representative Mr. Mansour S. Al Qurashi, General Manager for International Affairs, Communications and Information Technology Commission (CITC) of Saudi Arabia, and representatives from WSIS Forum 2021 sponsors and exhibitors.



388. WSIS Forum 2021 virtual exhibition can be seen here:
<https://wsisforum2021.pathable.co/exhibitors-partners>

(h) Hackathon

389. WSIS Forum 2021 Hackathon titled “Ageing Better with ICTs” was held virtually, in collaboration with the Global Coalition on Aging (GCOA). The virtual hackathon focused on how ageing in today’s increasingly digital world can be enhanced through the use and applications of ICTs. The heightened awareness of the need to address the challenges of older persons with ICTs was starkly highlighted during the global pandemic.

390. The virtual hackathon ideated ICT solutions that respond to four challenge areas, namely (i) Alzheimer’s Disease and Cognitive Decline; ii) Frailty; (iii) Transportation and Mobility; and (iv) Financial Tools for Longevity. Four winners from each challenge areas were awarded during a High-Level Dialogue gathering expert judges in field of technology and ageing. One winning team in each challenge area received a 6-month mentorship with the Global Coalition on Aging and their member companies as well as a \$1,000 cash prize. More information of WSIS Forum 2021 Hackathon [here](#).

391. UNESCO and ITU WSIS team will jointly organise a Hackathon and WSIS Special Prize on ICTs and Indigenous Peoples and Cultures for the WSIS Forum 2022.

(i) WSIS Forum Special Initiatives

392. **ICTs and Gender Mainstreaming:**

WSIS Stocktaking Repository of Women in Technology
(<http://www.itu.int/go/WSISGender>)

At the request of stakeholders and in collaboration with them, the WSIS Stocktaking Repository: Women in Technology has been launched. The main aim of the repository is to have a ready pipeline of women speakers and experts. This is one of the results of the ICTs and Gender Mainstreaming special track at the WSIS Forum. This repository provides opportunities to connect with women leaders and practitioners in all sectors of the ICT industry from all regions and to engage in various activities on ICTs and Gender Mainstreaming, such as workshops, training courses, networking events, WSIS Forum, and others that aimed at fostering a dialogue on the use of ICTs as a means for implementing the SDGs.

WSIS Gender Trendsetters will be initiated to:

- gather inspiring trailblazers for gender equality all around the world and to create a community
- identify the current ICTs trends on gender issues to promote gender mainstreaming and equality
- organise workshops for the ICTs and Gender Mainstreaming special track at the WSIS Forum
- promote the WSIS Forum 50/50 gender balance challenge
- promote and encourage stakeholders to join the WSIS Stocktaking Repository of Women in Technology
- advocate for the inclusion of gender issues and gender digital equity in ICT discussions

393.ICTS and Older Persons:

- Follow-up to the International Year of Older Persons: Second World Assembly on Ageing, Report of the Secretary-General. Reference: The International Telecommunication Union published Ageing in a Digital World: From Vulnerable to Valuable, which addresses two mutually reinforcing global megatrends: the emergence of digital technologies and ageing populations. In 2021, the World Summit on the Information Society Forum partnered with the Global Coalition on Ageing (GCOA), in collaboration with ITU, WHO and the Department of Economic and Social Affairs on its first-ever healthy ageing innovation prize, which was awarded to the most innovative technology enabling healthier and more-active ageing and was presented as part of a special track on information and communications technology and older persons.
- GCOA announced the continuation of the ICTs and Older Persons special track and WSIS Healthy Ageing Innovation Prize, including strengthening linkages of the WSIS Forum with the Silver Economy Forum.

- World Telecommunication and Information Society Day (WTISD) 2022 theme: Digital technologies for Older Persons and Healthy Ageing
- Special publication on ICTs and Older Persons
- Special initiative on healthcare technologies

394. WSIS Youth Campaigners:

The WSIS Youth Campaigners are actively contributing to the ICTs and Youth special track to provide young people and the representatives of youth communities with a platform to share and exchange their insights related to the information society and international development, including the United Nations 2030 Sustainable Development Agenda.

