

## Study Group 1 Question 7

# Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs



Output Report on ITU-D Question 7/1

**Access to telecommunication/  
ICT services by persons  
with disabilities and other  
persons with specific needs**

Study period 2018-2021



## Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs: Output Report on ITU-D Question 7/1 for the study period 2018-2021

ISBN 978-92-61-34131-2 (Electronic version)

ISBN 978-92-61-34141-1 (EPUB version)

ISBN 978-92-61-34151-0 (Mobi version)

### © International Telecommunication Union 2021

International Telecommunication Union, Place des Nations, CH-1211 Geneva, Switzerland

Some rights reserved. This work is licensed to the public through a Creative Commons Attribution-Non-Commercial-Share Alike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that ITU endorses any specific organization, product or service. The unauthorized use of the ITU name or logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the International Telecommunication Union (ITU). ITU is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition". For more information, please visit

<https://creativecommons.org/licenses/by-nc-sa/3.0/igo/>

**Suggested citation.** Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs: Output Report on ITU-D Question 7/1 for the study period 2018-2021. Geneva: International Telecommunication Union, 2021. Licence: CC BY-NC-SA 3.0 IGO.

**Third-party materials.** If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the

copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

**General disclaimers.** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of ITU or its secretariat concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by ITU in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by ITU to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall ITU be liable for damages arising from its use.

**Cover photo credits:** Shutterstock

## Acknowledgments

The study groups of the ITU Telecommunication Development Sector (ITU-D) provide a neutral platform where experts from governments, industry, telecommunication organizations and academia from around the world gather to produce practical tools and resources to address development issues. To that end, the two ITU-D study groups are responsible for developing reports, guidelines and recommendations based on input received from the membership. Questions for study are decided every four years at the World Telecommunication Development Conference (WTDC). The ITU membership, assembled at WTDC-17 in Buenos Aires in October 2017, agreed that for the period 2018-2021, Study Group 1 would deal with seven Questions within the overall scope of “enabling environment for the development of telecommunications/information and communication technologies.”

This report was prepared in response to Question 7/1: **Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs** under the overall guidance and coordination of the management team of ITU-D Study Group 1 led by Ms Regina Fleur Assoumou-Bessou (Côte d'Ivoire), as Chairman, supported by the following Vice-Chairmen: Ms Sameera Belal Momen Mohammad (Kuwait); Mr Amah Vinyo Capo (Togo); Mr Ahmed Abdel Aziz Gad (Egypt); Mr Roberto Hirayama (Brazil); Mr Vadim Kaptur (Ukraine); Mr Yasuhiko Kawasumi (Japan); Mr Sangwon Ko (Republic of Korea); Ms Anastasia Sergeyevna Konukhova (Russian Federation); Mr Víctor Martínez (Paraguay); Mr Peter Ngwan Mbengie (Cameroon); Ms Amela Odobašić (Bosnia and Herzegovina); Mr Kristián Stefanics (Hungary) (resigned in 2018); and Mr Almaz Tilenbaev (Kyrgyzstan).

The report was authored by the Rapporteur for Question 7/1 Ms Amela Odobašić, Communications Regulatory Agency (Bosnia and Herzegovina), in collaboration with the following Vice-Rapporteurs: [Mr Abdoulaye Dembele](#) (Mali) until he sadly passed away in November 2020; Ms Anastasia Sergeyevna Konukhova (Russian Federation); Ms Mina Seonmin Jun (Republic of Korea); Ms Maryam Tayefeh Mahmoudi (Islamic Republic of Iran); Ms Andrea Saks (United States); Mr Mitsuji Matsumoto (Japan); Ms Yinghua Wu (China); Mr George Anthony Giannoumis (Oslo and Akershus University College of Applied Sciences, Norway); Ms Ileana Gama Benítez (Mexico); Mr Godfrey Muhatia (Kenya); Ms Rachel Kalala Kabedi (Democratic Republic of the Congo); Mr Lamine Mahamadou Diallo (Mali) and Mr Issouf Soulama (Burkina Faso).

Special thanks go to chapter coordinators for their dedication, support and expertise.

This report has been prepared with the support of the ITU-D study group focal points, the editors as well as the publication production team and ITU-D study group secretariat.

