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Report by the Secretary-General

COMPILATION OF THE REPORTS OF THE ANNUAL ITU COUNCIL CONTRIBUTION TO THE HIGH LEVEL POLITICAL FORUMS IN 2016, 2017, 2018 AND 2019

Summary

At its 33rd meeting, the Council Working Group on WSIS&SDG (CWG-WSIS&SDG) had a discussion on ITU's four-year report to the High-Level Political Forum (HLPF) under the auspices of the United Nations General Assembly (UNGA) in September 2019. Though at present there is no procedure specified for the preparation of the four-year report, the group proposed that the secretariat, with the CWG-WSIS&SDG management team, should provide a compilation of the reports of the annual HLPFs in 2016, 2017, 2018, and 2019.

The report is to be submitted to the ITU Council Chair to follow the requests and procedure from the UNGA for the formal submission of the report.

Action required

The Council is invited to **note** this report.

References

Summary of the 33rd meeting CWGWSIS

Attachment: Compilation of the ITU Council contributions to the HLPF 2016-2019.

COMPILATION
ITU COUNCIL CONTRIBUTIONS
TO THE HIGH-LEVEL POLITICAL FORUMS

2016, 2017, 2018, 2019

ECOSOC functional commissions and other intergovernmental bodies and forums are invited to provide substantive inputs to the HLPF showcasing the intergovernmental body's contribution towards the 2030 Agenda in general, and particularly for the Sustainable Development Goals (SDGs) and respective targets that are most relevant to the intergovernmental body's mandate.

Inputs follow the template inspired by the report of the Secretary-General on global follow-up and review of the 2030 Agenda for Sustainable Development (A/70/684).

GENERAL INTRODUCTION

The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies (ICTs). ITU allocates global radio spectrum and satellite orbits, develops the technical standards that ensure networks and technologies seamlessly interconnect, and strive to improve access to ICTs to underserved communities worldwide. ITU is committed to connecting all the world's people – wherever they live and whatever their means.

Through ITU's work, we protect and support everyone's fundamental right to communicate. The Sustainable Development Goals (SDGs) and targets stimulate global action in the coming years in areas of critical importance for humanity and the planet. As acknowledged by the 2030 Agenda for Sustainable Development, "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, as does scientific and technological innovation across areas as diverse as medicine and energy".

Indeed, increased connectivity, digital technologies, information systems and Internet use have the potential to reduce poverty and create jobs through applications and services, such as e-agriculture and digital finance; help end poverty and hunger; monitor and mitigate climate change and sustaining our natural resources; as well as improved efficiency and transparency. All three pillars of sustainable development – economic development, social inclusion and environmental protection – need ICTs as key catalysts. The development potential of ICT as crosscutting enablers must therefore be fully harnessed for achieving the SDGs.

At the ITU Plenipotentiary Conference 2018 (PP-18)[1] in the United Arab Emirates (29 October to 16 November 2018) ITU members approved the Strategic plan for the Union for 2020-2023 (Resolution 71, Rev. Dubai, 2018). This Strategic Plan, covering the time-frame 2020-2023, is the first Strategic Plan fully within the time-frame of the 2030 Agenda for Sustainable Development.

The new Strategic Plan clear links to the SDGs and a vision to have an impact in achieving the SDGs. The section entitled *Linkages with the Sustainable Development Goals* highlights the most relevant SDG Goals for ITU, such as: SDG 9 (Industry, Innovation and Infrastructure) and in particular Target 9.c; SDG17 (Partnership for the Goals) as a means of implementation; SDG 4 (Quality Education including Target 4.b); and SDG 5 (Gender Equality, in particular Target 5.b). The section also addresses other SDGs where ICTs, enabled by ITU activities, will have the biggest impacts such as: SDG 11 (Sustainable Cities and Communities), SDG 12 (Ensure sustainable consumption and production patterns), SDG 10 (Reduced Inequalities), SDG 8 (Decent Work and Economic Growth), SDG 1 (No Poverty), and SDG 3 (Good-Health and Well-Being). In addition the revised Resolution 200 entitled "Connect 2030 Agenda for global telecommunication/ICT, including broadband, for sustainable development" closely aligns with the SDGs and their timeframe.

[1] ITU is governed by the Plenipotentiary Conference and the administrative Council. The Plenipotentiary Conference is the supreme organ of the Union. It is the decision making body which determines the direction of the Union and its activities.

PP-18 also re-enforced the linkages between the World Summit on the Information Society (WSIS) Action Lines and the 2030 Agenda for Sustainable Development; most notably those where ITU is the sole Action Line facilitator C2 (Information and communication infrastructure), C5 (Building confidence and security in the use of ICTs) and C6 (Enabling environment). The outcome document of the 2015 high-level meeting of the General Assembly on the overall review of the implementation of the outcomes of the World Summit on the Information Society (UNGA Resolution A/70/125), called for close alignment between the WSIS process and the 2030 Agenda.

The effective implementation of the WSIS Action Lines can help accelerate the achievement of the SDGs. To that end, the WSIS SDG Matrix[2], coordinated by ITU and developed in collaboration with the different UN Action line Facilitators, clearly shows the linkage between each Action line and the 17 SDGs. In addition, the WSIS Forum, held annually, serves as a key multi-stakeholder platform for discussing the role of ICTs as a means of implementation of the SDGs and targets, and is constantly evolving and strengthening the alignment between these and the WSIS Action Lines. The outcomes of the Forum are submitted to the HLPF[3]2. As a key partner in the WSIS process ITU also contributes to the Commission on Science and Technology for Development (CSTD), by providing a report of its WSIS implementation activities in order to populate the UN Secretary-General's annual report, and also provide inputs to be considered in the preparation of the annual ECOSOC Resolutions on the Assessment of the progress made in the implementation of and the follow-up to the outcomes of the World Summit on the Information Society, highlighting the cross-cutting role of ICTs in achieving the SDGs.

The governing bodies of the ITU Sectors have also embedded the SDGs as key goals in their activities. In this regard, 2017 marked an important milestone for the global discussion on the contribution of the ICT to the achievement of SDGs. The 7th ITU World Telecommunication Development Conference (WTDC-17), 9-20 October 2017, Buenos Aires, Argentina, was held under the overall theme of "ICT for Sustainable Development Goals" (ICT④SDGs). WTDC-17 provided a unique opportunity for the ITU Membership to discuss the future of the telecommunications and ICT sector and its contribution to the sustainable development. It also defined the contribution of ITU to the attainment of SDGs including SDGs under consideration by HLPF-19 (see below for more details) while underlining the role of WSIS framework as the foundation through which the ITU helps achieve the 2030 Agenda for Sustainable Development.

Furthermore, the 18th Global Symposium for Regulators (GSR-18), held in Geneva, Switzerland, 9-12 July 2018, under the theme of "New Regulatory Frontiers", culminated with the adoption by ICT regulators of a set of best practice guidelines on new regulatory frontiers to achieve digital transformation. ITU monitors and tracks evolution of regulatory frameworks, and publishes such results in its ICT Regulatory Tracker. ITU also monitors and quantifies the impact of broadband, digital transformation and the interplay of ICT regulation on the global economy, including digital economy and circular economy, providing evidence of the importance of the regulatory and institutional variable in driving digital growth, and illustrates that broadband technologies, on one hand, and effective ICT regulation, on the other hand, can have positive impact on the growth of national economies and prosperity.[4]

An in-depth view of the role of ICTs and ITU's contribution to all 17 goals reviewed at the High-Level Political Forum for Sustainable Development is provided in Annex 1.

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2 http://www.itu.int/net4/wsis/sdg/

3 WSIS Forum outcomes are transmitted to the HLPF annually: 2016; 2017; 2018

4 The economic contribution of broadband, digitization and ICT regulation, 2018

2016

Ensuring that no one is left behind

ITU Council Contributions to the 2030 Agenda for Sustainable Development

Submission Template

1. An assessment of the situation regarding the principle of "ensuring that no one is left behind" at the global level:

ITU regularly monitors the digital divide each year, including the gender digital divide (see below), to assess and track who has access to Information and Communication Technologies (ICTs) and telecommunication networks, and where, with a view to "connecting the world", the mission statement of ITU.

2. The identification of gaps, areas requiring urgent attention, risks and challenges:

In adopting the Connect 2020 Agenda, at the ITU 2014 Plenipotentiary Conference, ITU Member States committed themselves to the shared vision of "an information society, empowered by the interconnected world, where telecommunications/ICTs enable and accelerate social, economic and environmentally sustainable growth and development for everyone". The latest edition of the Measuring the Information Society Report, published in December 2015, features key ICT data and benchmarking tools to measure the information society, including the ICT Development Index (IDI), and also includes an analysis of various aspects of the Connect 2020 goals and targets.

Access and use of Information and Communication Technologies

Currently available data show a figure for household Internet access of 43.9 per cent in 2014, rising to an estimated 46.4 per cent in 2015.

Data illustrating the development of Internet usage show a figure of 40.6 per cent in 2014, rising to an estimated 43.4 per cent in 2015. The increasing deployment of wireless-broadband networks in rural areas of developing countries and the displacement of feature phones by smartphones are expected to accelerate the pace of growth in developing countries.

The Combined Annual Growth Rate (CAGR) for household Internet access in developing countries, for the period 2005-2015, was 15.4 per cent between 2005 and 2015, and 15.7 per cent in the five years from 2010 to 2015. By the end of 2015, an estimated 34.1% of households in the developing world had access to the Internet.

The CAGR for household Internet access in LDCs was 33.9 per cent between 2005 and 2015, and 25.6 per cent in the five years between 2010 and 2015, much higher than for developing countries in general. Despite the high growth rates, LDCs are starting from a much lower baseline and therefore the progress in absolute terms is smaller – with an estimated 6.7% of LDC households having access to the Internet at the end of 2015.

The CAGR in Internet usage in developing countries for the period 2005-2015 was 16.4 per cent for developing countries, with an estimated 35.3% of the population in developing countries being online at the end of 2015. For LDCs, the CAGR in Internet usage was 28.4 per cent between 2005 and 2015, with an estimated 9.5% of the population in LDCs being online at the end of 2015.

Affordability of ICTs

Looking at the evolution of the global level for the fixed-telephone, mobile-cellular and fixed-broadband prices, there was a marked drop in fixed-broadband prices over the period 2008-2012, while price reductions in fixed-broadband services saw a slowdown between 2012 and 2014, despite the fact that average fixed-broadband prices are still relatively unaffordable in several developing countries. Fixed-telephone and mobile-cellular service prices also fell during the period 2008-2014, albeit at slower rates than fixed broadband given the initial lower levels of fixed-telephone and mobile-cellular prices.

Data concerning mobile-broadband prices for 2013 and 2014 show that there was a decrease in all four of the sub-categories used to assess mobile-broadband prices. Prices in all four cases remain substantially lower, in relation to monthly GNI p.c., in developed than in developing countries, but have fallen most markedly in LDCs.

The cost of a mobile-cellular service corresponded on average to 5.0 per cent of GNI p.c. in 2012, and fell to 4.4 per cent of GNI p.c. in 2014. Considering that by 2020 the cost of the service should, according to the Connect 2020 target, correspond to 3.0 per cent of GNI p.c., this means that 29 per cent of the price reduction required to meet the target has already been achieved in the period 2012-2014. The progress made towards achieving the target is somewhat lower for the fixed services: 26 per cent for fixed broadband and 21 per cent for fixed telephony. Significant progress has already been achieved in terms of improving the affordability of these three services, but sustained regulatory and policy attention will be required in the coming years to keep prices on track to meet the target. Concerning mobile broadband, the decrease in prices recorded is remarkable.

The difference in the affordability of fixed and mobile-cellular services between developed and developing countries fell steadily and significantly during the period 2008-2012, followed by a slowdown in the period 2012-2014, and even an increase in the case of fixed broadband in 2014. On the other hand, the difference in the affordability of mobile broadband between developed and developing countries narrowed from 2013 to 2014.

The gender digital divide

The gender digital divide was estimated in developed and developing countries in 2013 and 2015. These data, suggest that the Internet user penetration rate has been around 11 per cent lower for females than for males in both years. The gap between the two rates is lowest in developed countries (at 5.4 per cent in 2015), significantly higher in developing countries (15.4 per cent in both years), and highest in LDCs (28.9 per cent in 2015). The data suggest that the gap has narrowed in developed countries between 2013 and 2015, while remaining stable in developing countries and LDCs. Only one region, the Americas, displays an Internet user penetration rate that is higher for females than for males.

ICT accessibility for persons with disabilities

The World Report on Disability, jointly published by the World Health Organization and the World Bank in June 2011, estimates that around 15 percent of the world population or more than one billion people live with some form of disability, the majority of whom are in lower-income countries or lower-income segments of their societies.

The importance of accessibility was recognized when United Nations Member States adopted in 2006 the *United Nations Convention for the Rights of Persons with Disabilities* (UNCRPD). The UNCRPD takes the view that persons with disabilities are “subjects” with rights, capable of claiming those rights and

making decisions for their lives based on their free and informed consent as well as being active members of society. Especially, §§ (2)(g) and (2)(h) of Article 9 of UNCRDP requires that States Parties take appropriate measures:

i) 9(2)(g) "to promote access for persons with disabilities to new information and communications technologies and systems, including the Internet";

ii) 9(2)(h) "to promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost",

§ 18 of the Tunis Commitment, made at the second phase of the World Summit on the Information Society (Tunis, 2005): "We shall strive unremittingly, therefore, to promote universal, ubiquitous, equitable and affordable access to ICTs, including universal design and assistive technologies, for all people, especially those with disabilities, everywhere, to ensure that the benefits are more evenly distributed between and within societies, …"[5];

Cybersecurity and national strategies

Modern societies have a growing dependency on information and communication technologies that are globally interconnected. However, this interconnectivity also creates interdependencies and risks that need to be managed at the national, regional and international levels. Enhancing cybersecurity and protecting critical information infrastructures is essential to each nation's security and economic well-being.

At the national level, this is a shared responsibility requiring coordinated action related to the prevention, preparation, response, and recovery from incidents on the part of government authorities, the private sector and civil society. The formulation and implementation of a national framework for cybersecurity requires a comprehensive approach. This framework often receives a label of a National Cybersecurity Strategy (NCS).

National Cybersecurity Strategies, however, do not always take the form of a single, aptly titled, document; certain states chose a fragmented approach and decided to address different cybersecurity areas via multiple different instruments. Together, they form a National Cybersecurity Strategy. At the same time, strategies may receive a designation other than a National Cybersecurity Strategy. Documents titled, for example, National ICT Strategy or National Cybersecurity Masterplan should not be disregarded. What is more, certain states have multiple strategies.

ICT Applications

ICT applications, such as e-Government, e-Commerce, e-Education, e-Health and e-Environment, are seen as enablers for sustainable development, as they provide an efficient channel to deliver a wide range of basic services in remote and rural areas. ICT applications can facilitate the achievement of millennium development targets, reducing poverty and improving health and environmental conditions in developing countries. Given the right approach, context and implementation processes, investments in ICT applications and tools can result in productivity and quality improvements. In turn, e-applications may liberate technical and human capacity and enable greater access to basic services.