395. ICTs and Indigenous Languages:

ITU, UNESCO and relevant stakeholders will jointly organize a WSIS Forum 2022 Hackathon on ICTs for Indigenous Languages.

From January to May 2022: Announcements of the Winners will take place during the WSIS Forum 2022 final week 30 May – 3 June 2022.

The Hackathon is calling on stakeholders to form teams to explore the use of ICTs in preventing, revitalising, and promoting the indigenous languages.

The Hackathon is linked with the Global Action Plan for Making a Decade of Action for Indigenous Languages, WSIS Action Lines, and the Sustainable Development Goals.

WSIS Forum 2022 will initiate a special track on ICTs and Indigenous Languages, which will provide space for discourse on the important role that indigenous languages could play towards sustainable development with ICTs that are made accessible, inclusive and affordable for all.

Further, a WSIS Special Prize on ICTs for Preserving, Revitalizing and Promoting Indigenous Languages will also be launched for the WSIS Forum 2022.

(j) The Global Cyber Security Agenda (GCA)

396. 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.

397. Second Open Consultation on the draft Guidelines for utilization of the GCA was held during the WSIS Forum 2021 on 1 March 2021.

(k) Connect 2030 Agenda for global telecommunication/ICT development

1. Background

398. 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.
399. 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.
400. 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

401. An annual report on the progress and implementation of ITU Strategic Plan and the Connect 2030 Agenda is presented each year to ITU Council. The latest report for the period 2019-2020 was presented in June 2021 and is available online ([ITU Annual Report 2019-2020](#)).
402. A dedicated microsite for the Connect 2030 Agenda was also created to measure, in a yearly basis as from 2020, the progress of the Connect 2030 Agenda targets. The microsite provides a dashboard for both the goals and targets, as well as relevant links to publications, data and other resources, so that ITU and its members can progress together towards connecting the world.
403. The Connect 2030 Agenda has 24 targets designed to provide an indication of progress towards the achievement of the 5 goals up to 2023:

Goal 1 – Growth: Enable and foster access to and increased use of telecommunications/ICT in support of the digital economy and society.



Recognizing the role of telecommunications/ICTs as a key enabler for social, economic and environmentally sustainable development, ITU will work to enable and foster access to, and increase the use of, telecommunications/ICTs, foster the development of telecommunications/ICTs in the support of the digital economy and help developing countries make their transition to the digital economy. Growth in the use of

telecommunications/ICTs has a positive impact on short- and long-term socio-economic development as well as on the growth of the digital economy towards building an inclusive information society. The Union is committed to working together and collaborating with all stakeholders in the telecommunication/ICT environment in order to achieve this goal.

- 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)
- 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 access for all.



Being committed to ensuring that everyone without exception benefits from telecommunications/ICTs, ITU will work to bridge the digital divide for an inclusive information society and enable the provision of broadband access for all, leaving no one offline. Bridging the digital divide focuses on global telecommunication/ICT inclusiveness, fostering telecommunication/ICT access, accessibility, affordability and use in all countries and regions and for all peoples, including women and girls, youth and marginal and vulnerable populations, people from lower socio-economic groups, indigenous peoples, older persons and persons with disabilities.

- 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

Goal 3 – Sustainability: Manage emerging risks, challenges and opportunities resulting from the rapid growth of telecommunications/ICT.



To promote the beneficial use of telecommunications/ICTs, ITU recognizes the need to manage emerging risks, challenges and opportunities from the rapid growth of telecommunications/ICTs. The Union focuses on enhancing the quality, reliability, sustainability and resilience of networks and systems as well as building confidence and security in the use of telecommunications/ICTs. Accordingly, the Union will work to make it possible to seize of opportunities presented by telecommunications/ICTs while working towards minimizing the negative impact of undesired collaterals.

- 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
- 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.



The Union recognizes the crucial role of telecommunications/ICTs in the digital transformation of society. 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.