# Table of contents

Acknowledgments .....	iii
List of figure .....	v
Executive summary .....	vi
i. Introduction .....	vi
ii. Statement of the situation .....	vii
iii. Impact of COVID-19 on telecommunication/ICT accessibility .....	viii
Abbreviations and acronyms .....	xii
 <b>Chapter 1 - Telecommunication/ICT accessibility policy and regulatory framework .....</b>	<b>1</b>
1.1. Policy and regulatory frameworks for telecommunication/ICT accessibility for persons with disabilities and other persons with specific needs, and tools to foster their implementation .....	1
1.2. Guidelines for amending existing legislation to implement ICT accessibility .....	3
1.3. Overview of current policies and regulations for telecommunication/ICT accessibility for persons with disabilities and other persons with specific needs .....	4
1.4. Good practices, challenges and available case studies .....	7
 <b>Chapter 2 - Technologies and solutions in an ICT-accessible ecosystem .....</b>	<b>11</b>
2.1. Mobile communication accessibility policy framework .....	13
2.2. Television/video programming accessibility policy framework .....	16
2.3. Policy approaches to web accessibility .....	21
2.4. Accessible ICT public procurement policies and strategies .....	27
 <b>Chapter 3 - Requirements and guidelines to promote, implement and use accessible public telecommunication and ICT spaces .....</b>	<b>30</b>
3.1. Requirements for relay services for persons with disabilities and other persons with specific needs .....	30
3.2. ICT accessibility in education .....	31
3.3. Requirements for accessible mobile phones and apps for older persons with age-related disabilities .....	34
 <b>Chapter 4 - Conclusions and general recommendations .....</b>	<b>36</b>

4.1. Key issues to be considered for implementing a telecommunication/ICT accessibility policy and regulatory framework for persons with disabilities and persons with specific needs in all countries .....	36
4.2. Promoting accessibility in public ICT spaces, such as telecentres and public payphones .....	36
4.3. Promoting accessibility tools for accessible e-education, which can be used for people who have difficulties mastering reading and writing .....	39
4.4. Key policy considerations for web accessibility .....	39
4.5. Key policy considerations for accessible mobile phones and services .....	41
4.6. Key issues identified by members in regard to developing policies and services for accessibility of audiovisual media content .....	41
4.7. Key considerations in the area of public procurement .....	41
4.8. Final comments – Food for thought.....	42
<b>Annex 1: Overview of good practices and achievements in ICT accessibility worldwide.....</b>	<b>44</b>
<b>Annex 2: ITU-D resources on ICT accessibility .....</b>	<b>51</b>
<b>Annex 3: Accessibility-related information pertaining to the other ITU Sectors and cooperation with the Joint Coordination Activity on accessibility and human factors (JCA-AHF).....</b>	<b>56</b>

## List of figure

Figure 1: Functional blocks of accessibility service.....	21
---	----

# Executive summary

This document presents a final report on ITU Telecommunication Development Sector (ITU-D) Question 7/1 (Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs) for the ITU-D study period 2018-2021.

Sadly, during this study period, a Vice-Rapporteur for Question 7/1, and an important member of ITU family, a distinguished delegate from Mali, Mr Abdoulaye Dembele, passed away in November 2020. Mr Dembele was a kind person and a strong advocate not only for persons with disabilities, but for all of us.

Following an introduction, a statement of the situation and a specific section on the impact of the COVID-19 pandemic on telecommunication/ICT accessibility, the report comprises four core chapters, covering telecommunication/ICT accessibility policy and regulatory framework; technologies and solutions in an accessible ICT ecosystem; requirements and guidelines to promote, implement and use accessible public telecommunication and ICT spaces; and conclusions and general recommendations.

The three annexes provide an overview of good practices related to each of the above topics; a list of ITU-D resources on ICT accessibility; and accessibility-related information pertaining to the other ITU Sectors and the relevant ITU joint coordination activity.

## i. Introduction

In today's world, as the digital revolution intensifies and grows, and recognizing the global impact of information and communication technologies (ICTs) across all sectors of activity, there is a need for governments, non-profit organizations and businesses not only to extend access to telecommunications/ICTs more widely than ever, but also to ensure that digital information products and services are accessible to everyone, regardless of their gender, age, ability, location or financial means, as the only way forward for creating a more enabling and competitive global society and achieving digital inclusion.

This global objective is also in line with ITU's Strategic goal 2 (Inclusiveness: Bridge the digital divide and provide broadband access for all) and the associated specific Target 2.9: "By 2023, enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities should be established in all countries".<sup>1</sup>

To put this into practice, ICT accessibility policies and strategies must be placed squarely on the agenda of global policy-makers, and industry and the private sector will need to develop accessible ICTs.

Bearing in mind that the United Nations identifies access to information, including digital information and the Internet, as a basic human right that should be extended to all citizens of the world, a prime goal of digital inclusion must be full implementation of the United Nations

---

<sup>1</sup> ITU strategic plan for 2020-2023. [Resolution 71 \(Rev. Dubai, 2018\)](#) of the Plenipotentiary Conference.