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[5] Geneva Declaration of Principles §§ 13 and 30; Geneva Plan of Action §§ 9 (e) and (f), 12 and 23; Tunis Commitment §§ 18 and 20; Tunis Agenda for the Information Society §§ 90 (c) and (e).

Climate change

Information and Communication Technologies (ICTs), such as satellites, mobile phones or the Internet, play a key role in addressing the major challenges related with climate change and sustainable development. ICTs are fundamental for monitoring climate change, mitigating and adapting to its effects and assisting in the transition towards a green economy. By raising awareness of the role of ICTs, ITU is promoting transformative solutions that can ensure a sustainable future for all. Explore the links below to find more about ITU's vision and mission in the area of environmental sustainability and climate change.

3. Valuable lessons learned on ensuring that no one is left behind:

"Ensuring that no one is left behind" has a very specific meaning in telecommunications – that of ***universal access and service (UAS***). A large number of countries have instituted legislation defining and protecting universal service, through: telecom regulatory frameworks; National Broadband Plans; legal rights for citizens; Universal Service Obligation Funds (USOFs); and/or some other combination.

Many National Broadband Plans focus on the expansion of broadband networks, raise common concerns regarding universal service, including: the inclusion of broadband service in the scope of universal service; the role of mobile communications in universal service; and funding universal service obligations. According to ITU data, some twenty countries have also made broadband and/or Internet access a right – either as a basic legal right, citizen's right or constitutional right (all of which carry different connotations, according to the legal framework in the country of origin). These include Costa Rica (2010), Estonia (2000), Finland (2010), France (2009), Greece, Spain and Switzerland.

In telecommunications, the marginal costs of connecting the very last subscribers to be connected escalate quickly, as these include people living in remote and hard-to-reach areas. The key to unlocking universal service is solid consideration of how to fund the last 5-10% of subscribers, and who should bear this financial burden.

According to ITU research, different regions have adopted different approaches to extending universal access. Europe has a marked preference for National Broadband Plans. Africa is also well-endowed with NBPs from fairly early on in the first decade of the new millennium, partly because ICTs have been included in a number of IMF/World Bank Poverty Reduction Strategy Papers (PRSPs). The region with the fewest National Broadband Plans is the Arab States, which have generally revised their existing Universal Service Obligations (USOs) to include broadband. The Americas and Asia-Pacific are the regions most likely to make use of a Plan in combination with a UAS definition.

USOFs can also play a role in extending access, usually overseen by Ministries or regulators. These are typically funded through a levy on operator revenues and may finance projects in certain areas (e.g., accessibility for persons with disabilities) and/or technologies in accordance with appropriate policies and/or regulatory frameworks. Many modern USOFs recognize the important role of competition and no longer assume that the fixed line incumbent is the sole (or even necessarily a) universal service provider (USP), and have typically broadened their scope to enable the Fund to take a converged approach to providing telecommunication services (e.g. India, Chile, Brazil, and the U.S.). However, there are some evidences to suggest that, in many countries, USOFs have made only limited disbursements. UAS programmes may also include demand-side initiatives.

Maximizing the accessibility and usability of telecommunication/ICT services, products and terminals through universal design will increase their uptake by persons with disabilities and older persons, and thereby increase revenues. For example, it is estimated that ensuring full compliance with accessibility standards in new public buildings adds generally very limited extra costs, which are much less than

adapting existing buildings later on. It is also recognized that standards for everyday products and services cannot meet all needs, and that additional standardization for assistive products and assistive technologies may be necessary to meet certain requirements. Realizing that standardization can impact the design of products, services and environments and can therefore play an important role, ITU has been encouraging together with ISO and IEC to mainstream 'universal design principle' in their standardization.

Supporting Member States in addressing special needs of indigenous people as regards to equitable access, use and knowledge of information communication technology (ICT's), based on the preservation of their heritage and cultural legacy contributes to leverage their social and economic community development and to promote, preserve and protect their indigenous culture development. ICT is an essential tool for the social and economic development of women and girls. Technology can also be used to provide education as well as jobs, literacy and life skills training.

Youth and children with access to information and communication technologies (ICTs) are coming of age as digital natives, the early adopters of ICTs and better positioned than their parents to harness the power of digital technologies in new and imaginative ways. Youth can only leverage the transformative power of ICTs when they have access to ICT services and are equipped with a range of digital skills. ICTs can enhance education, reduce youth unemployment and promote social and economic development.

Member states, policy makers, regulators and service providers have an important role to play to ensure that ICTs in their countries are accessible for persons with disabilities and to eliminate ICT accessibility barriers.

Capacity building also refers to strengthening the human and institutional capacity of developing countries to adapt to an evolving ICT and telecommunication sector. Building broad telecommunication/ICT literacy enables citizens to access and contribute information, ideas and knowledge in order to create an inclusive and sustainable information society.

4. Emerging issues likely to affect the realization of this principle:

The growing cost of providing even basic telecommunication services means that universal service has become even more expensive to achieve. A recent ITU/UN Broadband Commission study estimated the cost of connecting the next 1.5 billion people with Internet access at around US$ 450 billion. The cost of connecting the total remaining 4.2 billion people without Internet access could be several multiples of this.

Soft measures encouraging the private sector to make ICTs accessible are not going to achieve all the expected results; mandatory legislations are also required. Policies that require government agencies to procure accessible ICTs are a proven force in ensuring that accessible ICTs are readily available in the countries that have such policies. Effective policies require a related standard to be used by procurers, manufacturers and service providers.

One of the key challenge is to contribute to enable developing countries to achieve smooth migration from analogue to digital broadcasting including terrestrial TV, mobile TV and sound broadcasting, and follow with the countries the post-transition activities like e.g. introducing new broadcasting services, allocation of the digital dividend. One particular aspect is to provide assistance on policy and regulatory frameworks for digital broadcasting and organising regional meetings for member states on the use of spectrum for broadcasting or other services.

5. Areas where political guidance by the High-level Political Forum on Sustainable Development is required:

The High-level Political Forum may wish to consider addressing the following key measures as a means of promoting access and use of ICTs, and in particular broadband, as a foundation for sustainable development:

1. Review and update ICT regulatory frameworks, including regulatory approaches to spectrum, and reducing differences in regulatory environments to create level playing-field to encourage innovation and reduce barriers to trade and competition;
2. Make Full Use of Universal Service Obligations Funds (USOFs);
3. Consider infrastructure-sharing and open access approaches to publicly funded infrastructure;
4. Consider measures to make broadband more affordable, including implementing international standards;
5. Reduce taxes and import duties on telecommunication/ICT equipment and services;
6. Promote investments in broadband infrastructure and applications in ecosystem;
7. Promote trainings and measures to stimulate demand;
8. Invest in the creation of local content in local languages;
9. Facilitate innovation in ecosystem for inclusive and sustainable development; and
10. Engage in Ongoing Monitoring of ICT Developments.

6. Policy recommendations on ways to accelerate progress for those at risk of being left behind:

A range of policy options are available to maximize access to broadband, and to capitalize on its benefits. These policy options can broadly be divided into both supply and demand sides' measures, although some policy measures can promote both – for example, the adoption of a National Broadband Plan promoting development of content and human capacities; monitoring; and tax reductions to reduce overall tariffs and promote affordability.

Examples of supply-side measures include:

- Promote co-deployment and infrastructure-sharing of telecommunication infrastructure and co-investment to reduce prices;
- Foster co-deployment with access to non-telecommunication infrastructure (addressing key obstacles, such as limits on access and rights of way);
- Ensure sufficient availability of quality spectrum to deploy mobile broadband networks (e.g. via spectrum assignment and trading);
- Focus on expanding network coverage (e.g. via coverage obligations included in the licenses);
- Develop effective international technical standards to achieve economies of scale and enhance quality of services;
- Promote effective and functional wholesale and retail markets to lower prices.

Various policy measures exist on the demand side:

- Ensure the availability and affordability of broadband-enabled devices and services for poor or at-risk households and other vulnerable groups;
- Enable the development of local and relevant broadband applications and content including in multiple languages;

- Improve broadband availability mapping to increase consumer awareness about choice of services and service providers;
- Enhance transparency and control of market information to inform consumers about market prices and their rights to enable them to make informed decisions;
- Undertake communication campaigns to increase trust and security;
- Engage in ICT literacy campaigns and digital skills courses to boost user capacities, awareness and interest.
- Promote effective ICT skills through training and education at all levels, formal and informal, with a special focus on girls and women.

To promote ICT accessibility for persons with disabilities, countries should put in place mandatory ICT accessible procurement policies and standards with an enforcement mechanism. This should be accompanied by raising awareness, providing technical assistances to users, building capacity of public procurers and including ICT accessibility as a competition criteria in procurement processes so that products are not evaluated only on price. It is also important to include ICT accessibility requirements in foreign development aid and to have accessibility standards linked to the provision of development aid and international cooperation. Harmonized international standards will ensure that ICTs will be accessible by default, lead to lower prices and innovative solutions. They could also consider the following specific policy measures:

1 develop, within their national legal frameworks, guidelines or other mechanisms to enhance the accessibility, compatibility and usability of telecommunication/ICT services, products and terminals;

2 encourage to develop national policies and regulatory frameworks for utilizing the USOFs to enhance the accessibility of telecommunication/ICT services and products;

3 introduce telecommunication relay services to enable persons with hearing and speech disabilities to utilize telecommunication services that are functionally equivalent to telecommunication services for persons without disabilities;

4 implement international standards on ICT accessibility and support self-representation by persons with disabilities in international standardization process so as to ensure their experiences, views and opinions are taken into account;

5 encourage the provision of differentiated and affordable service plans for persons with disabilities in order to increase the accessibility and usability of telecommunications/ICT for these persons;

6 encourage the development of applications for telecommunication products and terminals to increase the accessibility and usability of telecommunications/ICT for persons with visual, auditory, verbal and other physical and mental disabilities.

2017

Eradicating poverty and promoting prosperity in a changing world

ITU Council Contribution to the High-Level Political Forum on Sustainable Development (HLPF)

Submission Template

(a) An assessment of the situation regarding the principle of "ensuring that no one is left behind" at the global level:

"Ensuring that no one is left behind" has a specific meaning in telecommunications – that of *universal access and service (UAS*) and leaving no one off-line.

Access to affordable, reliable and secure telecommunication/ICT networks, including broadband, and to related services and applications, can facilitate economic, social and cultural development and implement digital inclusion through these means.

In pursuance of its mission, ITU annually monitors the digital divide, including the gender digital divide (see below), to assess and track who has access to ICTs and telecommunication networks, and where.

Over the last ten years, the mobile sector has continued to grow dynamically, with mobile-cellular penetration increasing from 41.7 per cent in 2006 to almost 100 per cent by the end of 2016. Mobile-broadband subscriptions grew more rapidly than fixed-broadband subscriptions, in the last six years, fixed-broadband penetration increased from 7.6 to almost 12.0 per cent, while mobile-broadband penetration saw a four-fold increase to reach an estimated 49.4 per 100 inhabitants. This indicates that the spread of Internet access has been largely driven by mobile technologies. Around 84 per cent and 53 per cent of the population are now within reach of a 3G and LTE mobile-broadband signal, respectively.

However, a continued and significant divide exists between regions, between developed and developing countries, between the majority of developing countries and LDCs, and within countries, including between rich and poor, rural and urban, young and old, and men and women. While penetration rates for mobile-cellular subscriptions are now high in all regions, and exceed 100 subscriptions per 100 inhabitants in most of them, they are still significantly lower in the Asia-Pacific and Africa regions.

The increasing deployment of wireless-broadband networks in rural areas of developing countries and the replacement of feature phones by smartphones are expected to accelerate the pace of growth and connectivity in developing countries.

Despite the high growth rates, LDCs are starting from a much lower baseline and therefore the progress in absolute terms is smaller – with an estimated 11.1 per cent of households having access to the Internet at the end of 2016 underscoring the importance of SDG9.c which aims, in line with ITU's Connect 2020 Agenda, for significant progress in the number of people connected in LDCs by 2020.

(b) The identification of gaps, areas requiring urgent attention, risks and challenges:

Access and use of Information and Communication Technologies

The spread of 3G and 4G networks across the world has brought the Internet to more and more people. In 2016, mobile-broadband networks covered 84 per cent of the world's population, yet with 47.1 per cent Internet user penetration, the number of Internet users remains well below the number of people with network access. While infrastructure deployment is crucial, high prices, poor quality of service and other barriers are serious obstacles to getting more people to enter the digital world. Affordability is the main barrier to mobile uptake. The mobile device is the main cost barrier along with, to a lesser extent, credit recharge.

Affordability of ICTs

Looking at the evolution of mobile-cellular and fixed-broadband prices at the global level, there was a significant drop in fixed-broadband prices over the period 2008-2015, despite the fact that average fixed-broadband prices are still relatively unaffordable in a number of LDCs.

Mobile-cellular prices continued to fall in 2015, and more steeply than in previous years. For the first time, the average cost of the mobile-cellular basket (which includes 100 SMS and 30 mobile calls per month) in developing countries accounted for less than 5 per cent of GNI per capita. Least developed countries (LDCs) saw a 20 per cent drop in mobile-cellular prices, the strongest decrease in five years.

The gender digital divide

The gender digital divide has been tracked by ITU in developed and developing countries in 2013 and again in 2016. In 2016, female Internet user penetration is 12.2 percent lower than males. The gap is lowest in developed countries (at 2.8 per cent in 2016), significantly higher in developing countries (16.8 per cent in 2016), and highest in LDCs (30.9 per cent in 2016).

Significantly, the global gender digital divide has actually widened by 1.2 per cent since 2013, equivalent to a total gap of some 257 million more men online than women and a significant gap in terms of female empowerment, and everything we know about the correlation between better maternal education and improved education rates and school completion rates for the children in families with better educated mothers.

Cybersecurity

With ICTs increasingly underpinning a broad range of human activities, modern societies have developed a growing dependency on ICTs in their daily operations and management of critical infrastructure. However, this creates risks that need to be addressed at all levels – national, regional and international in collaboration with all stakeholders.

Without ensuring confidence and security in the use of ICTs, the lack of trust can hinder the adoption of ICTs and minimize their positive impact in countries' development process.

This is especially important to protect the vulnerable, especially children as one out of three internet users is below the age of 18. As the sole facilitator of WSIS Action Line C5 "Building Confidence and Security of ICTs", ITU is playing an important global effort to protect children online including through the multistakeholder Child Online Protection (COP) Initiative. The partnership brings together partners from all sectors of the global community to create a safe and empowering online experience for children around the world.

(c) Valuable lessons learned on eradicating poverty and promoting prosperity:

The growth of Internet and broadband technologies highlights the link between ICTs and economic growth and social opportunity and brings into focus the increased importance of universal access to ICTs to achieve the SDGs.