- Target 4.1: By 2023, all countries should have policies/strategies fostering telecommunication/ICT-centric innovation

Goal 5 – Partnership: Strengthen cooperation among the ITU membership and all other stakeholders in support of all ITU strategic goals.



In order to facilitate the achievement of the above strategic goals, the Union recognizes the need to foster engagement and cooperation among governments, the private sector, civil society, intergovernmental and international organizations, and the academic and technical communities. The Union also recognizes 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.

- Target 5.1: By 2023, increased effective partnerships with stakeholders and cooperation with other organization and entities in the telecommunication/ICT environment.

404. Each year, the World Telecommunication and Information Society Day (WTISD) theme is also linked to the Connect 2030 Agenda goals and targets, the SDG's and the WSIS Action Lines so as to continue to promote and raise awareness about the possibilities that the use of the Internet and other information and communication technologies (ICTs) can bring to societies and economies, as well as of ways to bridge the digital divide.



Operationalization of the ITU Strategic Plan 2020-2023

405. 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 2030 Agenda to the Sustainable Development Goals

406. 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 2030

407. ITU will further advance the implementation of Connect 2030 by:

- 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.
- 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.

(II) Broadband Commission for Sustainable Development

408. The Broadband Commission for Sustainable Development was established May 2010 by ITU and UNESCO 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 is grounded in the belief that universal connectivity is key to achieve the Sustainable Development Goals (SDGs). Acting as the UN advocacy engine for implementation of the UNSG's Roadmap for Digital Cooperation and leveraging the strength of its membership and collective expertise, the Commission's work advocates for meaningful, safe, secure, and sustainable broadband communications services that are reflective of human and children's rights.
409. The Broadband Commission for Sustainable is led by President Paul Kagame of Rwanda and Carlos Slim Helù of Mexico and is co-chaired by ITU's Secretary-General Houlin Zhao and UNESCO Director-General Audrey Azoulay. It is comprised of over 50 Commissioners representing a cross-cutting group of top CEOs and industry leaders, senior policymakers and government representatives, and experts from international agencies, academia and organizations concerned with development. Its mission is to catalyze the expansion of broadband connectivity globally to enhance quality of life, power sustainable development, and accelerate the achievement of the United Nations' SDGs by 2030.
410. 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 practices and policies, so the entire world can take advantage of the benefits. It defines strategies for accelerating broadband roll-out worldwide and examines applications that could see broadband networks improve ICT delivery in healthcare, education, environmental management, safety and across society.
411. Every year, the ITU/UNESCO Broadband Commission for Sustainable Development publishes its flagship annual 'State of Broadband' report in September to take the pulse of the global broadband industry and to explore progress towards universal connectivity and make progress towards realizing the Commissions 7 Advocacy Targets. This year, broadband adoption has accelerated and an unforeseen pace as it has emerged as the hidden hero in the global battle against the COVID-19 pandemic. In 2021, still, almost half the global population still has no access to the internet. The digital divide has been highlighted as a key barrier to the power of digitization to mitigate the COVID pandemic disruption, bringing the work of the Commission to the forefront.
412. Over the course of 2021, the Broadband Commission pursued a range of work through its Working Groups on: 21st Century Financing Models, Digital Learning and Epidemic Management, each of which launched a publication in 2021. The Commission Working Groups for the next year will be focused on, among other topics, Virtual and Data Driven Health, Smart Devices, with the potential for two additional Working Groups on Data for Learning and Ai Capacity Building.

413. By issuing these reports, the ITU/UNESCO 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 through people-centred solutions and innovative financing mechanisms. The Commission will continue working with many different stakeholders to fulfill its Universal Connectivity Manifesto dedicated to connecting the unconnected and realizing the forthcoming SDGs and the 2030 Agenda.
414. 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](#).
415. In addition to its Working Group activities, the Broadband Commission, hosts two regular face-to-face meetings each year, in some cases virtual, to solicit feedback from regional constituents, including ministers and regulators, as well as members of the private sector and UN high level representatives. At these bi-annual meetings, Broadband Commissioners debate key issues to advance the work of the Commission, present findings and recommendations from their work throughout the year, offer expertise and guidance to high-profile guests and launch global calls to action like the [2020 Universal Connectivity Manifesto](#).
416. On 19 September 2021 the Commission held its Annual Fall Session, titled [People-Centred Solutions for Universal Broadband](#), focused on the digital cooperation needed to reach the Commission's goal of universal connectivity. It also served as a platform for Commissioners to share progress through the flagship State of Broadband Report, Working Groups publications.
417. This meeting reaffirmed the Commission's call for digital cooperation, innovation with ICTs, and collaborative approaches to secure universal connectivity and access to digital skills.