Convention on the Rights of Persons with Disabilities (CRPD).<sup>2</sup> That Convention designates ICTs as an integral component of accessibility rights, on par with transportation and the physical environment. Implementation of CRPD also reflects and impacts on the United Nations Sustainable Development Goals (SDGs) and the global commitment “that no one will be left behind”.<sup>3</sup> However, leaving no one behind will be possible only if ICTs are available, accessible and affordable to all, and in particular to the disadvantaged groups of society – persons with disabilities, persons with specific needs, including indigenous peoples and people living in rural areas, women and girls, youth and children, as well as older persons.<sup>4</sup>

Although the spread of new ICTs is seen as something which has a positive impact on sustainable development, it may also be a source of risks that require policy responses. Given that half of the world’s population is not yet using the Internet, technological change, including the impact of artificial intelligence (AI) or the emergence of smart cities and society, may create new divisions. Therefore, timely implementation of the right enabling environments (i.e. policies, strategies and regulatory frameworks) is key to ensuring that the contribution of ICTs to sustainable development is positive and leaves no one behind.

No one should be excluded from using the Internet, mobile phones, television, computers and the myriad of associated applications and services that exist for education, economic and social life, cultural activities, e-government or e-health. Exclusion from these ICT-enabled services and applications not only cuts people off from the information society and prevents them from accessing essential public services, but also deprives them of the opportunity to live an independent life.

## ii. Statement of the situation

According to ITU estimates, at end 2018, some 51.2 per cent of the global population, or 3.9 billion people, were using the Internet.

The World Health Organization (WHO) states that globally over 1 billion people live with some form of disability.<sup>5</sup> The 2017 United Nations report on World Population Ageing indicates that the number of older persons (age 60 and above), who may face age-related disabilities, will stand at 1.4 billion in 2030 and is expected to climb to 2.1 billion in 2050.<sup>6</sup> Furthermore, as remarked within the framework of the WHO-ITU Making Listening Safe initiative, 1.1 billion young people are at risk of suffering hearing loss due to unsafe listening habits.<sup>7</sup> These data suggest that, in the next 30 years, the number of people affected by some form of disability could constitute half of the world’s population, all of whom will require accessible ICTs. Accessibility of ICTs for everyone means equitable access to information and communication, without limitation.

<sup>2</sup> United Nations. Department of Economic and Social Affairs (UNDESA). Disability. [Convention on the Rights of Persons with Disabilities \(CRPD\)](#).

<sup>3</sup> United Nations. A/RES/70/1. [Transforming our world: The 2030 Agenda for Sustainable Development](#).

<sup>4</sup> Pursuant to United Nations General Assembly [Resolution 50/141](#) (1996) (International Year of Older Persons: towards a society for all ages), the General Assembly decided, in §14, “... that henceforth the term “older persons” should be substituted for the term “the elderly”, in conformity with the United Nations Principles for Older Persons, with the result that the Year and the Day concerned shall be called the International Year of Older Persons and the International Day of Older Persons”.

<sup>5</sup> World Health Organization (WHO) Media Centre. News release. [New world report shows more than 1 billion people with disabilities face substantial barriers in their daily lives](#). New York, 9 June 2011.

<sup>6</sup> UNDESA. ST/ESA/SER.A/397. [World Population Ageing – 2017 \[Highlights\]](#). New York, 2017.

<sup>7</sup> WHO (2015). Prevention of blindness and deafness (PBD). [Make Listening Safe](#).



In September 2015, the Member States of the United Nations and the United Nations General Assembly formally agreed on the SDGs and set out a global agenda for development based on economic prosperity, social inclusion and environmental sustainability, known as the 2030 Agenda for Sustainable Development. The Agenda recognizes that “the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies”.<sup>8</sup>

With the aim of bridging the digital divide and equipping all groups of society to access ICTs, including persons with disabilities and other persons with specific needs, the ITU membership, assembled at the World Telecommunication Development Conference (Buenos Aires, 2017) (WTDC-17),<sup>9</sup> agreed that the objectives under Question 7/1 to be studied by the ITU Telecommunication Development Sector (ITU-D) for the study period 2018-2021 should focus on the implementation of ITU policies and practices in respect of ICT accessibility.<sup>10</sup>

Key steps towards achieving ICT accessibility continue to include devising national policies and legal frameworks; developing standards; creating capabilities; raising awareness; sharing good practices; and ensuring timely implementation to respond to new technological trends. To this end, all stakeholders are encouraged to engage in global and regional activities that advance ICT accessibility, including ITU regional initiatives, the ITU Digital Inclusion programme and ongoing technical standardization of ICT accessibility, and to ensure effective implementation of the available accessibility legislation. In support of their efforts to implement ICT accessibility, stakeholders can draw on available ITU resources such as model policies and guidelines,<sup>11</sup> training courses,<sup>12</sup> video tutorials on how to develop accessible digital content<sup>13</sup> and a programme on web accessibility,<sup>14</sup> as well as the platform provided by the Rapporteur Group on Question 7/1, working in close collaboration with other ITU Sectors and other partners. (For an extensive list of these resources, see also **Annexes 2 and 3** to this report). Through these mechanisms, ITU contributes to creating a more self-sustainable membership and stimulates implementation of the key steps at national, regional and global level.