Today, more than 40 countries include broadband in their universal service or universal access definitions, although there are regional differences. In telecommunications, the marginal costs of connecting the last subscribers to be connected escalate quickly, as these include people living in remote and hard-to-reach areas. The key to unlocking UAS lies in innovative investment and partnership solutions to connect the last 5-10% of subscribers.

Affordable access and availability of communications services requires an interplay between interdependent elements, including cross-sectoral collaboration focusing on supply as well as demand-side measures. According to ITU data, 75 percent of ITU Member States have some kind of UAS policy and regulations in place through: telecom policy and regulatory frameworks; National Broadband Plans; legal rights for citizens; Universal Service Obligations, Universal Access and Service Funds (USFs) or other forms of universal service financing mechanisms (PPPs, etc.); and/or some other combination.

In addition, there are far fewer women than men who study science, technology, engineering and math (STEM) or who work in jobs requiring ICT skills such as computer scientists, computer engineers and software, website and mobile apps developers. Given the global shortage for people with STEM skills, there are unfilled jobs that could be performed by qualified women, but young women and girls are often discouraged from entering these fields. Moreover, given the importance that ICTs play in our daily lives, it is necessary that ICTs be developed by both women and men to address their daily challenges.

Youth and children with access to information and communication technologies (ICTs) are coming of age as digital natives, the early adopters of ICTs and better positioned than their parents to harness the power of digital technologies in new and imaginative ways. Youth can only leverage the transformative power of ICTs when they have access to ICT services and are equipped with a range of digital skills. ICTs can enhance education, reduce youth unemployment and promote social and economic development.

The importance of ICT accessibility to persons with disabilities, as recognized by Article 9 of the United Nations Convention for the Rights of Persons with Disabilities (UNCRPD) and Art. 18 of the Tunis Commitment, under the auspices of the World Summit on the Information Society (2005) which strives "to promote universal, ubiquitous, equitable and affordable access to ICTs, including universal design and assistive technologies, for all people, especially those with disabilities, everywhere, to ensure that the benefits are more evenly distributed between and within societies." Countries that have adopted ICT accessibility policies and which use government purchasing power by requiring accessible ICTs in their calls for tender have shown the greatest progress in ensuring that accessible ICTs are available for persons with disabilities to ensure that persons with disabilities can live independently and participate fully in all aspects of life.

Supporting Member States in addressing special needs of indigenous people to equitable access, use and knowledge of ICTs, based on the preservation of their heritage and cultural legacy contributes to leverage their social and economic community development and to promote, preserve and protect their indigenous cultural development.

Capacity building also refers to strengthening the human and institutional capacity of developing countries to adapt to an evolving ICT and telecommunication sector. Building broad telecommunication/ICT and digital literacy enables citizens to access and contribute information, ideas and knowledge to create an inclusive and sustainable information society.

(d) Emerging issues likely to affect the realization of poverty eradication and achieving prosperity:

Digital Financial Services

In recent years, ICT has been instrumental to developing new and more affordable digital financial products that better respond to the needs of unbanked people in the world today, most notably rural and remote communities. Significant challenges remain to quickly and effectively leverage ICT to drive full financial inclusion. The full potential of mobile money has not yet been realised, with two billion people in developing countries still lacking a viable alternative to the cash economy and informal financial services, 1.6 billion of whom have access to a mobile phone. Yet, the industry has found it challenging to scale services for the unbanked mostly due to regulatory frameworks being out of step.

Artificial intelligence (AI)

Artificial Intelligence (AI) is growing rapidly with the potential to become truly scalable and capable of solving some of the most pressing challenges to our societies and economies. While it may soon impact hundreds of millions of lives, discussions around the role of AI in society has traditionally been the realm of scientists and futurists. A wide range of voices from Silicon Valley to the European Parliament have been calling for an open debate on AI among governments, industry and civil society. We need a multi-stakeholder approach in designing AI based systems as not only would this help ensure the responsible and beneficial development of AI by allowing additional cross-checks, it would also contribute to dispelling misconceptions and fears surrounding AI. AI can only meet its full potential if its benefits are accessible to people from all socio-economic backgrounds, including disadvantaged communities. Developing countries play a fundamental role in the advancement of AI, both as a source of innovation and as beneficiaries of creative solutions capable of alleviating their most pressing global challenges such as hunger and poverty.

The Internet of Things (IoTs)

The Internet of Things (IoTs) provides both opportunities and challenges to fulfil the expectations of the new global development agenda. IoTs are a core set of emerging technologies which have great potential to improve connectivity by connecting smart devices, applications, services, and even people over the Internet network. IoTs are increasingly common to build sustainable and smart cities in developed world: not just as connected smart phones or tablets, but also as extended to a wide range of multiple machines and services, including vehicles, household applications, wearable devices, health-care monitors, energy consumption meters, or security systems. IoTs can also greatly benefit populations in regions in developing countries: specifically impactful applications of IoTs could facilitate - IoT applications in agricultural fields can check soil conditions, connected thermometers can monitor vaccine delivery and storage in real-time, smart sensors can measure a level of pollution in the air or water, and other smart devices can also provide remote diagnosis of diseases, are as just few examples. The deployment of IoT is expected to connect an estimated 50 billion devices to the network by year 2020. For the effective deployment of IoT, standards are required to enable interoperability of IoT applications and datasets employed by various vertically oriented industry sectors IoT systems.

(f) Policy recommendations on ways to accelerate progress in poverty eradication:

ICT regulators and policy makers as well as industry and the wider community of stakeholders recognize that ICTs play a crucial role in the achievement of the SDGs, and that issues such as affordability and availability, including with regard to creating incentives for innovation and entrepreneurship, must be addressed at the policy level in both a comprehensive and integrated manner. The issues are complex and multi-faceted, but what is clear is that there is an interdependence of targets and goals and that ICTs have a pivotal role to play to achieve the SDGs.

The ITU 2013 GSR Best Practice Guidelines recognized that governments should work collaboratively with all stakeholders and in particular with the industry and regulators to facilitate and support the development of infrastructure and provision of services, particularly in rural, un-served and underserved areas.

A range of policy options are available to maximize access to ICTs, and to capitalize on its benefits. These policy options can broadly be divided into both supply and demand sides' measures, although some policy measures can promote both – for example, the adoption of a National Broadband Plan promoting development of content and human capacities; monitoring; and tax reductions to reduce overall tariffs and promote affordability. From the supply side, predictable and stable regulations are needed to maintain effective competition, stimulate investment in ICT infrastructure such as broadband designed with high-speed backhaul, and drive the development of innovative services; the availability of relevant digital content, including in local languages.

In particular, regulators are encouraged to modernize Universal Service programs to extend broadband to the un-served and underserved, notably through a redefinition of the scope of universal service. From the demand side, measures such as deferring or altogether discouraging heavy or special taxes on ICT equipment and services, encouraging research and development, promote cybersecurity and privacy and endorsing special programs to stimulate e-literacy, will result in higher penetration, increased demand, better social inclusion and contribute to national economic growth.

Governments and regulators have a key role to play in promoting and increasing awareness of the use and benefits of ICTs[6]. Focus on STEM skills development such as coding skills where jobs are currently going unfilled due to a lack of qualified workers. Also, for example, to promote ICT accessibility for persons with disabilities, countries should put in place mandatory ICT accessible procurement policies and standards with an enforcement mechanism.

ITU activities across all three sectors of – radiocommunications, standardization and development – can contribute to the achievement of the SDGs, linking these activities closely to the ITU's Strategic Plan; Connect 2020 Agenda, and the WSIS Action Lines, by:

- Providing the necessary spectrum allocations, especially for future mobile services;
- Providing the technical standards for networks and applications;
- Providing the necessary policy and regulatory environment – An enabling environment that facilitates and promotes innovation.

6 http://www.itu.int/en/ITU-D/Regulatory-Market/Documents/GSRBestPracticeGuidelines_2013.pdf

2018

Transformation towards sustainable and resilient societies

ITU Council Contribution to the High-Level Political Forum on Sustainable Development (HLPF)

Submission Template

(A) AN ASSESSMENT OF THE SITUATION REGARDING THE PRINCIPLE OF "ENSURING THAT NO ONE IS LEFT BEHIND" AT THE GLOBAL LEVEL:

"Ensuring that no one is left behind" has a specific meaning in telecommunications – that of *universal access and service (UAS*) and leaving no one off-line.

Access to affordable, reliable and secure telecommunication/ICT networks, including broadband, and to related services and applications, can facilitate economic, social and cultural development and implement digital inclusion through these means.

In pursuance of its mission, ITU annually monitors the digital divide, including the gender digital divide (see below), to assess and track who has access to ICTs and telecommunication networks, and where.

The latest data on ICT development from ITU show continued progress in connectivity and use of ICTs. There has been sustained growth in the availability of communications in the past decade, led by growth in mobile cellular telephony and, more recently, in mobile broadband. Growth in fixed and mobile-broadband infrastructure has stimulated Internet access and use. Mobile-cellular networks are increasingly pervasive and now dominate the provision of basic telecommunication services.

The number of mobile-cellular subscriptions worldwide now exceeds the global population, although many individuals, especially in developing countries, still do not use a mobile phone.

The number of fixed-telephone subscriptions has continued to fall, dropping below 1 billion worldwide, and is particularly low in the least developed countries (LDCs).

There has been rapid growth in mobile-broadband services. The number of mobile-broadband subscriptions worldwide now exceeds 50 per 100 inhabitants, enabling improved access to the Internet and online services. The introduction of new mobile technologies is accelerating this trend, with LTE or higher capabilities now available to most mobile users.

There has been slower growth in the number of fixed-broadband subscriptions worldwide, although this now marginally exceeds that for fixed telephone lines.

There are substantial digital divides between countries and regions, and between developed and developing countries, particularly LDCs. There are twice as many mobile-broadband subscriptions per 100 inhabitants in developed countries compared to developing countries, while the gap between more-connected developing countries and LDCs has grown in recent years. Mobile-broadband subscription rates are much higher in Europe and the Americas than in other regions, and more than three times those in Africa. Subscribers in developed countries also tend to benefit from higher bandwidth than those in developing countries. These divides are evident in Internet use as well as connectivity.

More than half of all households worldwide now have access to the Internet, although the rate of growth appears to have fallen below 5 per cent a year. Households in developed countries are almost twice as likely to be online as those in developing countries and more than five times as likely as those in LDCs. There are similar differences between rates of access for individual users. People in Europe are more than three times more likely to access the Internet regularly than those in Africa, and are likely to benefit from higher access speeds when doing so.

There is a significant gender digital divide. Data compiled by ITU suggest that this digital gender gap is relatively small in developed countries, more pronounced in developing countries and substantial in LDCs, where only one in seven women is using the Internet compared with one in five men. The gender digital divide in Africa appears to have grown significantly over the past five years.

Young people are more likely to be online than their elders. The proportion of people aged between 15 and 24 who are online is estimated to be over 70 per cent worldwide, compared with just 48 per cent of the population overall. Elderly people are less likely to be connected.

International Internet bandwidth grew worldwide by 32% between 2015 and 2016. Africa experienced an increase of 72% during this period, the highest of all regions.

Strategies for ensuring that all citizens, wherever they may be, have access to the best possible infrastructure and services is an important public policy priority that will also assist in reaching the SDGs. Regulation has a pivotal role to play to help today's fast-evolving markets thrive while shaping future markets for digital services that are innovative, balanced and inclusive. More inclusive, incentive-based and collaboration-driven regulation will not only benefit consumers and businesses, but will help fast-track a digital future for the billions who remain unconnected.

(B) THE IDENTIFICATION OF GAPS, AREAS REQUIRING URGENT ATTENTION, RISKS AND CHALLENGES:

Access and use of Information and Communication Technologies

The global number of fixed-broadband subscriptions has increased by 9% annually in the last five years and 330 million new fixed-broadband subscriptions have been added. Higher growth will be needed to bridge the divide between developed and developing countries: there are 31 fixed broadband subscriptions per 100 inhabitants in developed countries against 9 in developing countries. Fixed-broadband uptake remains very limited in LDCs, with only one subscription per 100 inhabitants.

Mobile-broadband subscriptions have grown more than 20% annually in the last five years and are expected to reach 4.3 billion globally by end 2017. Despite the high growth rates in developing countries and in LDCs, there are twice as many mobile-broadband subscriptions per 100 inhabitants in developed countries as in developing countries, and four times as many in developed countries as in LDCs.

In developed countries, the proportion of households with Internet access at home is twice as high as in developing countries. Only 15% of households in LDCs have Internet access at home. In these countries, many Internet users are accessing the Internet from work, schools and universities or from other shared public connections outside the home.

Rural divide

Digital divides are also evident within countries, for example between urban and rural areas. There are still rural areas in some developing countries which are not adequately covered by either wireline or mobile-cellular signal and therefore with limited or no access to the Internet. Lower incomes which prevail in rural areas of some countries are also likely to reduce take-up and usage of ICTs. The business case is challenging for coverage of rural areas where too often, topography and demography defeat market viability.

The transition from 2G to 3G mobile services in some countries, as well as the transition from 3G to LTE or LTE-Advanced services in some other countries, is providing a window of opportunity for policy-makers to

shake up the mobile market. Coverage obligations attached to the new licences have proved to be an efficient way to extend 3G and LTE network coverage to rural areas, particularly in those countries where market forces by themselves had not previously reached universal mobile-broadband coverage.

New technologies and innovative approaches to covering rural areas will also hopefully be coming in the next few years, and will play a key role in opening new opportunities for people living in rural areas and sparsely populated areas. Recent technological advances and solutions within satellite and high altitude communications, such as high-throughput satellites (HTS), massive non-geostationary satellite orbit (NGSO) constellations, high-altitude platform stations (HAPS) systems, and networks of satellites in low-Earth orbit are starting to offer broadband capacity across the globe, bringing reliable connectivity to the hardest-to-reach corners of the planet. Their ubiquitous coverage, high reliability, high mobility, and high flexibility make space-based and upper-atmosphere technologies driving solutions for expanding the reach of the global Internet to remote, sparsely populated and rural areas.

Youth

In 104 countries, more than 80% of the youth population are online. In developed countries, 94% of young people aged 15-24 use the Internet compared with 67% in developing countries and only 30% in Least Developed Countries (LDCs). Out of the 830 million young people who are online, 320 million (39%) are in China and India. Nearly 9 out of 10 young individuals not using the Internet live in Africa or Asia and the Pacific. The proportion of young people aged 15-24 using the Internet (71%) is significantly higher than the proportion of the total population using the Internet (48%). Young people represent almost one-fourth of the total number of individuals using the Internet worldwide. In LDCs, 35% of the individuals using the Internet are young people aged 15-24, compared with 13% in developed countries and 23% globally.

Gender divide

The proportion of women using the Internet is 12% lower than the proportion of men using the Internet worldwide. While the gender gap has narrowed in most regions since 2013, it has widened in Africa. In Africa, the proportion of women using the Internet is 25% lower than the proportion of men using the Internet. In LDCs, only one out of seven women is using the Internet compared with one out of five men.