(m) AI for Good Global Summit

Introduction

418. The [AI for Good Global Summit](#) series identifies practical applications of AI with the potential to accelerate progress towards the SDGs. Close to 40 UN organizations are partners of the AI for Good Global Summit. Now in its fourth edition, this year's AI for Good Global Summit is being held online all year, and will continue to connect AI innovators with public and private-sector decision-makers in the interests of stimulating the discovery and delivery of "AI for Good" solutions for all. The AI for Good series has been arranged into three streams (Build, Learn, Experience) with the following service offerings:

Build:

- AI for Good Breakthroughs
- AI for Good Innovation Factory
- AI for Good Machine Learning 5G Challenge
- AI for Good Repository

Learn:

- AI for Good Keynotes
- AI for Good Webinars

- AI for Good Perspectives
 - AI for Good On the Go!
- Experience:
- AI for Good Artistic Intelligence
 - AI for Good Demos

419. Following TSAG discussions on the matter in September 2019 (see [TSAG-R8](#)), a [roundtable](#) was convened at ITU headquarters on 30-31 January 2020 to discuss the mission and composition of a Global Initiative to support the implementation of beneficial AI-based solutions to accelerate progress towards the SDGs.

Attended by around 100 participants (including AI specialists, data owners, and infrastructure providers from the private sector, academia, governments, UN agencies and standards bodies), the roundtable highlighted the need for the Global Initiative to maximize collaboration in order to:

- Match problem owners with providers of solutions using AI and data
- Scale and sustain AI-based projects
- Make available and accessible capabilities, resources, datasets, know-how, guidelines, frameworks and standards as a common good

At the roundtable, two working groups (on repositories and on marketplaces) were established and one project was identified (Global AI services platform, initially introduced at an AI for Good Global Summit) to progress toward achieving the mission of the Global Initiative, summarized [here](#).

420. On 16 July 2020, as part of the AI for Good webinar series, the Global Initiative launched the [Global Data Pledge project](#) to help identify, support and make available data as a common global resource.

(n) Girls in ICT Day

421. The [10th Anniversary of Girls in ICTs](#) was celebrated on 22 April 2021. With the theme ‘Connecting girls, creating brighter futures’, 10 Moments of Girls in ICT was a series of virtual events hosted by ITU and its partners. The 10 Moments series was designed with three goals in mind: build momentum and awareness about the importance of encouraging girls in STEM; engage key stakeholders and communities; and provide an inclusive platform to discuss the best ways to encourage girls to pursue STEM careers.

422. The ITU “[European celebration of Girls in ICT 10-year anniversary](#)” was organized by the ITU and EQUALS-EU, with the support of UN Women and CEPT and included high level messages from the European Commission (EC) and Regional Cooperation Council (RCC) and Generation Connect Europe Youth Group. It was held within the framework of the ITU Girls in ICT day initiative, which aims to empower girls and young women through ICTs, as well as the ITU regional initiative for Europe on accessibility, affordability and skills development for all to ensure digital inclusion and sustainable development. This virtual celebration was held on 22 April 2021. The virtual [event](#) was followed and viewed by over **1500 individuals** and supported with captioning.