### iii. Impact of COVID-19 on telecommunication/ICT accessibility

During the COVID-19 pandemic, the issue of digital inclusion and telecommunication/ICT accessibility has gained significant momentum around the world.

The importance of designing and implementing more inclusive and accessible societies was reiterated in this context by the Secretary-General of the United Nations, António Guterres, who stated that “We must guarantee the equal rights of people with disabilities to access healthcare and lifesaving procedures during the pandemic”.<sup>15</sup>

<sup>8</sup> United Nations. A/RES/70/1 (op. cit.)

<sup>9</sup> ITU. [Final Report of the World Telecommunication Development Conference \(Buenos Aires, 2017\)](#) (WTDC-17). Geneva, 2018.

<sup>10</sup> ITU. ITU-D study groups. [ITU-D Question 7/1](#) (Access to telecommunication/ICT services by persons with disabilities and with specific needs).

<sup>11</sup> ITU-D. Digital inclusion. Persons with disabilities. [ITU reports and guidelines on accessibility](#).

<sup>12</sup> ITU-D. Regional presence. Europe. [Self-paced online training on ICT accessibility: The key to inclusive communication](#).

<sup>13</sup> ITU-D. Digital inclusion. Persons with disabilities. [Video tutorials on the creation of accessible digital documents](#).

<sup>14</sup> ITU-D. Digital inclusion. Persons with disabilities. [The ITU-D national programme in web accessibility: “Internet for @ll”](#).

<sup>15</sup> United Nations. COVID-19 response. [“We have a unique opportunity to design and implement more inclusive and accessible societies”](#). New York, 6 May 2020.

ITU Secretary-General Houlin Zhao has highlighted that “The unprecedented COVID-19 crisis has demonstrated the vital role of digital technologies. Now more than ever, ITU is committed to leveraging its diverse membership to make humanity safer, stronger, and more connected”.<sup>16</sup>

To support its membership, ITU has a dedicated COVID-19 updates webpage highlighting all ITU initiatives, events, products and partnerships related to COVID-19.<sup>17</sup> Furthermore, ITU has developed guidelines to ensure that digital information, services and products are accessible for everyone, including persons with disabilities, during COVID-19. Bearing in mind that many persons with disabilities will face a higher risk of contamination due to lack of access to information on the measures to be assimilated and respected during this pandemic period, it is important to ensure that all people are able to access information and instructions during the COVID-19 pandemic regardless of gender, ability, age or location.<sup>18</sup>

In this context, ICT accessibility has emerged even more plainly as being essential to guaranteeing inclusive societies in the digital world. There is no doubt that COVID-19 has provided clear proof that there is a need to intensify all activities related to digital/ICT accessibility in order to ensure digital inclusion for all, including persons with disabilities, and for Member States to expedite achievement of the aforementioned ITU Target 2.9 by establishing enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities, bearing in mind that timely implementation of this objective could be vital for everyone.

For this to happen, and to give the public and private sectors and industry manufacturers the necessary incentive to develop and deliver accessible ICTs, the introduction and implementation of ICT accessibility policies and strategies should be considered as a top priority and a key item on the global policy-makers' agenda. In this way, governments will lead by example and ensure that digital information, products and services are available, affordable and accessible for all persons, including those with disabilities.

In view of the COVID-19 pandemic and the upcoming recovery period, and ahead of the upcoming world telecommunication development conference (WTDC-21), ITU-D Question 7/1 addressed the impact, within the scope of its mandate related to ICT accessibility, of what is an unprecedented global situation, through a webinar on “Digital accessibility during COVID-19 and the recovery period: An imperative to ensure inclusive societies in the digital world”.<sup>19</sup> This open, informative and interactive web dialogue analysed the impact of COVID-19 on the lives of persons with disabilities, as well as the importance of global implementation of ICT accessibility. The aim was to motivate all stakeholders to ensure that, through national, regional and global implementation of ICT accessibility, Member States guarantee that no one is left behind in the digital world and that inclusive communities are established.

During the webinar, it was agreed that:

- ICT accessibility should be mainstreamed through the implementation of policies, regulations and communication strategies (including education, employment and health) for the socio-economic development of all people, including persons with disabilities. (Work of ITU-D Question 7/1)

<sup>16</sup> ITU. [Tech v COVID-19: Managing the crisis](#). ITU News magazine, No.3, 2020.

<sup>17</sup> ITU. [COVID-19 response and recovery](#).

<sup>18</sup> ITU. [ITU Guidelines on how to ensure that digital information, services and products are accessible by all people, including persons with disabilities, during COVID-19](#).