There is a strong link between gender parity in the enrollment ratio in tertiary education and gender parity in Internet use. The only region where a higher percentage of women than men are using the Internet is the Americas, where countries also score highly on gender parity in tertiary education.

Affordability of ICTs

Mobile-broadband prices as a percentage of GNI per capita halved between 2013 and 2016 worldwide. The steepest decrease occurred in LDCs, where prices fell from 32.4 to 14.1% of GNI p.c. Mobile broadband is more affordable than fixed-broadband services in most developing countries. However, mobile broadband prices represent more than 5% of GNI per capita in most LDCs and are therefore unaffordable for the large majority of the population. In LDCs, on average, an entry-level fixed-broadband subscription is 2.6 times more expensive than an entry-level mobile-broadband subscription.

High-speed fixed broadband

Despite the worldwide increase in high-speed fixed-broadband subscriptions, there remains a lack of high-speed connections in the developing world, with a penetration rate of 6% (1.6% excluding China) compared with 24% in developed countries. Most of the increase in high-speed fixed-broadband subscriptions in developing countries can be attributed to China, which accounts for 80% of all fixed-broadband subscriptions at 10 Mbit/s or above in developing countries.

Developing countries and LDCs are deploying fibre infrastructure directly, leapfrogging cable and DSL. However, the proportion of fibre broadband subscriptions per 100 inhabitants in developed countries is twice

as high as in developing countries, and ten times higher than in LDCs. The share of fibre in total fixed-broadband subscriptions is highest in the CIS and Asia and the Pacific.

Cybersecurity

With ICTs increasingly underpinning a broad range of human activities, modern societies have developed a growing dependency on ICTs in their daily operations and management of critical infrastructure. However, this creates risks that need to be addressed at all levels – national, regional and international in collaboration with all stakeholders.

Without ensuring confidence and security in the use of ICTs, the lack of trust can hinder the adoption of ICTs and minimize their positive impact in countries' development process.

This is especially important to protect the vulnerable, especially children as one out of three internet users is below the age of 18. As the sole facilitator of WSIS Action Line C5 "Building Confidence and Security of ICTs", ITU is playing an important global effort to protect children online including through the multistakeholder Child Online Protection (COP) Initiative. The partnership brings together partners from all sectors of the global community to create a safe and empowering online experience for children around the world.

(C) VALUABLE LESSONS LEARNED ON ERADICATING POVERTY AND PROMOTING PROSPERITY:

The growth of Internet and broadband technologies highlights the link between ICTs and economic growth and social opportunity and brings into focus the increased importance of universal access to ICTs to achieve the SDGs.

Today, more than 80 countries include broadband in their universal service or universal access definitions, although there are regional differences. The key to unlocking UAS lies in innovative investment and partnership solutions to connect subscribers in remote and scarcely-populated areas where commercial models are not likely to take off.

Affordable access and availability of communications services requires an interplay between the public and the private sector at multiple levels. Cross-sectoral collaboration focusing on supply as well as demand-side measures is essential in facilitating this interplay. According to ITU data, close to 85 percent of ITU Member States have some kind of UAS policy and regulations in place, either through traditional telecom/ICT policy and regulatory frameworks or National Broadband Plans or through establishing legal rights for citizens.

Policy-makers and regulators should continue to work together to provide people with access to technologies, the digital skills to use them, and trust in using ICTs. It is essential therefore that they have the right tools for effective cross-sector collaboration which in turn includes and empowers citizens though ICTs. A new regulatory approach that is open, collaborative, incentive-based and cross-sectoral can enable digital transformation further and open new social and business opportunities. Amidst a swirling technology landscape studded with new technologies, challenges, opportunities and players, collaborative regulation can engender balanced, innovative and vibrant ICT markets to the benefit of all.

In addition, there are far fewer women than men who study science, technology, engineering and math (STEM) or who work in jobs requiring ICT skills such as computer scientists, computer engineers and software, website and mobile apps developers. Given the global shortage for people with STEM skills, there are unfilled jobs that could be performed by qualified women, but young women and girls are often discouraged from entering these fields. Moreover, given the importance that ICTs play in our daily lives, it is necessary that ICTs be developed by both women and men to address their daily challenges.

Youth and children with access to information and communication technologies (ICTs) are coming of age as digital natives, the early adopters of ICTs and better positioned than their parents to harness the power of digital technologies in new and imaginative ways. Youth can only leverage the transformative power of ICTs when they have access to ICT services and are equipped with a range of digital skills. ICTs can enhance education, reduce youth unemployment and promote social and economic development.

The importance of ICT accessibility to persons with disabilities, as recognized by Article 9 of the United Nations Convention for the Rights of Persons with Disabilities (UNCRPD) and Art. 18 of the Tunis Commitment, under the auspices of the World Summit on the Information Society (2005) which strives "to promote universal, ubiquitous, equitable and affordable access to ICTs, including universal design and assistive technologies, for all people, especially those with disabilities, everywhere, to ensure that the benefits are more evenly distributed between and within societies." Countries that have adopted ICT accessibility policies and which use government purchasing power by requiring accessible ICTs in their calls for tender have shown the greatest progress in ensuring that accessible ICTs are available for persons with disabilities to ensure that persons with disabilities can live independently and participate fully in all aspects of life.

Supporting Member States in addressing special needs of indigenous people to equitable access, use and knowledge of ICTs, based on the preservation of their heritage and cultural legacy contributes to leverage their social and economic community development and to promote, preserve and protect their indigenous cultural development.

Capacity building also refers to strengthening the human and institutional capacity of developing countries to adapt to an evolving ICT and telecommunication sector. Building broad telecommunication/ICT and digital literacy enables citizens to access and contribute information, ideas and knowledge to create an inclusive and sustainable information society.

(D) EMERGING ISSUES LIKELY TO AFFECT THE REALIZATION OF POVERTY ERADICATION AND ACHIEVING PROSPERITY:

Advanced ICTs, such as Internet of Things (IoT), big data analytics, cloud computing and artificial intelligence (AI), contribute to realizing the Sustainable Development Goals (SDGs). Promising applications exist in areas such as manufacturing, precision agriculture, government, education, health care, smart cities, and smart transportation. These technologies will fundamentally transform business, government, and society over the coming decades. To harness their benefits, countries will need to create conditions supportive to the deployment of next-generation network and service infrastructures. They will also have to adopt policies that are conducive to experimentation and innovation while mitigating potential risks to information security, privacy, and employment.

IoT will greatly expand the digital footprint. In addition to people, organizations and information resources, it will connect objects equipped with digital information sensing, processing, and communication capabilities. This ubiquitous infrastructure will generate abundant data that can be used to achieve efficiency gains in the production and distribution of goods and services, and improve human life in innovative ways.

Big data analytics will extract useful knowledge from digital information flows. It will enable us to better describe, understand and predict developments and to improve management and policy decisions. Making sense of proliferating information requires a workforce with appropriate analytical, computational and methodological skills, as well as a high-capacity ICT infrastructure.

Cloud computing and other architectures will lower the entry barriers to scalable computing resources. They are able to deliver flexible and on-demand computational services over the Internet, lowering the fixed costs of ICT infrastructure, to the benefit of small and medium-sized organizations. Realizing their full potential will depend on the availability of reliable fixed and mobile broadband connectivity.

Artificial intelligence will help human beings to make better decisions. In order to achieve this objective, every algorithm needs to be tailored carefully to existing data and the objectives pursued. This requires considerable human expertise in machine learning and large datasets to train algorithms.

Digital Financial Services

In recent years, ICT has been instrumental to developing new and more affordable digital financial products that better respond to the needs of unbanked people in the world today, most notably rural and remote communities. Significant challenges remain to quickly and effectively leverage ICT to drive full financial inclusion. The full potential of mobile money has not yet been realised, with two billion people in developing countries still lacking a viable alternative to the cash economy and informal financial services, 1.6 billion of whom have access to a mobile phone. Yet, the industry has found it challenging to scale services for the unbanked mostly due to regulatory frameworks being out of step. Various regulatory measures can be considered at the national level to leverage the potential of two-sided platforms for enabling digital financial inclusion. What's more, harmonization of legal and regulatory requirements for digital financial services at the regional or sub-regional level can have a multiplier effect on innovation and investment in national markets.

(E) AREAS WHERE POLITICAL GUIDANCE BY THE HIGH-LEVEL POLITICAL FORUM IS REQUIRED:

(F) Policy recommendations on ways to accelerate progress in poverty eradication:

Harnessing the benefits of advanced ICTs requires appropriate infrastructures, services, and skills. Networks will have to support diverse quality-of-service demands from applications and users while delivering robust and ubiquitous connectivity. This will require roll-out of wireless IoT platforms, reliance on network virtualization and improved fibre connectivity. Moreover, it will require the development of advanced ICT skills among users. Advanced ICTs raise concerns over next-generation digital divides. Network operators and users will have to adapt their business models to take advantage of the opportunities of the digital transformation. Policy-makers and regulators are called upon to create conditions facilitating entrepreneurial experiments and innovation. Policy will also have to mitigate challenges in the areas of information security, privacy, employment and income inequality. Reliable and meaningful measurements of the deployment and use of advanced ICTs are critical. Fully harnessing the potential benefits of advanced ICTs requires reliable and meaningful metrics that go beyond existing data. This will require collaboration among various stakeholders and novel approaches to harvesting information from digital infrastructures and applications directly.

Policy and regulation in the digital world is subject to constant change, opening up new avenues for tech innovation, creating business opportunity and providing safe harbor for consumers. As markets become more complex and their interplay with regulation more outspoken, regulators and policy makers need to stay pro-active, to demonstrate leadership, skill-up and reach out to new actors. The core driver for regulation is how best to extend the benefits of innovation and economic growth to the greatest number of citizens. While no single regulatory model is perfect, the guiding imperative is to integrate ICT regulation with other sectors through a collaborative regulatory approach. Otherwise, the next billion to be connected will be left waiting.

Global Symposium for Regulators 2017 (GSR17) Best Practice Guidelines on Policy and Regulatory Incentives for Affordable Access to Digital Services

The rich potential of the transformative digital economy is within our reach. The digital world offers a host of opportunities in various sectors such as agriculture, health, education, financial services, artificial intelligence and public governance. Digital services can enable economic growth and social development across the board. …

We, the regulators participating in the 2017 Global Symposium for Regulators, recognize that there is no single, comprehensive blueprint for best practice, but agree that country experiences can be enlightening and guide us towards regulatory excellence. In the increasingly complex and dynamic digital ecosystem, it is important to agree on common principles and put forward clear and simple rules. …

Governments and regulators should do more to address the affordability and use of digital services by promoting policies and regulatory measures to:

- Providing regulatory and policy incentives for investment in high-speed and high-capacity broadband networks

- Incentivizing competition among ICT and other sector players, which brings opportunities for innovation and price reduction in digital services
- Encourage co-investment and the co-location and shared use of infrastructure, where appropriate, including through active infrastructure sharing and national roaming arrangements and sharing with other public utilities that lead to cost reductions and reduce consumer prices …

We further reiterate that an open, collaborative approach to regulation can go a long way towards addressing affordability of digital services. Regulators from all sectors where digital services have become available need to cooperate proactively, in particular:

- Outreaching to fellow regulators from other sectors to put in place concrete mechanisms for formal or informal cooperation
- Promoting the development of cross-cutting services such as e-commerce, e-finance and e-governance
- Cooperating with academia in studying and anticipating regulatory challenges and designing policies to leverage on the rise of new technologies in the digital economy and society
- Putting in place innovative, out-of-the-box measures to stimulate the adoption of services and the creation of locally-relevant apps and content, and to preserve local heritage.
- Promoting digital skills for all, which are essential for the wide adoption and efficient use of digital services and apps.

Advocating widely for the benefits of new technologies in the digital economy and society

2019

Empowering people and ensuring inclusiveness and equality

ITU Council Contribution to the High-Level Political Forum on Sustainable Development (HLPF)

Submission Template

A. AN ASSESSMENT OF THE SITUATION REGARDING THE PRINCIPLE OF "ENSURING THAT NO ONE IS LEFT BEHIND" AT THE GLOBAL LEVEL:

"Ensuring that no one is left behind" has a specific meaning in telecommunications – that of *universal access and service (UAS*) and leaving no one off-line.

Access to accessible, affordable, reliable and secure telecommunication/ICT networks, including broadband, and to related services and applications, can facilitate economic, social and cultural development and implement digital inclusion through these means.

In pursuance of its mission, ITU annually monitors the digital divide, including the gender digital divide (see below), to assess and track who has access to ICTs and telecommunication networks, and where.

The latest data on ICT development from ITU estimates that[7]:

More than half of the world's population is now online. At the end of 2018, 51.2 per cent of individuals, or 3.9 billion people, were using the Internet. This represents an important steps towards a more inclusive global information society. In developed countries, four out of five people are online, reaching saturation levels. In developing countries, though, there is still ample of room for growth, with 45 per cent of individuals using the Internet. In the world's 47 least developed countries (LDCs), Internet uptake remains relatively low and four out of five individuals (80 per cent) are not yet using the Internet.

There continues to be a general upward trend in the access to and use of ICTs. With the exception of fixed-telephony, all indicators showed sustained growth over the last decade. However, in recent years, growth is slowing for most of the access indicators, particularly in countries where large parts of the population are already connected. Growth will need to pick up again if the ambitious targets of the ITU Connect 2030 Agenda and the Broadband Commission for Sustainable Development are to be met. These include a target of 70 per cent Internet penetration by 2023, and 75 per cent by 2025.

Mobile access to basic telecommunication services is becoming ever more predominant. While fixed-telephone subscriptions continue their long-term decline, mobile-cellular telephone subscriptions continue to grow. Although the number of mobile-cellular telephone subscriptions is already greater than the global population, the same is not true in all regions. It can be expected therefore that developing countries, and especially LDCs, will slowly catch up with the rest of the world.

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7 Measuring the Information Society 2018

Broadband access continues to demonstrate sustained growth. Fixed-broadband subscriptions are continuously increasing, without a slowdown in growth rates. Furthermore, almost all fixed-broadband subscriptions had download speeds of at least 2 Mbit/s, with a very substantial part having advertised speeds of more than 10 Mbit/s. In LDCs, there is still a significant pocket of subscriptions for the lowest speed tier (⩾256 kbit/s to <2 Mbit/s), although that proportion is decreasing rapidly. The growth in active mobile-broadband subscriptions has been much stronger, with penetration rates increasing from 4.0 subscriptions per 100 inhabitants in 2007 to 69.3 in 2018.

Almost the whole world population now lives within range of a mobile-cellular network signal. In addition, most people can access the Internet through a 3G or higher-quality network. This evolution of the mobile network, however, is going faster than the growth in the percentage of the population using the Internet.