423. A special session dedicated to International Girls in ICT Day and the launch of the Network of Women for the CIS Region was held in April 2021 with participation of delegates of Regional Preparatory Meeting for WTDC and the Generation Connect Youth Group for CIS. Participants discussed the opportunities of professional fulfilment of girls/women in the ICT and through ICT and shared their experience in pursuing ICT/Telecom related education and careers.
424. In September 2021, as part of Girls in ICTs 2021, Airtel Networks Zambia Plc partnered with the Smart Zambia Institute to provide digital skills training to schoolgirls in the country and to encourage them to pursue careers in STEM. Under the program, hosted by Smart Zambia Institute, 150 girls selected from three provinces in Zambia will undergo digital skills training that will run throughout 2021. The partnership is part of the Digital Transformation Centres (DTC) initiative launched by the ITU and CISCO.
425. As part of the ICTs and Youth special track, WSIS organised a session to celebrate International Girls in ICT Day on 22 April. This session brought together dynamic women in the tech field to share their professional careers journey, discuss mentorship and STEM courses to inspire and motivate generations of young people to consider ICTs for academic, research and professional development. More details of the session are available [here](#). During the previous WSIS Forum events, we have been able to spark many youth communities and their representatives to join the discussions on the implementation of the WSIS process, and several youth-related sessions were held that resulted in shaping and developing the Special Track on ICTs and Youth. We strive to provide young people and to representatives of youth communities with a platform to share and exchange their insights related to the information society and international development, including the United Nations 2030 Sustainable Development Agenda.



Over the past three years, we have witnessed an outstanding growth of the ICTs and Youth special track at the WSIS Forum. This year, youth continued to gather in even greater numbers, especially due to virtual nature of the event. We had some inspirational sessions with concrete outcomes. One such outcome is the creation of the WSIS Youth Campaigns.

We believe in a bright future of this special track and would like to work together in scaling it up by campaigning to our networks and communities about the importance of three key pillars:

- Stronger youth engagement in the international development,
- ICTs and Youth track at the WSIS Forum as the youth voice amplifier, and
- Promoting the healthy use of ICTs among the global youth.

We proudly present our 12 WSIS Youth Campaigners who will be promoting the voice of youth at the WSIS Forum, help us scale-up special track on ICTs and Youth, and promote ICTs as enablers of SDGs. Hear more from them by visiting this [link](#).

(o) Equals in Tech Awards -2021

426. The EQUALS in Tech Awards, hosted by the EQUALS Global Partnership, recognize innovative solutions aimed at closing the digital gender gap. The nominations for the eighth EQUALS in Tech Awards 2021 was open in May 2021 and until now over 120 nominations have been received from 34 countries representing the private sector, civil society, governments and academia. The ceremony of the awards will be held virtually as part of the Internet Governance Forum on December 2021.

(p) Roadmaps for WSIS Action Lines C2, C5, C6

427. 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).

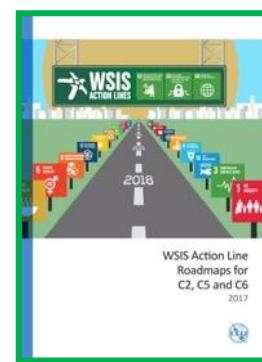
428. With the aim of strengthening the implementation mechanism, ITU Council 2009 agreed on the framework for roadmaps of ITU's activities in its role as the sole facilitator for the above mentioned WSIS Action Lines in the implementation of WSIS up to 2015. Highlighting the important role of ITU in 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:

1. 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;
2. 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.*

429. 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.

430. 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.

431. At its 34th ITU Council Working Group (CWG) on WSIS&SDG in September 2019, the Secretariat was requested to provide information on the implementation of activities that have already expired, by including a new section and linking them to previous reports and to include the work plans of WSIS Action Lines C1, C3, C4, C7, C8, C9 and C11, into the ITU Roadmaps document. At its 35th CWG on WSIS&SDG in December 2019, the



Secretariat was requested to analyze the implementation of the WSIS outcomes for Action Lines C2, C5 and C6, and the achieved results in the ITU Roadmaps document.

432. At the 36th CWG on WSIS&SDG meeting on 28-29 January 2021, the Group endorsed the revised template for ITU Roadmaps C2, C5 and C6 and recommended to use them for analyzing the implementation and achieved results of the WSIS outcomes for the Action Lines C2, C5 and C6.