<sup>19</sup> ITU-D. Study groups: 2018-2021. [ITU Public Webinar on digital accessibility during COVID-19](#).

- Implementation of ICT accessibility policies and strategies should be considered as a top priority and part of the global policy-makers' agenda.
- It is vital to speed up the achievement of Target 2.9 under ITU Strategic goal 2 ("*By 2023, enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities should be established in all countries*"), the timely implementation of which could be vital for all.
- To this end, multistakeholder engagement is critical for ensuring that information, products and services are accessible to all people regardless of their gender, age, ability, location or financial means.
- It is necessary to incentivize both the public and private sectors as well as industry manufacturers to develop and deliver accessible ICTs.
- The digital gap will increase unless accessibility of ICTs is considered as from the design stage.

Some of the contributions from members shared measures taken during COVID-19 that could be replicated regionally and globally, including the following:

**Bosnia and Herzegovina** has implemented substantial measures to ensure that all information, including emergency information related to COVID-19, is available in accessible formats to all. In addition, to respond adequately to the needs of persons with disabilities, a partnership was established with Initiative and Civil Action (ICVA).<sup>20, 21</sup>

In the **Islamic Republic of Iran**, various activities were carried out to provide appropriate services for persons with disabilities during the COVID-19 outbreak, including teleguidance for prevention and treatment purposes, tele-education and e-learning, and telerehabilitation.<sup>22</sup>

**China** made available an accessible Internet diagnosis and treatment app to help the visually impaired seek medical treatment without leaving home, which provided a distance e-education service for visually-impaired students to learn professional knowledge such as acupuncture and massage, etc., and provided a service for the hard of hearing to communicate with able-bodied persons by using speech and text interconversion technology. Beijing Phoenix Medlink Technology Co. Ltd. optimized the Beijing Yanhua Hospital medical app for accessibility, so that the visually impaired can use the app independently with the help of a screen reader, and thereby complete the whole process of medical treatment. This service provides timely assistance to the visually impaired as well as people with mobility difficulties in obtaining a diagnosis over the Internet. Improving the app's functionality in terms of accessibility helps overcome the problems that visually-impaired persons face in making independent medical consultations.<sup>23</sup> China Unicom developed an accessible communication service product which enables the hearing-impaired to answer and make calls with the help of automatic speech-recognition technology and speech-synthesis technology.

**Japan** has taken proactive measures that include promoting accessibility features within the digital transformation process and increasing online education facilities. Furthermore, as a communication tool alongside video, sign language, voice and text, new technologies that support language conversion and translation were considered. For example, the emergency notification system Net119, which is based on chat text exchange, was introduced.<sup>24</sup>

<sup>20</sup> ITU-D SG1 Document [SG1RGQ/301](#) from Bosnia and Herzegovina

<sup>21</sup> *Inicijativa I civilna akcija* (ICVA) ([Initiative and Civil Action](#)).

<sup>22</sup> ITU-D SG1 Document [SG1RGQ/305](#) from the ICT Research Institute (Islamic Republic of Iran)

<sup>23</sup> ITU-D SG1 Document [SG1RGQ/353](#) from China

<sup>24</sup> ITU-D SG1 Document [SG1RGQ/376](#) from Japan

The **Republic of Korea** has compiled and applied a general epidemic response manual in the process of tackling the COVID-19 outbreak. The country's government is fully aware of the difficulties faced by the physically challenged, even in the initial information acquisition stage, in the wake of the outbreak of an epidemic. It thus provided support in connection with the current COVID-19 outbreak by categorizing the physically challenged into key target groups based on their vulnerabilities and unique needs, so as to consider tailored actions to improve their access to information on the epidemic.<sup>25</sup>

---

<sup>25</sup> ITU-D SG1 Document [SG1RGQ/381](#) from the Korea Information Society Development Institute (KISDI) (Republic of Korea)

# Abbreviations and acronyms

*This table contains abbreviations/acronyms relating to international, regional or supranational bodies, instruments or texts, as well as technical and other terms used in this report.*

*Abbreviations/acronyms of national bodies, instruments or texts are explained in the text relating to the country concerned, and are thus not included in this table.*

Abbreviation	Term
AAT	automatic Alt Text
AD	audio description
AI	artificial intelligence
ASR	automatic speech recognition
AT	assistive technology
ATAG	Authoring Tool Accessibility Guidelines
BDT	Telecommunication Development Bureau
CA	communication assistant
CI	computational intelligence
COVID-19	coronavirus disease 2019
CRPD	Convention on the Rights of Persons with Disabilities
DARE	Digital Accessibility Rights Evaluation Index
DPI	Disabled People's International
DPOs	organizations for people with disabilities
ECOWAS	Economic Community of West African States
G3ict	Global Initiative for Inclusive ICTs
GARI	Global Accessibility Reporting Initiative
GSMA	Global System for Mobiles Association
GSR	Global Symposium for Regulators
HCI	human-computer interaction
ICT	information and communication technology
IDA	International Disability Alliance
IEC	International Electrotechnical Commission
IFHOH	International Federation of the Hard of Hearing