Internet access at home is gaining traction. Almost 60 per cent of households had Internet access at home in 2018, up from less than 20 per cent in 2005. Fewer than half of households had a computer at home, highlighting that a substantial number of households accessed the Internet (also) through other means, most importantly through mobile devices, often using the data plan of the mobile-broadband subscription. Three quarters of the world's population owned a mobile phone in 2017, but in LDCs this proportion stood at 56 per cent. Given the positive impacts of mobile phone ownership on development, this is an area where quick gains can be made.

Growth in international bandwidth and Internet traffic has been even stronger than growth in access to ICTs and the percentage of the population using the Internet. This could be explained by the fact that people spend more time online, and more and more spend that time doing data-intensive activities, such as watching videos and playing interactive games.

ICT prices have dropped globally in the last decade, in parallel with the increase in access to and use of ICT services. Improved ICT regulation and policy-making have played a pivotal role in creating the conditions for the reduction of prices seen in the period 2008–2017, ensuring that the efficiency gains of higher ICT adoption are partly passed on to customers.

Mobile-cellular prices followed a sustained decreasing trend in the period 2008–2015. From 2015, mobile-cellular prices have plateaued and the ITU mobile-cellular basket (51 minutes and 100 SMS messages per month) cost on average USD 12.5 per month at the end of 2017. This is half the average price of the fixed-broadband basket, but 35 per cent higher than the average for the handset-based mobile-broadband basket, thus suggesting that there is still room for lower mobile-cellular prices.

B. THE IDENTIFICATION OF GAPS, AREAS REQUIRING URGENT ATTENTION, RISKS AND CHALLENGES:

Accessibility of ICTs

Globally 1.1 billion people currently live with some form of disability (WHO Report). The number of older persons is expected to grow to more than 2.1 billion by 2050 (2017 UN. Report in Aging Population), the majority of which will live in less developed regions, while over 1 billion youth are in danger of hearing loss due to their unsafe listening habits (ITU-WHO Make Listening Safe Initiative). This means that in the next 30 years the number of persons affected by a form of disability could touch half of the world's population, all of whom will require accessible ICTs. Accessible ICTs provide equal access to information, communication and functionalities to all users.

Lack of ICT Skills[8]

Lack of ICT skills is an important impediment for people to access the Internet. Data show that, as activities get more complex, fewer people undertake these activities. More importantly, computer users in developed countries seem to possess more ICT skills than users in developing countries, pointing to a serious constraint on the development potential of developing countries and LDCs.

There is an increased need for "soft" skills beyond technical and navigational skills. A breadth of skills – including technical operational, information management, social and content-creation skills – will be fundamental for achieving positive and avoiding negative outcomes. Furthermore, algorithms, the proliferation of bots, and a shift to the Internet of Things and Artificial Intelligence, augment the need for critical information and advanced content-creation skills. With the increased complexity of ICT systems, and an exponential increase in the amount of data being collected, transferable digital skills and lifelong learning are indispensable.

ITU data and other cross-nationally comparative data sources show that there are considerable gaps across the board in the skills needed at all levels. A third of individuals lack basic digital skills, such as copying files or folders or using copy and paste tools; a mere 41 per cent have standard skills, such as installing or configuring software or using basic formulas on spreadsheets; and only 4 per cent are using specialist language to write computer programs.

Scarce data suggest developing countries are particularly disadvantaged when it comes to digital skills. There is a lack of data collected on skills in developing regions, but the available data suggest that inequalities reflect other inequalities between the different regions of the world, particularly in relation to basic skills. The patterns for standard skills are less clear.

Within-country inequalities in basic and standard skills reflect historical patterns of inequality. On average, those in employment were ten percentage points more likely to have a skill than the self-employed, who are in turn ten percentage points more likely than the unemployed to have a skill. Those with tertiary education are around 1.5 to 2 times as likely to have a skill than those with upper secondary education, and 3.5 to 4 times as likely as those with only primary education. Individuals in rural areas are about ten percentage points less likely than urban dwellers to have a skill. Finally, there is a five percentage point difference between men and women in having a certain skill.

There are skill inequalities between children as much as there are between adults. While little data are available on this outside of Europe, available data suggest that digital inequalities are not a generational thing and will persist into the future.

There are clear gaps in data collection for certain countries and groups, and a limited range of methodological tools is used to collect these data. Proxy survey measures (e.g. asking about use to measure skill) and self-reported skill measures are most common. Recently, self-reported skill measures using scales that have been validated through performance tests (performance test survey proxies) have been developed. The least common are actual performance tests or formal exams; in most cases, these are sector- and context-specific. It is recommended to develop survey measures that can be used for larger populations that have been validated to avoid response biases.

There is an urgent need for the development of measures across the range of operational, information management, social and content-creation skills. These items should be device- and platform-independent, measure skills rather than activities, and limit social desirability bias in the design of

8 Measuring the Information Society 2018

their answer scales. Furthermore – to understand the skills gap in relation to a potential future in which ICTs are embedded and invisible – the development of critical information, communication and data management, and production skills measures is desperately needed.

Survey measures used in most internationally comparative studies have severe shortcomings. They lack variety (measure only a narrow range of operational skills), comparability (have not been tested to be fit for cross-cultural comparisons), adaptability (are not transferable, as they are associated with specific platforms or activities rather than a core "curriculum" of future proof skills) and equity (have not been validated as comparable assessment tools for different subgroups across highly diverse populations).

Confidence and Security in Use of ICTs

We are in an era of massive technological advancements, driven by frontier technologies such as AI, 5G, Internet of things and many others. They hold great promise in revolutionizing the way we do things - offering potential solutions to many of the world's problems.

Building trust in cyberspace and in the usage of these new technologies will be crucial in ensuring that the all the world's people enjoy the benefits of ICTs, especially considering that in today's world, everything depends on ICTs – and particularly on the networks which underpin them. This includes essential national infrastructure and services such as: government services; financial services; emergency services; water supplies and power networks; food distribution chains; aircraft and shipping; navigation systems; industrial processes and supply chains; healthcare; public transportation; and even our children's education.

Standardization also has a key role to play. Interoperability of new security products and services should be ensured from the early design stage.

Collaboration and cooperation among all stakeholders is key for strengthening confidence and security in the use of ICTs.

There are a number of positive initiatives globally, including within the UN System. It is important to focus on the overall coherence and the inter-linkages between the processes. It's important to design the processes with interlinkages for collaboration and cooperation as early as possible rather than as an afterthought, or there is a risk of duplication which dilutes rather than reinforce the global dialogue. However, with the right approach there is an enormous potential to multiply the effect of individual initiatives through partnerships and synergies.

C. VALUABLE LESSONS LEARNED ON ERADICATING POVERTY AND PROMOTING PROSPERITY:

Broadband Investment

Broadband connectivity and services could have a much larger impact in LDCs and developing countries. ITU projects have shown that by connecting schools, healthcare's centres and local communities to internet services, especially in rural and remote areas have played a key role in access to health, education and the dissemination of ICT knowledge. The establishment of a broadband wireless network in developing countries, especially in rural and remote areas, have shown that they help connect the unconnected.

Broadband infrastructure projects need to be coupled with other type of ICT related projects which will alleviate weak digital literacy, lack of relevant local content and applications. Policy-makers of other cross-cutting sectors (for example: health, education, financial services, etc.) need to as well consider a coordinated effort for the application of broadband across all sectors of the economy.

ITU has been able to develop and implement projects in Africa for wireless broadband connectivity that have provided free or low-cost digital access for schools and hospitals, and for underserved populations in rural and remote areas. With the advancing technologies, wireless solutions to provide connectivity at multiple locations has become an achievable task, despite the fact that hardware and equipment needs still require a substantial amount of investment.

Compared to the vast connectivity needs in countries, ITU projects in Africa were an appropriate attempt to improve the quality of life of its citizens through broadband but was limited in terms of its budget and scale. With more investment, the impact of such connectivity would undoubtedly be multiplied. The projects addressed a genuine need of providing last mile connectivity to the people in remote and rural areas. To this end, all stakeholders and beneficiaries underlined the usefulness of the network in increasing quality of life, bringing time and cost savings to the local communities.

Accessibility and Affordability

It is widely recognized that accessible and affordable ICTs provide equal access to information, communication and functionalities to all users, without any discrimination, including for persons with disabilities.

Accessibility is defined as the: "*extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use*" (ISO TC 159). For many modern technologies and in many contexts of use, ICTs can be designed and developed to meet the needs of all users (e.g. a smart phone can be used by a young person, a person with hearing impairment as well as by a blind person). However, for many of the users accessible ICT are not affordable, so they cannot have access to these technologies.

Affordability "*means the state of being cheap enough for people to be able to buy".* Considering that in general, persons with disabilities are facing financial constraints, the lack of affordability is also a *"barrier*" to access ICTs. Therefore, affordability should be considered as a key element to ensure that PwD have access to ICTs.

The Model Policy Report of the ITU- (عربي, 中文, English, Français, Русский, Español, e-book version) provides Governments with the necessary guidelines on accessible ICT public procurement policy framework. Also self-paced training courses are available for members to strengthen their capacity on the topic.

Accessible ICTs are also compatible with assistive technologies and features necessary for users with severe disabilities. Mainstreaming accessibility from the stage of fabrication reduces production costs and results in affordable accessible ICT equipment and services for users with disabilities. On occasion, where persons with disabilities face barriers to use, teachers, employers and persons with disabilities themselves may not be aware that accessible ICT solutions could facilitate their participation in digital life and work, and consequently contribute to their social and economic development. However, the rate at which governments are meeting their obligation to have public websites and services accessible to all citizens can be slow, which means that the adoption of accessible ICTs and remediation of existing resources for the digital inclusion of persons with disabilities can take time. ITU-Digital Inclusion Programme developed a series of key resources to support Member States in accelerating their implementation process in ICT accessibility.

From the implementation process of Digital Inclusion activities several lessons learned were identified as essential to ensure effectiveness in the process of empowering persons with specific needs through ICT and ensure that they have a better life: our activities must:

1. Be developed and implemented based on the direct requirements and evolving needs of our Members States;
2. Involve and collaborate with all relevant stakeholders in particular the "end users" from design to implementation up-to evaluation of these activities. The most impactful ICT accessibility policies are crafted in adherence to the principle of "Nothing about us without us," in collaboration with persons with disabilities (who are the end users);
3. Consider the evolving trends of the ICT ecosystem: ITU's work on ICT solutions for youth unemployment, shows that digital skills training is most effective when it is demand-driven, using a curriculum designed according to employers' stated needs;
4. Keep a holistic and long term vision in the development and implementation of the activities. (E.g.: in the guidelines for designing a national digital skills development strategy, ITU recommends teaching computational thinking and coding to all students from a young age to start developing the skills required to work in the digital economy. Similarly, ITU's international Girls in ICT Day initiative has shown that girls are more likely to choose ICT studies and careers if a sustained effort is made to undo negative gender stereotypes and to provide them with the skills, confidence and support they need.)

Financial Inclusion

Financial inclusion is a critical enabler for poverty reduction and inclusive growth. ITU is part of the Financial Inclusion Global Initiative (FIGI), a collaborative initiative with the World Bank Group, the BMGF, the Committee on Payments and Market Infrastructures (CPMI), and the with broad participation from public and private sector partners. FIGI's activities support and accelerate the implementation of country-led reform actions to meet national financial inclusion targets, and ultimately the global 'Universal Financial Access 2020' goal.

Regulation

Although ICT regulation has evolved globally over the past ten years and has experienced steady transformation, regulators need to keep pace with advances in technology, address the new regulatory frontiers and create the foundation upon which digital transformation can achieve its full potential. Best practice guidelines will give regulators the necessary tools to address these new horizons (see below).

D. EMERGING ISSUES LIKELY TO AFFECT THE REALIZATION OF POVERTY ERADICATION AND ACHIEVING PROSPERITY:

- Digitization is increasingly and fundamentally changing societies and economies and disrupting many sectors in what has been termed the 4th Industrial Revolution. Being prepared for digital transformation and emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), Machine to Machine communications (M2M), Big Data, Blockchain and 5G is fundamental. At the same time, there is a continuing need for trusted, secure and reliable ICT infrastructure, as well as for affordable access to and delivery of digital services.
- Digital skills development (see above), particularly considering the career opportunities that exist for people with advanced digital skills.
- Mainstreaming accessible ICTs and Universal design[9] (see above).

E. AREAS WHERE POLITICAL GUIDANCE BY THE HIGH-LEVEL POLITICAL FORUM IS REQUIRED:

[9] ICTs that have accessibility features embedded in the product or the service and/or are designed and developed from the stage of fabrication following international accessibility standards.

F. POLICY RECOMMENDATIONS ON WAYS TO ACCELERATE PROGRESS IN POVERTY ERADICATION:

- Proactive, collaborative and dynamic policy and regulatory approaches together with innovative and sustainable business and investment models are required to create the conditions for this digital transformation to achieve its full potential.

  ICT regulators participating in the 2018 Global Symposium for Regulators (GSR), recognized that, flexible and innovative policy and regulatory approaches can support and incentivize digital transformation. The best practices in this regard would allow us to respond to the changing landscape and address the continuing need for secure and reliable ICT infrastructure, affordable access to and delivery of digital services, as well as protect consumers and maintain trust in ICTs. GSR identified and endorsed these regulatory best practice guidelines on new regulatory frontiers to achieve digital transformation.

- Implementing national ICT accessibility policies and regulatory frameworks is a necessary step towards removing barriers to ICTs for persons with disabilities and the elderly. Access to ICT services has been acknowledged as essential for social, cultural, economic, political and democratic development, and for the exercise of fundamental rights. Also this will accelerate development of inclusive societies and progress in involving persons with disabilities in the education and work so, accelerate progress in poverty eradication.

  Enabling accessible ICT ecosystem and environments though elimination of barriers, including by: amendments to the existing ICT legal framework; the provision of public accessible ICT access; accessible and affordable mobile communications and television/video programming; provision of accessible public information to all citizens (webs that consider the ICT accessibility standards); and public procurement of accessible ICTs.

  Creating such environments requires changes in the work approach to ensure joint efforts and enlarge collaboration with all stakeholders for ensuring common approach, which includes detailed implementation plans and execution of well-defined targets based upon consultations with industry, service providers, organizations of persons with disabilities, standards development organizations, and policy-makers and regulators.

- The utmost priority is to make digital skills policies in relation to gaps in the labour market and concerns about widening social inequalities more effective. This can be done by (a) collecting higher-quality and more reliable data on the full range of digital skills in different sectors; (b) targeting specific groups depending on need and outcomes to be achieved, rather than following a one-size-fits-all approach; and (c) instead of establishing funding principles and incentives around success, where only best practices are shared, by stimulating multisectoral stakeholder partnerships with a continuous exchange of lessons learned and improvements made.

- ICT prices have dropped globally in the last decade, in parallel with the increase in access to and use of ICT services. Improved ICT regulation and policy-making have played a pivotal role in creating the conditions for the reduction of prices seen in the period 2008–2017, ensuring that the efficiency gains of higher ICT adoption are partly passed on to customers.