(q) Communication and Outreach

433. WSIS Flash: is a monthly newsletter on WSIS Related news, projects and activities.
<https://www.itu.int/net4/wsisis/stocktaking/Flash/Newsletter>

434. 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.wsisis.org/iwrite>



435. 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](#).



436. 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>

437. @WSISprocess on Twitter: The WSIS Twitter page gives opportunity to fans to get informed and actively participate at the page <https://twitter.com/WSISprocess>\

438. 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/wsisisprocess>.

439. 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.

440. 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/>

441. 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/wsisis_process/

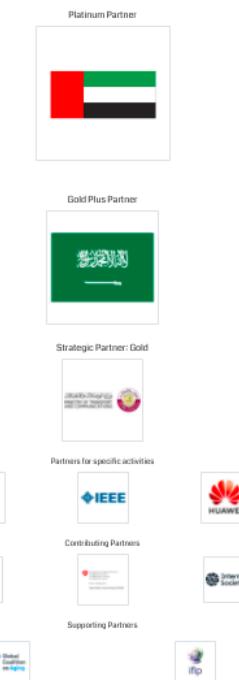
(r) WSIS Fund in Trust

442. 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.

443. 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.

444. 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>

445. We thank United Arab Emirates, Saudi Arabia, Qatar, Japan, IEEE, Huawei, Rwanda, Switzerland, Internet Society, IFIP, and Global Coalition on Aging for their contributions to the WSIS Fund in Trust in 2021 to accelerate the implementation of the WSIS related activities undertaken by ITU.



(s) Future Actions

446. The WSIS Forum 2022 is scheduled to be held starting from 15 March with the final week that will be held on 30 May – 3 June 2022 at ITU Headquarters premises in Geneva, with the fallback option of a fully virtual event along the lines of WSIS Forum 2021, or a combined event with physical and virtual components, depending on the evolving COVID-19 pandemic situation. Additional information about the WSIS Forum 2022 is available [here](#).

447. 1) WSIS Forum 2022 (Open Consultation Process) www.wsis.org/forum

The Open Consultation Process for the WSIS Forum 2022 is structured in five phases as follows:

- Phase I: 19 August 2021, 14:00-15:00 CEST: Launch of the Open Consultation (Virtual Launch, open to all Stakeholders)
 - Launch of the WSIS Forum 2022 website for the Official Submissions
 - Official Submissions to the WSIS Secretariat on the Thematic Aspects and Innovations on the Format to be made via <https://www.itu.int/go/OCP2022>

- Open call for nominations for WSIS Forum 2022 multistakeholder High-Level Track Facilitators
 - Launch of the WSIS Photo Contest 2022
 - Phase II: 8 December 2021, 13:50-14:50 CET, Katowice, Poland/Virtual: 1st Meeting: Open Forum on Implementation of WSIS Action Lines and WSIS Forum (during IGF 2021)
 - Phase III: 31 January 2022: 2nd Virtual/Physical Meeting
 - Phase IV: 7 March 2022: Deadline for Submissions of Official Contributions and Binding Requests for Workshops
 - Phase V: 2 May 2022: 3rd Virtual/Physical Meeting
448. 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.

449. 2) WSIS Prize 2022- Phases – www.wsis.org/prizes

The contest was organized into five phases:

FIVE PHASES OF THE CONTEST

1. The first phase: Submission phase
1 September 2021 – 21 January 2022 (Deadline for last submission: 23:00 Geneva time)
2. The second phase: Nomination Phase. Revision of submitted projects that will result with a list of 360 nominated projects, twenty (20) projects per Action Line Category (18)
1 February – 25 February 2022 (twenty projects per each category will be nominated)
3. The third phase: Public online voting (identification of five projects per category with the highest number of votes)
1 March – 31 March 2022 (Deadline for casting last vote: 23:00 Geneva time)
4. The fourth phase: Selection of winning projects by the ITU Expert Group that will result with a list of winning projects
1 April – 15 April 2022
5. The fifth phase: Announcement of winners to the public during WSIS Prize 2022 Ceremony at WSIS Forum 2022, and the release of publication “WSIS Stocktaking: Success Stories 2022”, which is a compilation of extended descriptions of the 18 winning projects and 72 champion projects.