(continued)

Abbreviation	Term
IPTV	Internet Protocol television
ISO	International Organization for Standardization
ITA	IPTV terminals with accessibility enhancements
ITU	International Telecommunication Union
ITU-D	ITU Telecommunication Development Sector
ITU-T	ITU Telecommunication Standardization Sector
JCA-AHF	Joint Coordination Activity on accessibility and human factors
MMS	multimedia messaging service
MWF	Mobile & Wireless Forum
NGO	non-governmental organization
NRA	national regulatory authority
OCR	optical character recognition
OTTs	over-the-top services
SDGs	United Nations Sustainable Development Goals
SMS	short message service
STT	speech-to-text
TTS	text-to-speech
TWSI	tactile walking surface indicator
UDL	universal design for learning
UNDESA	United Nations Department of Economic and Social Affairs
VoD	video on demand
W3C	World Wide Web Consortium
WA	web accessibility
WAI	Web Accessibility Initiative
WASLI	World Association of Sign-Language Interpreters
WCAG	Web Content Accessibility Guidelines
WFD	World Federation of the Deaf
WHO	World Health Organization
WTDC	World Telecommunication Development Conference
WTSA	World Telecommunication Standardization Assembly

# Chapter 1 – Telecommunication/ ICT accessibility policy and regulatory framework

## 1.1. Policy and regulatory frameworks for telecommunication/ICT accessibility for persons with disabilities and other persons with specific needs, and tools to foster their implementation

There are many reasons for promoting and implementing accessible telecommunications and ICTs for persons with disabilities.

It is a well-known fact that, in some countries, persons with disabilities tend to display resistance to ICTs because they are not accessible to them. To a large extent, the lack of Internet access prevents persons with disabilities from expanding their knowledge, and only a small proportion of them use social networks due to lack of web and mobile accessibility. The lack of legally binding regulations, lack of funds, insufficient awareness of the accessible services that do exist and the need to develop more and better ones remain the principal challenges.

National regulatory authorities (NRAs) and governmental institutions can play an essential role in improving the current situation by updating current legislation and promoting ICT accessibility. The fundamental goal of any policy should be to remove barriers to ICT use faced by persons with different kinds of disabilities. NRAs and governmental institutions should spare no effort to achieve this, exploiting the whole range of ICT devices. In accordance with the motto “Nothing about us without us”, the voice of persons with disabilities should be heard and heeded by policy-makers in all countries, and dealing with the legal aspects should go hand in hand with a change in attitude.

To build the capacity of ITU members in the different aspects of ICT accessibility, the ITU Telecommunication Development Bureau (BDT), in cooperation with the Global Initiative for Inclusive ICTs (G3ict), has elaborated the Model ICT Accessibility Policy report, as a tool to assist national policy-makers and regulators in developing ICT accessibility policy frameworks. The report, which is available in all six ITU official languages as well as in an accessible e-book format, helps countries understand the generic steps and requirements necessary to promote accessibility for persons with disabilities and provides guidance in areas where these can be adapted to national circumstances.<sup>1</sup> Members can also turn for guidance to the ITU/G3ict E-accessibility policy toolkit for persons with disabilities.<sup>2</sup>

Technology paradigms and business models are challenging existing regulatory patterns and frameworks. In the digital era, NRAs are expected to provide robust and enforceable mechanisms for consumer protection, including a set of rules on data protection, privacy and data portability, as well as accessible mechanisms for consumer redress. These are essential

<sup>1</sup> ITU. Digital inclusion. [Model ICT Accessibility Policy report](#). Geneva, November 2014.

<sup>2</sup> ITU/G3ict. [E-accessibility policy toolkit for persons with disabilities](#).

to support digital transformation in economic sectors across the board and to ensure that consumers' interests are safeguarded.<sup>3</sup>

Digital inclusion, in its broadest form, is the ability of individuals and groups to access and use ICTs. It has four critical elements:

- ICT accessibility (products, services and content developed taking into account accessibility standards, legislation and regulation to foster the development and availability of accessible ICTs)
- Access (Internet connectivity)
- Adoption (digital literacy, application in workforce development, education, healthcare, civic engagement)
- Affordability (affordable Internet and devices).

Therefore, key amendments to promote accessibility would ideally be incorporated in new law. Alternatively, policy-makers may wish to launch a process of amending their existing laws specifically to promote ICT accessibility.