ANNEX 1

IN-DEPTH VIEW OF THE ROLE OF ICTS AND ITU'S CONTRIBUTIONS TO GOALS 1 - 17
(SDG MAPPING OF ITU'S STRATEGIC AND OPERATIONAL PLANS)

Goal 1. End poverty in all its forms everywhere

ICTs are a key enabler to achieve SDG-1, for example, by providing timely and accurate information services which will help ensure equal rights to economic resources, as well as ownership and control over different forms of property, as well as enabling services such as mobile banking for micro-credit, which have already brought direct benefits to millions of people who were previously unbanked.

ITU contributes to SDG1 Targets 1.4, 1.5 and 1.a:

- Target 1.4 - By promoting access to basic ICT services for all men and women, in particular the poor and the vulnerable; by monitoring, collecting and disseminating data on access to basic ICT services, including households with broadband Internet access in urban and rural areas; by ensuring the radio frequency spectrum, a natural resource, is accessed everywhere and by all, equally and at the lowest possible price;
- Target 1.5 - By providing expertise through assistance and technical publications in the development of affordable ICT infrastructure to deal with the challenges and system requirements of fixed and mobile networks for rural and remote areas as well as broadcasting networks; by reducing vulnerability to disasters and to the effects of climate change through the development of National Emergency Telecommunication Plans, the establishment of early warning systems and business continuity plans, among other relevant activities relates to disaster risk reduction; through the management of spectrum resources and the development of standards and best practices on radiocommunications and disseminating the related information and know-how, ensuring more accurate weather predictions, climate change monitoring and mitigation, public protection and disaster relief, as well as search and rescue;
- Target 1.a - By the mobilization of resources through partnerships with various stakeholders from the ICT ecosystem for the implementation of ICT development activities, projects and initiatives in developing countries, including through developing strategies and related tools and services (databases, sponsorship packages, dedicated websites, concept notes, promotional vehicles, etc.).

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

ICTs give farmers new ways of accessing information and services. Extension agents improve their services through mobile access to digital information services, online education, and business planning tools, allowing them to record service delivery events and solicit farmer feedback using mobile devices

Government ministries can remotely monitor extension agent capacity building and service delivery efforts, and evaluate results with an eye to improving services over time. Rural business productivity and effectiveness tend to increase once farmers and smallholders gain access to ICTs, enabling them to access market information, weather forecasts, and availability of fertilizers, as well as many programmes now springing up giving improved access to extension agents.

ITU contributes to SDG2 Targets 2.1, 2.3, 2.4, 2.5 and 2.a:

- By supporting countries to develop their e-agriculture strategy as a framework to identify and develop sustainable ICT in agriculture services and solutions, in close collaboration with FAO. E-agriculture offers a strong potential for driving economic growth and raising incomes among the rural population through increased efficiency of agricultural production, improved livelihoods and value chain development;
- By providing spectrum and standards and the dissemination of the related information and know-how for IoT, drones, radionavigation, meteorology and Earth-exploration satellite systems, for the development and sustainability of e-agriculture.

Goal 3. Ensure healthy lives and promote well-being for all at all ages

Connectivity provided by data and telecommunication networks enable health workers to be connected to information and diagnostic services and allow them to form support networks and communicate with doctors and nurses within clinics and hospitals. Mobile phones allow community health workers to learn and prepare for disease outbreaks, identify patient symptoms, follow established treatment protocols, perform remote diagnostics, access expert support, refer patients to clinics, send patient reminders, record delivery of health services, and receive mobile payments for those services. Social media helps to provide advice and support, and allows health workers and patients alike to benefit from shared best practice, and to obtain important information about disease outbreaks and the availability of health services. Analytics provide the capabilities needed to produce snapshots, analyse trends, and make projections about disease outbreaks, health service usage, and patient knowledge, attitudes, and practices regarding their health – all within time frames critical to eradicating disease and reducing mortality rates.

ITU contributes to SDG3 Targets 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.a, 3.d:

- By combating diseases through the establishment of monitoring systems using mobile networks;
- Targets 3.1, 3.2, 3.7 and 3.8 - By sharing information and documenting ICT best practices on how eHealth applications can play an essential role in meeting the SDG targets for women's and children's health. Additionally, ITU contributes by supporting countries through regional capacity-building workshops and direct technical assistance, in collaboration with WHO, to develop their national eHealth strategies to better harness ICT for health, particularly for women's and children's health;
- Target 3.3 and 3.d - Through its ongoing project on ICT Applications Against Ebola Disease (being implemented in West Africa);
- ITU contributes to the implementation of broadband networks which provide the underpinnings of optimal service delivery calling for high quality and safety requirements. In addition ITU is providing information about electromagnetic field (EMF) issues for the protection of the population;
- In the framework of the ITU Interactive Transmission Map, ITU is enhancing awareness of developing countries on the existing telecommunication/ICT infrastructure (including broadcasting networks) that are being taken into consideration when designing new networks for early warning and risk reduction;
- Targets 3.4, 3.5, 3.6 and 3.a - Through the joint initiative with WHO "Be Healthy Be Mobile", using mobile technology to help member states combat the growing burden of non-communicable diseases (cancer, stroke, heart disease, lung disease and diabetes) and their risk factors (tobacco use, an unhealthy diet, physical inactivity and the harmful use of alcohol). This initiative supports governments who are seeking to bring mobile health services to scale within national health systems, by providing technical expertise on implementing mobile health interventions. It also promotes a

highly multisectoral approach to ensure that the programmes are sustainable. The initiative has established partnerships with its target 8 countries from a range of low-, middle- and high-income countries;

- Target 3.6 - By providing spectrum and standards and disseminating the related information and know-how for Intelligent Transport Systems (ITS), radionavigation-satellite systems and IoT;
- Target 3.8, 3.9, 3.d - By providing globally harmonized spectrum and standards and disseminating the related information and know-how, ITU enables the development of mobile broadband and its wider penetration, thus permitting E-medicine to become available throughout the world. By providing spectrum and standards for weather forecasting, Earth Exploration satellites, sound and television broadcasting and mobile networks, ITU contributes to early detection of natural disasters and other health risks, timely information of populations and mitigation decisions;
- Technical standardization of multimedia systems and capabilities for e-health applications.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

ICTs are powering a revolution in digital learning, which has become one of the world's fastest-growing industries. Mobile devices now allow students to access learning assets anytime, anywhere. Teachers are now using mobile devices for everything from literacy and numerical training to interactive tutoring. Indeed, mobile learning has the ability to help break down economic barriers, divides between rural and urban, as well as the gender divide.

ITU contributes to targets 4.1, 4.2, 4.3, 4.4, 4.5, 4.7, 4.b, 4.c through:

- Ensuring equal access for women to technical, vocational and tertiary education by leading the global International Girls in ICT Day campaign to encourage and empower more young women and girls to choose ICTs studies, and by providing information about scholarships for ICT studies and other ICT learning opportunities, as well as practical assistance to Girls in ICT Day event organizers through the Girls in ICT Portal.
- Increasing the number of youth and adults with relevant ICT skills for employment, decent jobs and entrepreneurship by sharing innovative strategies with all ITU Members on how to build their national digital skills development strategies (ITU Digital Skills Toolkit, 2018), and raising awareness on the importance of a range of digital skills for youth employment and entrepreneurship (from basic digital literacy to advanced coding skills).
- The project "Capacity Building at Rural Internet Centres (Thailand)" providing skills development and access to ICTs to rural communities.
- Supporting countries in developing ICT policies and legislation that contribute to the development of a new generation of educated and technology-savvy workforce by ensuring the timely and effective introduction and spread of new and improved products and processes in the economy, reinforcing the ability of individuals and businesses to continuously create wealth.
- Monitoring of Target 4.4 by collecting and disseminating data on individuals with ICT skills.
- Ensuring equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, elderly persons, and indigenous peoples, by: providing assistance to ITU Member States on how to formulate a national ICT Accessibility Policy and providing them key resources in digital content promoting affordable and accessible ICTs for persons with disabilities that facilitate the education

and vocational training and by providing online digital skills training to indigenous peoples.

- Ensuring the access of training material on ICT-related topics, including on specialized topics such as cybersecurity in order to increase opportunities for employment.
- The advocacy and promotion of the power of mobile communications for socio-economic development. The ITU m-Powering Development Initiative is creating a resource and an action plan to facilitate the deployment of mobile-based services particularly for m-Health, m-Learning, m-Governance, m-Commerce, etc.
- Offering a number of tutorials on ICT technology and on the standardization process. Some of the training offered is web-based, i.e. by using current ICT technology. Using electronic working methods EWM help to drastically reduce the costs of training. ITU sees itself at the forefront of this, acting as a role model within the UN system and as the main entity which should further promote EWM for training purposes. The Ad-hoc Group on Education on Standardization is actively filling a gap in current education systems.
- Providing globally harmonized spectrum and standards, ITU enables the development of mobile broadband and its wider penetration, thus permitting E-education to become available throughout the world.
- Several ITU standards provide technical specifications of telepresence systems and services, and of audio-visual multiparty tele meetings, in support of ubiquitous self-directed learning and for distance learning, and a language learning system based on speech/NLP technology.
- Disseminating its outputs through on-line publications, seminars and workshops, ITU contributes to capacity building on information and communication technologies throughout the world.
- Open events and symposia in developing countries raise awareness of ITU services, and encourage peer-learning and best-practices in standards-based innovation.
- Efforts to improve the capacity of developing countries to participate in the development and implementation of international ICT standards, using the vehicle provided by ITU's Bridging the Standardization Gap (BSG) programme.
- Enhancing awareness of the role of capacity building through the implementation of regional workshops and the organization of the ITU Global ICT Capacity Building Symposium.

Goal 5. Achieve gender equality and empower all women and girls

ICTs allow women and girls to access information of importance to their productive, reproductive and community roles and to obtain additional resources. Access to ICTs can enable women to gain a stronger voice in their communities, their government and at the global level. ICTs also offer women flexibility in time and space and can be of particular value to women who face social isolation. There is a growing body of evidence on the benefits of ICTs for women's empowerment, through increasing their access to health, nutrition, education and other human development opportunities, such as political participation. Women's sustainable livelihoods can be enhanced through expanded access of women producers and traders to markets, and to education, training and employment opportunities. ICT can provide new opportunities for women's economic empowerment by: creating business and employment opportunities for women as owners and managers of ICT-accessed projects, as well as employees of new business ventures; creating an environment, including through training, where women feel comfortable participating in community development activities and advocating for their needs and priorities; developing ICT-based tools that address women's specific needs and are run by women (for example, literacy programmes, business planning courses, ICT training, access to market and trading information services and e-commerce initiatives); and offering economic opportunities

in salaried employment and entrepreneurship, as well as in the ICT sector itself and in jobs enabled by ICT.

ITU contributes to SDG5 Targets 5.5 and 5.b:

- By leading the global International Girls in ICT Day campaign to encourage more young women and girls to study and take up ICT careers, by sharing best practices on the recruitment, retention and promotion of women in the ICT sector and by publishing profiles of successful women role models on the Girls in ICT Portal;
- ITU contributes to the monitoring of Target 5.b by collecting and disseminating a number of gender-disaggregated ICT indicators, including on mobile phone ownership and usage, Internet usage and ICT skills;
- By providing globally harmonized spectrum and standards, ITU enables the development of mobile broadband and its wider penetration, thus permitting E-education to become available throughout the world. By disseminating its outputs through on-line publications, seminars and workshops, ITU contributes to capacity building on information and communication technologies throughout the World;
- The annual GEM-TECH Awards, jointly organized by ITU and UN Women, celebrate personal or organizational achievements and innovative strategies to advance Gender Equality and Mainstreaming in the area of ICTs. The GEM-TECH Awards provide a platform for advancing women's meaningful engagement with ICTs and their role as decision-makers and producers in the technology sector.
- ITU/UN Women EQUALS: The Global Partnership for Gender Equality in the Digital Age, a coalition of programmes dedicated to women and girls in technology with a vision of harnessing the power of modern information and communication technologies (ICTs) to accelerate global progress to bridge the gender digital divide, focusing on three areas of action: access, skills and leadership.

Goal 6: Ensure availability and sustainability management of water and sanitation for all

ICTs are particularly important for smart water management, facilitating the measurement and monitoring of water supplies as well as necessary interventions, and enabling practitioners at the local level to ensure the equitable and sustainable extension of water, sanitation and hygiene (WASH) services. As the costs of ICTs continues to fall, governments will be able to better integrate ICTs into monitoring and evaluation frameworks to optimize operations and improve the quality of service.

ITU contributes to SDG6 Targets 6.1, 6.4, 6.5, 6.6:

- ITU contributes to targets 6.1, 6.4 and 6.5 through the work of study groups on creating the Smart Society, which raises awareness and examines best practices for fostering and enabling the deployment and use of smart devices, including management and control of drinking water supplies, water pumps, among others. This is especially important in developing countries.
- ITU contributes to target 6.4, recognizing the need to develop 'smart' water-management systems; one that incorporates the views of irrigation, agriculture, environment and communications ministries as well as those of the ICT industry and relevant intergovernmental and non-governmental organizations. A number of relevant texts were developed. ITU also contributes to SGD target 6.4 by studying smart water management in the context of IoT and smart cities.
- Radiocommunication systems, as enabled by ITU activities, are fundamental for Target 6.6, to monitor the water cycle and groundwater and help to efficiently monitor, protect and restore water resources and associated ecosystems.

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

ICTs and energy efficiency can be connected in two ways: 'Greening of ICTs' and 'Greening through ICTs'. In the first case, ICTs are being transformed and developed to be more environmentally sound and less carbon-intensive. In the second case, ICT-enabled solutions (for example smart grids, smart buildings, smart logistics and industrial processes) are helping to transform the world towards a more sustainable and energy efficient future. These green technologies and processes have the potential to play a significant role in significantly reducing global greenhouse gas emissions.

ITU contributes to SDG7 Targets 7.1, 7.2, 7.3, 7.a and 7.b:

- ITU contributes to targets 7.1, 7.2 and 7.3 through the work of the study groups on creating the Smart Society, which raises awareness and examines best practices for fostering and enabling the deployment and use of smart devices, including mobile devices, that can contribute to saving electrical energy; measuring the effects of environmental pollution; and solving the challenges facing cities and rural areas, among others. ITU contributes to target 7b through helping countries develop and establish green telecenters that will provide connectivity to LDCs, SIDS and LLDCs;
- ITU studies methodologies for assessing the environmental impact of ICT, published guidelines for using ICTs in an eco-friendly way, tackling e-waste issues, and energy efficiency of the power feeding system. For SDG target 7a, a number of Recommendations elaborate on energy efficiency of networks and green data centres, and on energy efficiency of universal power adapter solutions. ITU collected and documented information and concepts that would be helpful for developing Recommendations to support smart grids from a telecommunication/ICT perspective (SDG targets 7a and 17.6);
- ITU contributed to SDG target 7a having developed several Recommendations on home energy management systems, and a framework of energy saving for future networks, on requirements, scenarios and functional architecture for user-side energy Management Service, and on requirements and architecture of the home energy management system and home network services.
- Radio systems such as Wireless avionics, smart grids, and Internet of Things- IoT, enabled by ITU activities, help ensure reliable and modern energy services, improve energy efficiency, and decrease energy consumption.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

ICT skills have already become a prerequisite for almost all forms of employment, and ICT capacity-building must therefore be prioritized in national youth employment and entrepreneurship strategies in all countries. It is not simply that most jobs and businesses now require ICT skills, but also that ICTs themselves are transforming the way that business is being done everywhere and creating new employment opportunities.