Phase one will open the call for submissions to the contest of the WSIS Prize 2021 at www.wsis.org/prizes. During the period from 1 November until 21 January 2021, 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 online at www.wsis.org/prizes.

The contest is open to all stakeholders, entities representing governments, private sector, international and regional institutions, civil society, and academia. No more than one project from the same entity is allowed to be submitted per category. Stakeholders are invited to consult the rules for project submission and nomination criteria at the WSIS Prizes website. All WSIS stakeholders are encouraged to submit ICT projects for which they believe should be recognized and promoted, and for which they do not necessarily hold ownership of.

The eighteen Winners and Champions will be recognized at the WSIS Forum 2022, to be held from 30 May – 3 June 2022. The winning projects will be showcased in the WSIS Stocktaking: Success Stories 2022 publication, while all submitted descriptions of projects and activities will be reflected in the WSIS Stocktaking Report 2022. We invite all WSIS Stakeholders to participate in the contest of WSIS Prizes 2022.

450. WSIS Stocktaking: 2021-2022 Year-around Call for Update and New Entries is OPEN

www.wsis.org/stocktaking

451. The WSIS Stocktaking process has been maintained by ITU since 2004 as requested by the WSIS Outcomes (Tunis Agenda for the Information Society, Para 120). This publicly accessible WSIS Stocktaking database (www.wsis.org/stocktaking), currently with more than 12 000 entries and a growing community of 350 000 stakeholders, is a unique global tool for collecting information and regular reporting on information and communication technologies 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.
452. 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 United Nations Economic and Social Council (ECOSOC) [Resolution 2019/24](#) 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.
454. We are pleased to invite you to update and submit new entries online at the WSIS Stocktaking page <https://www.itu.int/net4/wsis/stocktaking/Project/Projects/Submit>.
455. Submitted activities will be reflected in the WSIS Stocktaking Report 2022, which will be released at the WSIS Forum 2022 to be held from 30 May – 3 June 2022 in Geneva, Switzerland.
456. WSIS Forum 2022 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.
457. Following the success of the previous editions of the WSIS Forum Photo Contest, we are pleased to announce another successful edition of [WSIS Photo Contest 2021](#) that was launched on 9 September 2020, inviting the community to picture how are ICTs advancing SDGs on the ground, therefore contributing to WSIS Stocktaking overall. More than 80 submissions were carefully reviewed and 3 winning photos were selected and announced. Find all finalists and winners at the WSIS Photo Contest page <https://www.itu.int/net4/wsis/forum/2021/PhotoContest>. In addition, all photos that fit

the criteria are being exposed at the dedicated WSIS Photo Contest 2021 Virtual Exhibition at the WSIS Forum 2021 online networking platform [ImeetyouatWSIS](#) <https://wsisforum2021.pathable.co> and will be also promoted in WSIS-related events.

458. All WSIS stakeholders are invited to use the photos of the WSIS Photo Contest in publications, websites, social media etc and thus promote the ICT work for social impact and Sustainable Development. Should you have any questions or need for assistance, please do not hesitate to contact the WSIS team at wsis-photocontest@itu.int. 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 2022.

(VI) Final conclusions

459. The ITU is committed to connecting the world in its role as one of the lead facilitating organizations for the WSIS Process. In 2021, 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. ITU has a number of new initiatives in response to COVID-19 and work programmes that are increasingly relevant in the current situation. The ITU [COVID-19 Updates](#) webpage highlights all ITU initiatives, events, products, and partnerships related to COVID-19. 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 environment and opportunities for multistakeholder cooperation in line with the goals of WSIS.
460. As the leading UN specialized agency focusing on ICTs and in collaboration with Stakeholders, ITU has been highlighting the role of ICTs (WSIS Action Lines) and their contribution to the social, economic and environmental development and the fight against COVID-19 to help build back better.
461. 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 with 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.