Depending on what strategies are suitable for them, countries around the world have adopted different regulatory approaches, ranging from "light-touch" regulatory frameworks that rely on industry self- and co-regulation to more traditional regulatory approaches entailing the promulgation of regulations. According to the Model ICT Accessibility Policy report, the regulator's role in facilitating ICT accessibility covers a range of actions, from implementing policy to drafting and enforcing regulations, setting targets and licence conditions, monitoring and enforcing obligations, drafting or approving codes of practice and driving awareness campaigns and consultations. However, NRAs in some countries do not have ICT accessibility as a priority, and thus rely on voluntary actions on the part of the industry. In any event, NRAs need to adopt a proactive approach and consider taking steps to improve the current situation.

ITU and its Member States recognize that access to telecommunications/ICTs plays a crucial role in the social, cultural, economic, political and democratic life of populations. Therefore, to fulfil their fundamental rights, accessibility of telecommunications/ICTs and of regulatory frameworks must focus on the needs of persons with disabilities, to usher in policies that will allow them access to telecommunication/ICT services and technologies on an equal footing, as described in this chapter.

Besides strengthening legal and regulatory frameworks, it is crucial to promote accessible telecommunications/ICTs for persons with disabilities and persons with specific needs.

It should not be assumed that protecting persons with disabilities and ensuring equal rights in terms of access to telecommunication/ICT services is a matter of concern only for persons with disabilities. Telecommunication/ICT accessibility is in fact of lifelong relevance for everyone. With age, very few of us will successfully avoid age-related disabilities. Therefore, the global population must understand the importance of telecommunication/ICT accessibility, join forces and make the world accessible when they still have the capability and opportunity to effect the necessary changes, because they are creating the future for themselves.

While some countries and regions have already considered the integration of some form of ICT accessibility policy and regulatory framework to foster implementation in this domain,

---

<sup>3</sup> ITU Global Symposium for Regulators (GSR), 2019. [Best Practice Guidelines – Fast forward connectivity for all](#). Port Vila, Vanuatu, 2019.



for others it is still a work-in-process, as they strive to overcome the difficulties inherent in the implementation of ICT accessibility.

In addressing this common challenge affecting all interested stakeholders, and in response to the needs of ITU members identified by the work under the Question 7/1, ITU-D is developing an forthcoming interactive toolkit and self-assessment for ICT accessibility implementation ("Towards building inclusive digital communities") as a practical tool, with the following goals:

- Support all countries in obtaining a quick overview of their level of national ICT/digital accessibility implementation.
- Based on the assessment result (from among five levels of implementation), equip countries with tailored guidelines to support the development of appropriate policies and strategies to advance implementation.
- Monitor the quality of implementation processes in ICT/digital accessibility at the national, regional and global levels.
- Ultimately, provide a practical tool to help ITU members progress in the implementation of ITU Target 2.9 and fulfil their national, regional and global commitments towards building enabling environments for persons with disabilities and thereby ensuring that all citizens, without discrimination based on gender, age, abilities or location, benefit equally and equitably from digital information products and services, so that no one is left behind in the digital transformation.

## 1.2. Guidelines for amending existing legislation to implement ICT accessibility

During the study period 2018-2021, ITU members carried out intensive activities, including the formulation and adoption of guidelines and proposals to improve accessibility for persons with disabilities and other persons with specific needs so as to enable them to use telecommunication/ICT services smoothly. This is an issue that should figure among the priorities of all countries. Every country should do its utmost to improve its accessible environment.

Among the most effective strategies and amendments to existing legislation to promote accessibility to telecommunications/ICTs for people with disabilities undertaken by some of the States Parties to CPRD and ITU members, we may cite:

- Encourage contributions from governments, national regulatory authorities, industry associations and other organizations in all member countries to strengthen work on promoting the accessibility of information and communication, in order to raise awareness in the industry about the importance of accessibility of information and communication, encouraging producers of terminal equipment to improve their products consciously and voluntarily.
- Encourage the participation of social welfare organizations and organizations of persons with disabilities in research on technical standards to meet the needs and aspirations of people with disabilities, direct and aim for the development of clearly marked accessible products and services, and find targeted solutions to the problems faced by people with disabilities.
- Enhance mutual understanding between companies in every link of the industry chain, promoting mutual trust and cooperation between different types of companies, in order to ensure coordinated development of products embodying the specialties and advantages of each company and solutions to the practical problems faced by people with disabilities.