ITU contributes to targets 8.1, 8.2, 8.3, 8.5 8.a and 8.b through:

- Through technological upgrading and innovation by encouraging young people to learn to code, and publishing research on coding boot camps, and offering training workshops on coding boot camp methods, management and instruction;
- Providing assistance and training on migration to converged networks (NGN) to allow adaptability and long term operation of telecommunication/ICT networks, the transition from IPv4 to IPv6, the adoption of IXP, and introducing digital broadcasting and developing Spectrum Management Master Plans. Developing and providing online training on ICT-enabled entrepreneurship and encouraging young men and women to

learn coding and other digital skills in light of the skills shortfall for people with high-level digital skills;

- Reducing the proportion of youth not in employment, education or training by leading the Digital Skills Thematic Area of the Global Initiative on Decent Jobs for Youth;
- Promoting the use of new and existing telecommunication technologies for enhanced trade, in particular in Least Developed Countries;
- The contribution of radiocommunication networks, notably broadband mobile, to overall growth is well demonstrated. Increased mobile broadband access, as impulse by ITU fosters economic growth and increases efficiency of work.
- Collaboration with ILO, leading the Digital Skills for Decent Jobs Campaign as part of the Global Initiative on Decent Jobs for Youth in order to foster decent and inclusive employment and entrepreneurship opportunities in line with the SDGs;
- Standards for telecommunication/ICT operators, network and service providers, and equipment manufacturers, in particular when addressing and providing security and trust, contribute to sustainable economic growth.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Global and local infrastructure in the 21st century is controlled, managed and optimized by ICTs – whether power networks, water supplies, transportation systems, or indeed communications networks themselves.

Industrialization – and notably the increases in productivity it enables – is highly-dependent on the effective use of ICTs. And nowhere has innovation been more clearly fostered than in the emerging information and knowledge societies, which depend on open access to academic research and the power of online collaboration.

ITU contributes to SDG9 Targets 9.1, 9.3, 9.5, 9.a, 9.c:

- The ITU Members States have unanimously adopted the Connect 2020 Agenda, setting out the shared vision, goals and targets that Member States have committed to achieve in collaboration with all stakeholders across the ICT ecosystem. The Connect 2020 goals and targets aim to bridge the digital divide and provide broadband for all, enabling and fostering access to and increased use of ICTs worldwide, and in particular in the LDCs – as well as ensuring that telecommunication/ICTs are a key enabler and a mean to accelerate the implementation of the 2030 Agenda for Sustainable Development;
- Target 9.1 and 9.3 - By providing globally harmonized spectrum and standards, ITU enables the development of high quality, reliable, sustainable and resilient infrastructures accessible to all under affordable and equitable conditions;
- ITU contributes to building resilient ICT infrastructure by assisting Member States in elaborating both holistic and targeted ICT policies and regulations that can contribute to reducing barriers to broadband deployment, actively facilitating build-out of national fibre-optic networks and international connectivity links, including across sectors. ITU also promotes the deployment of ICT services in unserved and underserved areas, including emergency and accessibility-enhanced services;
- By developing guidelines and recommendations for the elaboration, implementation and enforcement of a wide array of ICT regulatory policies and other legal instruments to stimulate the deployment of broadband networks, particularly in developing countries;

- By fostering the development of telecommunication/ICT network through the "ITU Interactive Transmission Map". This project provides a global perspective of broadband connectivity allowing the ICT community to identify broadband investment opportunities;
- Target 9.5. and 9.c - Space, mobile, transport industries benefit from ITU activities, which encourage investments by maintaining a stable and predictable regulatory environment, and promoting an efficient and sustainable use of spectrum resources;
- ITU is constantly promoting affordable access to ICT and Internet, through the development of standards and also within the following contexts:
    - IMT 2020/5G, smart and future networks
    - Broadband access and affordable optical networks
    - Tariffs
    - Consideration of Cost of implementation/complexity during development of recommendations
    - Policy/governance: cooperation with WSIS process, ISOC etc.
    - Workshops and tutorial
- The implementation of the Conformity and Interoperability (C&I) programme of ITU helps to increase interoperable products and systems, contributing to the availability of universal and affordable ICT solutions;
- The ITU and the Craig and Susan McCaw Broadband Wireless Network project is providing low-cost broadband connectivity and developing ICT applications for schools and hospitals with implementation in several African (in Burkina Faso, Mali, Rwanda, Swaziland, Lesotho, and Djibouti) and Arab countries;
- Through the establishment of telecentres that will provide connectivity to remote and rural areas, which will also serve to reduce vulnerability to disasters;
- ITU is supporting the adaptation to new ICT infrastructures by developing guidelines for implementing regional IXPs, taking into account the drop of Internet interconnection rates and the legal and regulatory framework of each country assisted;
- In the framework of the ITU Interactive Transmission Map, ITU is makes use of transmission links, together with data related to traffic, exchanged between countries for identifying missing links on regional/subregional basis and developing case studies for planning broadband infrastructures;
- ITU is contributing to bridging the standardization gap needed to ensure that countries experience the economic benefits associated with technological development, and to better reflect requirements related to universal and affordable access to the Internet;
- ITU contributes to promoting building confidence and security in the use of ICTs as an integral part of resilient infrastructures, through programmes aimed at building capacity and facilitating the establishment of cybersecurity capabilities in Member States;
- Target 9.a - Through the project "National Broadband Policies and Applications", implemented by ITU and the Ministry of Science, ICT and Future Planning (MSIP) of the Republic of Korea, ITU is providing technical assistance to developing countries;
- Target 9.1 and 9.c - ITU also contributes to the monitoring of these targets by collecting and disseminating a number of relevant ICT indicators, including on broadband Internet access in urban and rural areas, mobile population coverage, and broadband Internet prices.

Goal 10. Reduce inequality within and among countries

ICTs have the potential to help reduce inequality both within and between countries by enabling access to information and knowledge to disadvantaged segments of society – including those living with disabilities, as well as women and girls. However, by the end of 2016, almost half of the world's population – 3.7 billion people – were not yet using the Internet and access was uneven between genders and geographically. Reducing inequalities cannot be achieved without addressing these underlying issues.

ITU contributes to targets 10.2, 10.3, 10.c through:

- Promoting women and girls to take up ICT careers, youth to learn basic and advanced digital skills, sharing good practices on coding boot camps and promoting accessible ICTs which enable persons with disabilities to engage in economic activities;
- Eliminating discriminatory laws and policies and practices through its ongoing projects of "Support for Harmonization of ICT Policies in the Caribbean" and "Support for Capacity Building and ICT Policies, Regulatory and Legislative Frameworks in the Pacific Island Countries (ICB4PAC II)";
- Supporting Member States in elaborating and implementing enabling ICT regulatory policies paving the way for the establishment of cross-sectoral institutional and legal frameworks that are transparent, are conducive to investment and growth, foster fair and greater competition as well as innovation, stimulate the deployment of infrastructure, promote the development of new services, are security conscious, and protect and benefit consumers;
- Enhancing broadband access and core networks responsible for carrying international flows of information, including secure digital finance data, which are crucial to reducing transaction costs;
- Providing globally harmonized spectrum and standards, ITU enables the development of mobile broadband and its wider penetration, thus permitting social, economic and political inclusions of all;
- Organizing the Global Symposium for Regulators (GSR) which brings together heads of national telecom/ICT regulatory authorities from around the world and has earned a reputation as the global annual venue for regulators to share their views and experiences on the most pressing regulatory issues they have identified;
- Activities designed to assist ITU members to better understand the accessibility needs of persons with disabilities, the technical solutions that are available and the policy and regulatory solutions they can take to ensure such solutions are widely available at affordable prices;
- Developing key resources on ICT and web accessibility, including capacity-building trainings and programmes for ITU Members and stakeholders (e.g. a programme in web accessibility "Internet for @all" for ITU Member States on how to make public websites accessible for ALL) and freely available online training courses and tutorials (e.g. on ICT accessibility policies, regulations, technology trends, public procurement rules and standards, and digital document remediation);
- Key partnerships in the implementation of regional forums on ICT accessibility such as Accessible Americas and Accessible Europe, which encourage governments and other stakeholders to promote ICT accessibility for all and to see ICT accessibility as a cross-cutting development issue;
- International Girls in ICT Day, an ITU initiative which aims to create a global environment that empowers and encourages girls and young women to consider careers in the growing field of ICTs;

- Online training for indigenous peoples on “Indigenous Radio/Networks - Communication Innovative Tools for the strengthening of Indigenous Communities of the Americas Region” and has developed further curriculum to build the capacity of Indigenous technicians to ensure the self-sustainability of indigenous community-related networks;
- Strong advocacy of “Universal Design” as defined in the UN Convention on the Rights of Persons with Disabilities (UNCRPD) and has developed standardization guidelines to produce solutions that are inherently accessible to persons with and without disabilities. ITU proactively address accessibility and human factors in their standardization work by ensuring that the needs of persons with disabilities and persons with specific needs are taken into account, and by mainstreaming accessibility features in telecommunication/ICT accessibility standards for the inclusion of persons with disabilities and persons with specific needs, including age-related disabilities, those with illiteracy, women, children, and indigenous people. Multimedia telecommunication relay services based on ITU standards support inclusiveness for persons with disabilities, allowing them to be able to use telecommunications services with a level of functionality and ease of use that is similar to the way people use mainstream voice telecommunications services;
- Leading efforts to improve the capacity of developing countries to participate in the development and implementation of international ICT standards, using the vehicle provided by ITU’s Bridging the Standardization Gap (BSG) programme.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

With more than half the world’s population already living in urban environments, ICTs will be essential in offering innovative approaches to managing cities more effectively and holistically – through applications such as smart buildings, smart water management, intelligent transport systems, and new efficiencies in energy consumption and waste management.

Using ICTs to make cities more eco-friendly and sustainable is vital – not just for the well-being of urban inhabitants, but also for the sustainability of the planet.

ITU contributes to SDG11 Targets 11.2, 11.3, 11.4, 11.5, 11.6 and 11.b:

- ITU contributes to the achievement of this goal through developing and delivering training programmes on smart and sustainable cities. ITU contributes to accessible transport systems for all, with special attention to persons with disabilities by promoting accessible ICTs in public transport systems, including by promoting the public procurement of accessible ICTs for public transport systems. ITU contributes to promoting the protection of ICT systems governing critical infrastructures and services (including transport) in order to avoid and prevent the disruption of services and ensure business continuity.
- ITU contributes to target 11.6 through the work of s on creating the Smart Society, which raises awareness and examines best practices for fostering and enabling deployment and use of smart devices, including mobile devices, contributing to the protection of property and persons; smart management of motor vehicle traffic; saving electrical energy; measuring the effects of environmental pollution; improving agricultural yield; management of healthcare and education; management and control of drinking water supplies; and solving the problems facing cities and rural areas, etc.
- ITU contributes to target 11.5 and 11.b by implementing national emergency telecommunication plans that will help countries reduce vulnerability and enhance resilience when disasters strike, as well as the establishment of early warning and monitoring systems to mitigate the effects of climate change.

- ITU standards supporting the Internet of Things will assist both developed and developing countries in transforming city infrastructure, benefiting from the efficiencies of intelligent buildings and transportation systems. In support of SDG target 11.2, ITU is involved in several smart city pilot projects (with cities including Wuxi, Manizales, Dubai, Singapore, Santiago de Chile, Montevideo, and Rimini) to measure the smartness and sustainability of the participating city. The pilot projects are also expected to generate inputs for the refinement of these KPIs.
- ITU studies telecommunication/ICT accessibility for persons with disabilities, and in support of SDG target 11.2, has developed a Recommendation which explains how audio-based network navigation systems can be designed to ensure that they are inclusive and meet the needs of persons with visual impairments.
- Responsible for IoT security and in support of SDG target 11.2, ITU has developed a Recommendation on a simple encryption procedure for Internet of things (IoT) environments.
- ITU in support of SDG target 11.2 has developed a number of Recommendations on Internet of things (IoT), ubiquitous sensor networks, IoT-based web-of-things, key performance indicators for smart sustainable cities, inter alia, giving general guidance to cities and provides key performance indicators (KPIs) for smart sustainable cities to help cities achieve Sustainable Development Goals (SDGs), as well as on infrastructure and services for smart sustainable cities.
- ITU, in support of in support of SDG target 11.3, has been working with UNECE to develop an internationally accepted definition for Smart Sustainable Cities (SSC). An extensive list of key performance indicators (KPIs) for cities wishing to transition into SSC were developed. ITU, in support of SDG target 11b, is developing Recommendations to reduce the environmental impact of ICT and how Internet of Things can be applied for the sustainable growth of communities. In the area of emergency communications, a number of Recommendations have been developed for call priority schemes that ensure that relief workers can get communication lines when they need to, whether using traditional or next generation communication networks. Complementary to the need to provide call priority during emergencies is the ability to deliver warnings to users, and standards are fundamental to ensure that warnings are delivered in a timely way, uncorrupted from the source to the end users – no matter how they can be reached.
- ITU studies telecommunications for disaster relief/early warning, network resilience and recovery, and in support of SDG target 11.5, developed a Recommendation with requirements for safety confirmation and broadcast message service for disaster relief, which can realize public organizations' business continuity plans (BCP) and can, to the best of their ability, help protect lives and property during a disaster.
- ITU, in support of SDG target 11.5, studies appropriate ways to improve network resilience and recovery against disasters.
- In support of SDG target 11.5, the Common Alerting Protocol (CAP) was standardized as a simple but general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks.
- In support of SDG target 11.b, is developing Recommendations to reduce the environmental impact of ICT and how Internet of Things can be applied for the sustainable growth of communities. In the area of emergency communications, a number of Recommendations have been developed for call priority schemes that ensure that relief workers can get communication lines when they need to, whether using traditional or next generation communication networks. Complementary to the need to provide call priority during emergencies is the ability to deliver warnings to users, and standards are fundamental to ensure that warnings are delivered in a timely way, uncorrupted from the source to the end users – no matter how they can be reached.

- ITS- GNSS, radars, IoT for road, railway, aviation and maritime transport are all enabled by the activities of ITU on spectrum regulations and standards and their promotion. Earth Exploration satellites, Sound and Television broadcasting and broadband mobile, as enabled by ITU, contribute to the protection of the world's cultural and natural heritage.
- By managing spectrum resources and developing standards and best practices on radiocommunications, ITU contributes to ensure more accurate weather predictions, climate change monitoring and mitigation, public protection and disaster relief, as well as search and rescue, thus increasing resilience to disasters and reducing the losses caused by disasters.

Goal 12. Ensure sustainable consumption and production patterns

ICTs and responsible consumption and production are linked in two ways: increased dematerialization and virtualization as well as innovative ICT applications enabling sustainable production and consumption. Cloud computing, smart grids, smart metering, and reduced energy consumption of ICTs all have a positive impact on reducing our consumption. However, ICTs themselves require energy consumption. Therefore, effective policies are needed to ensure the negative impacts of ICTs, such as e-waste, are minimized. ITU is committed to tackling the challenges of e-waste by developing global strategies and policies which aim to reduce the adverse environmental effects of e-waste. ITU develops reports, toolkits and educational material to raise awareness on e-waste among its member states, sector members and academia on e-waste. It also provides direct assistance in planning and implementation of e-waste management techniques.

ITU contributes to SDG12 Targets 12..2, 12.3, 12.4 and 12.5:

- ITU has been given a mandate to "assist developing countries in undertaking proper assessment of the size of e-waste and in initiating pilot projects to achieve environmentally sound management of e-waste through e-waste collection, dismantling, refurbishing and recycling." To this end ITU is developing e-waste guidelines to help countries identify best policies. It is also carrying out an electronic waste management project, and recently launched a new partnership to help improve global e-waste statistics. Country case studies on the management of waste, electrical and electronic equipment (WEEE), have continued under the broader umbrella of ICTs and the environment analysing strategies to develop a responsible approach to and comprehensive treatment of e-waste.
- ITU promotes innovative ICT solutions in the domain of e-waste, and develops green ICT standards to reduce their negative impact. Studies on circular economy, including e waste, in support of SDG 12.4, address lifecycle and rare-metal recycling approaches for ICT equipment to minimize the environmental and health impact of e waste, on how to use ICTs to help countries and the ICT sector to adapt to the effects of environmental challenges, including climate change, in line with the Sustainable Development Goals (SDGs). Needs are being identified for more consistent and standardized eco-friendly practices for the ICT sector (e.g. labelling) including assessment of the sustainability impact of ICT; circular economy, environmentally sound management of e waste, energy efficiency and climate change to achieve the Sustainable Development Goals (including the Paris Agreement, Connect 2020 Agenda, SDGs, etc.). Several Recommendations were produced that help deal with e-waste procedures for recycling rare metals and life-cycle management in ICT goods, as well as external universal power adapter and green battery solutions, aiming to extend the life cycle and possibility of avoiding device duplication to reduce the demand on raw materials, limit the amount of e-waste and increase usability. The ITU Global Portal on

e-Waste features external resources on e-waste, including municipal waste, directed towards empowering institutional and governmental capabilities.

- ITU, in support of SDG target 12.4, studies to combat counterfeiting products including telecommunication/ICT and mobile device theft. ITU technical work to combat ICT counterfeiting continues to gain momentum with new standards under development, supported by ongoing studies into the scale and dynamics of the counterfeiting challenge.
- By providing globally harmonized spectrum and standards and promoting their adoption, ITU enables the development of mobile and IoT, which contribute to reduce waste generation in production, distribution and consumption.

Goal 13. Take urgent action to combat climate change and its impacts

ICTs, including satellite monitoring, play a crucial role in earth monitoring, sharing climate and weather information, forecasting, and early warning systems. ICTs therefore enable both the global monitoring of climate change as well as strengthen resilience by helping mitigate the effects of climate change through forecasting and early warning systems.

ITU contributes to targets 13.1, 13.3, 13.6, 13.a and 13.b through:

- Developing and delivering training programmes on ICT and climate change. It also contributes by increasing resilience through the development and establishment of monitoring and early warning systems, in partnership with other stakeholders.
- Implementing a project on restoring connectivity through the use of the movable and deployable ICT resource unit.
- The implementation of projects on climate change adaptation, developing satellite communications capacity and emergency communications solutions for the Pacific Islands.
- ITU's work on environment, climate change and circular economy is responsible for studies on methodologies for examining the potential role of ICTs in climate change related activities. ITU has published various guidelines and Recommendations on how ICTs are fundamental for monitoring climate change, mitigating and adapting to its effects and assisting in the transition towards a green and circular economy.
- Raising awareness of the role of ICTs, ITU is promoting transformative solutions that can ensure a sustainable future for all and reduce the impacts of unforeseen disasters, and serves as a platform to discuss the appropriateness of specific ICT technologies and solutions.
- In order to achieve target 13.6, the traffic management systems need to be implemented by 2019. ITU Collaboration on ITS Communication Standards CITS has a coordination function. CITS catalyses work in ITU study groups.
- Spectrum and standards provided by ITU for Earth observation systems to ensure monitoring and timely warning of natural and environmental disasters, accurate climate prediction and a detailed understanding, are essential to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. Sound and television broadcasting, PPDR and commercial mobile broadband networks, IoT, search and rescue satellite systems, as enabled by ITU activities, are also key enablers to ensure timely awareness and rescue of populations in case of climate-related hazards and natural disasters.
- Disseminating Handbooks and reports and organizing seminars and workshops, ITU contributes to improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
- The Global E-waste Monitor, a joint effort of the ITU, the United Nations University (UNU) and the International Solid Waste Association (ISWA), provides the most

comprehensive overview of global e-waste statistics and an unprecedented level of detail, including an overview of the magnitude of the e-waste problem in different regions.

- ITU standards for International Emergency Preference Scheme (IEPS) for disaster relief operations and for Emergency Telecommunications Services, and for communicating disaster alerts and public warnings provide specifications for the use of public telecommunications for emergency and disaster relief operations and enable telecommunications in the case of emergency and disaster situations.

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

ICTs can play a significant role in the conservation and sustainable use 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.

Big data can be used to analyse short- and long-term trends in terms of biodiversity, pollution, weather patterns and ecosystem evolution, and to plan mitigation activities.

Mobile devices – and especially mobile broadband enabled devices – help individuals to access information concerning the oceans, and to take an active role in discussing environmental issues and monitoring adherence to conservation targets.

ITU contributes to SDG14 Targets 14.1, 14.2, 14.a:

- Target 14.1 and 14.2 - Spectrum and standards provided by ITU for Earth observation systems are a key enabler to monitor, conserve and use the oceans, seas and marine resources for sustainable development. In particular, understanding the forces behind changing weather patterns which requires mapping variations in ocean surface conditions worldwide and the use of collected data to develop and run powerful models of ocean behaviour;
- Target 14.a - Spectrum and standards provided by ITU for GNSS, sea drones and satellite oceanic observations, are an essential enabler to Increase scientific knowledge on the state of oceans and marine resources;
- ITU, the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC), and the World Meteorological Organization (WMO) established a Joint Task Force (JTF) in late 2012 after Workshops in Rome (2011) and Paris (2012). The JTF is tasked with developing a strategy and roadmap that could lead to enabling the availability of submarine repeaters equipped with scientific sensors for ocean and climate monitoring and disaster risk reduction (tsunamis). It will also analyse the potential renovation and relocation of retired out-of-service cables in this realm. With the installation of new trans-ocean and regional telecommunication cable systems equipped with sensors, a global network could be established providing decadal real-time data for ocean climate monitoring and disaster mitigation (particularly from tsunamis).

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

ICTs can play a significant role in the conservation and sustainable use of terrestrial ecosystems and the prevention of the loss of biodiversity – 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 can deliver on the spot updates in real-

time. Big data can be used to analyse short- and long-term trends in terms of biodiversity, pollution, weather patterns and ecosystem evolution, and to plan mitigation activities.

ITU contributes to SDG15 Targets 15.1, 15.2, 15.3, 15.4:

- Spectrum and standards provided and promoted by ITU for Earth observation systems are a key to ensure monitoring, conservation, restoration and sustainable use of terrestrial ecosystems and biodiversity, including forests, mountains, land and soil.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

ICTs can play an important role in crisis management, humanitarian aid and peacebuilding, and have proved to be a powerful aid in areas such as electoral monitoring. The growing use of open data by governments increases transparency, empowers citizens, and helps to drive economic growth. ICTs are also essential in terms of record-keeping and tracking government data and local demographics.

When natural or man-made disasters occur, ICTs are crucial in obtaining, communicating and transmitting accurate and timely crisis information, allowing appropriate responses to be made. In the future, big data analysis and data mining should allow better use to be made of the vast amount of data that is already openly accessible online.

ITU contributes to targets 16.7, 16.9, 16.10 and 16.a through:

- Committed to promoting broadband, and mobile broadband in particular, to enable citizens to access any content, anytime, anywhere in the global information society. Enabling ICT regulatory policies promote innovative services and technologies enhancing such access and driving social and economic progress.
- The monitoring of Target 16.10 by collecting and disseminating data on Internet access and usage, a key indicator for public access to information.
- Providing high-quality data, research, analyses, and tools (to support membership in implementing and reviewing strategies, policies, and legal and regulatory frameworks as well as in moving towards evidence-based decision-making to achieve digital transformation.
- Capacity-building initiatives in areas such as international Internet governance and training in cybersecurity. ITU also contributes to this target by providing institutional capacity support to Centres of Excellence and Internet training Centres.
- The creation and ongoing capacity building of ICT regulatory authorities. ITU regular activities such as the Global Symposium for Regulators allow to have a constructive discussion on topical regulatory issues and identify best practice guidelines while ad hoc targeted assistance intervenes to leverage on those and provide for policy choices opening ways to new digital opportunities.
- Developing various platforms for developing a common understanding, vision and strategy on ICTs and multiple collaboration mechanisms are put in place to further the dialogue among regulatory authorities as well as with industry, consumers and other stakeholders.
- Acting as a partner to ICT regulators and policy makers as well as to the private sector to further ICT development and social inclusion, by facilitating and creating partnerships, such as private-public-partnerships (PPP), with aid-donors, governments, ministries and NGOs, in particular to meet universal access goals for rural, remote and unserved areas and for people with special needs.

- Promoting and facilitating international cooperation on specialized fields such as cybersecurity, together with other UN agencies, in order to contribute to the achievement of peace and international security.
- Providing globally harmonized spectrum and standards, ITU enables the development of mobile broadband, satellite and terrestrial sound and television broadcasting and their wider penetration, thus facilitating public access to information and protection of fundamental freedoms.
- Standardizing technical specifications and solutions for identity management in (heterogeneous) in next generation networks for interoperable identification and authentication (SDG target 16.9).

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

ICTs are specifically mentioned as a means of implementation under SDG17, highlighting the cross-cutting transformative potential of ICTs. Indeed, ICTs are crucial in achieving all of the SDGs, since ICTs are catalysts that accelerate all three pillars of sustainable development – economic growth, social inclusion and environmental sustainability – as well as providing an innovative and effective means of implementation in today's inter-connected world. Paragraph 15 of the 2030 Agenda for Sustainable Development highlights that "the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies…"

ITU contributes to targets 17.3, 17.6, 17.7, 17.8, 17.9, 17.11, 17.16 and 17.19 through:

- The implementation of ITU Strategic Plan and WTDC Action Plan will contribute in achieving the SDGs. Based on key policy and regulatory developments which impact innovation and investment, including and in particular through implementation of the Regional Initiatives and to implement the SDGs where ICTs can play a decisive role, including health, education, gender equality, agriculture, e-waste and emergency telecommunications. Mapping of activities between other Sectors is conducted and calendar of events which facilitates collaboration and coordination between Sectors is developed.
- Study groups that provide an opportunity for all Member States and Sector Members, Associates and Academia, to share experiences, present ideas, exchange views and achieve consensus on appropriate strategies to address ICT priorities.
- Mobilizing in-cash and in-kind resources through partnership with various stakeholders from the ICT ecosystem for the implementation of ICT activities, projects and initiatives in developing countries at national and regional levels, including by developing strategies and related tools and services (databases sponsorship packages, dedicated websites, concept notes, promotional vehicles, etc.).
- Strengthening the global ICT innovation ecosystem through activities such as know-how sharing (e.g. WSIS, Telecom, Broadband Commission for Sustainable Development), and co-creating grassroots projects based on new global and local partnerships.
- Strengthening the means of implementation and enhancing access to science, technology and innovation by strengthening international cooperation and knowledge sharing on key ICT topics through its dedicated study groups.
- Providing a neutral platform for international cooperation towards building a harmonized and coordinated approach to fast-forward the evolution of the information society.

- Monitoring of Target 17.6 by collecting and disseminating data on Internet access and usage, in particular fixed broadband access, which is a key requirement for enhanced access to science, technology and innovation networks.
- The establishment of Mutual Recognition Agreements for a common and harmonized Conformance and Interoperability (C&I) programme at international and regional levels. Through the share and efficient use of C&I infrastructures – as laboratories, accreditation bodies and regulatory practices – technical requirements can be harmonized and the transit of ICT goods and services can be facilitated, increasing trade and regional development.
- The deployment of broadband technology and network infrastructures for multiple telecommunication services and applications, and to the evolution to all IP-based wireless and wired next-generation networks (NGNs), introducing digital broadcasting, which is opening up opportunities for the dissemination of environmentally sound solutions.
- The monitoring of Target 17.8 by collecting and disseminating a number of relevant ICT indicators that enable STI capacity building in least developed countries, including on Internet access and usage, international bandwidth and ICT prices. Activities are carried out in close collaboration with the Partnership on Measuring ICT for Development.
- Bringing together key stakeholders to discuss international cooperation on ICT through its annual Global Symposium for Regulators, regional economic forums and dialogues and the World Telecommunication/ICT Indicators Symposium (WTIS), organised by ITU.
- Promoting ICT regulatory policies enhancing policy coherence, notably by making knowledge exchange tools and platforms available, raising awareness about the importance of an enabling environment.
- Building harmonized regulatory frameworks within and across regions, and establishing a broader and inclusive dialogue and enhanced cooperation among all stakeholders.
- Enhancing the global partnership for sustainable development by working with governments, through their policy making and development of institutional frameworks for the ICT sector as well as with the private sector, to lay the foundation of modern digital economies.
- Encouraging and promoting effective public, public-private and civil society partnerships by partnering with a range of stakeholders to empower women, girls, youth, children, indigenous peoples and persons with disabilities(e.g. for example by leading the Thematic Area on Digital Skills of the Global Initiative for Decent Jobs for Youth, and through the ITU-ILO Digital Skills Campaign for Decent Jobs for Youth; by leading the International Girls in ICT Day Campaign or by contributing to the regional initiatives and events in ICT accessibility – ICT for all)
- An ongoing track record of inviting experts from developing countries to ITU meetings, workshops etc. Also the Focus Group on Innovation studied cases of ICT innovations for developing countries and developed proposals for new standardization activities for ITU study groups and the ICT Innovation Panel.
- Developing and disseminating best practices on the use of radiocommunications and organizing seminars and workshops, ITU contributes to enhance the use of enabling technologies, in particular information and communications technologies.

  Cooperation and coordination with other standards developing organizations, such as through ITU Focus Groups, workshops and seminars, liaison activities, etc.