In a contribution from **Mauritania**, the Mauritanian Government stated that it is necessary to work on designing dedicated programmes and to conduct field activities at national and regional levels, on the basis of the following proposals:

- Ratify all international and regional conventions and treaties relating to the improvement of living conditions for persons with disabilities and with specific needs, in accordance with the laws and regulations in force in each country
- Review national legislation and regulatory arrangements to include laws, regulations, policies, guidelines and other national and local mechanisms to ensure access to telecommunications/ICTs for persons with disabilities and with specific needs
- Provide greater support from regulatory authorities, in cooperation with local civil-society organizations operating in this field or local councils, to ensure the availability of telecommunication/ICT equipment suitable for persons with disabilities and with specific needs
- Establish cooperation between developed and developing countries with a view to sharing expertise, knowledge, technology and good practices.<sup>4</sup>

### 1.3. Overview of current policies and regulations for telecommunication/ICT accessibility for persons with disabilities and other persons with specific needs

In November 2014, ITU, in cooperation with **G3ict**, published the Model ICT Accessibility Policy report, which represents the culmination of seven years of collaboration between the two organizations to compile good practices. The report facilitates exchanges among stakeholders for promoting ICT accessibility in compliance with the provisions of the United Nations CRPD.

The report remains the only global benchmark today for politicians seeking to promote ICT accessibility. It offers a robust model to translate the CRPD provisions into a legal framework and sectoral policies, laws and regulations governing a whole range of equipment and ICT services, such as public points of ICT access, mobile devices and services, TV and video programming and equipment, websites, and all ICTs acquired through public procurement.<sup>5</sup>

To measure and compare progress on implementation of the main features of the ITU-G3ict Model Accessibility Policy report, **G3ict** launched the DARE Index.<sup>6</sup> This index is designed and documented by accessibility advocates for accessibility advocates and other constituents. It measures 20 key variables derived from the ITU-G3ict report and the Decennial Call for Action<sup>7</sup> launched by the International Disability Alliance (IDA), Disabled People's International (DPI) and G3ict on 4 December, 2016. The DARE Index currently covers 121 countries representing 89 per cent of the world's population. Since there are no sources of consistent data available worldwide on digital accessibility, and it is in the best position to assess and report on digital accessibility issues, G3ict collects data in close cooperation with DPI and other organizations of persons with disabilities and advocates worldwide.

With regard to the administration and management of ICT accessibility, the Ministry of Industry and Information Technology (MIIT) (formerly the Ministry of Information Industry) of **China**

<sup>4</sup> ITU-D SG1 Document [1/299](#) from Mauritania

<sup>5</sup> ITU. Digital inclusion. [Model ICT Accessibility Policy report](#). (op. cit.)

<sup>6</sup> ITU-D SG1 Document [SG1RGQ/80](#) from the Global Initiative for Inclusive Information and Communication Technologies (G3ict)

<sup>7</sup> G3ict. News release. [G3ict launches Decennial Call for Action on digital inclusion: 2017-2027](#). New York, 3 December 2016.

scheduled work on accessibility of information in its "sunny green project" plan, and launched research tasks on related standards. Since then, MIIT has issued a series of standards on access to information technology, facilities, services, products, etc. pertaining to the telecommunication network and Internet. Standard YD/T 1761-2012, on technical requirements for web accessibility, issued by MIIT in 2012, is the primary technical basis for developing accessible websites in China. Standard YD/T 3329-201, on technical requirements for accessible mobile communication terminals, issued in 2018, is set to become the primary technical basis for developing mobile communication terminals accessible to native enterprises in China.<sup>8</sup>

In the **Russian Federation**, Federal Law No. 181-FZ, on social protection of persons with disabilities in the Russian Federation, is the principal legislation providing an accessible environment, information and ICT. After the Russian Federation ratified CPRD, the majority of laws and legal initiatives were supplemented so as to guarantee free and equal access to ICTs for persons with disabilities, through conditions such as the following:

- Facilities shall be equipped with inscriptions, text and other graphic information in large print, including Braille
- Operators' staff shall ensure persons with disabilities get all the required information on communication services by accessible means
- Operators shall duplicate all necessary audio and visual information on communication facilities in a form suitable for persons with disabilities without charging any additional fee
- Operators' staff shall provide assistance for persons with disabilities in the use of terminal equipment
- Operators shall guarantee the possibility for persons with disabilities to make emergency calls by sending short messages via a mobile radiotelephone system
- Access to universal services shall be guaranteed for persons with disabilities
- Official websites of federal government agencies, state authorities governing citizens of the Russian Federation and local governments shall be accessible for visually-impaired people
- Educational activity using e-learning technologies and distance learning shall be supported
- Archive, library, museum, cinema, video and audio material shall be digitized and the infrastructure created to make them accessible
- Subtitling and audio description shall be compulsory for films produced with government support, and funded from the State budget
- The blind and visually impaired shall have the right to access necessary information in accessible formats and on a variety of media
- Distance-education centres shall be established for children with disabilities
- Children with disabilities shall be provided with special computer, telecommunication and educational equipment and software
- Internet access shall be available to all participants in education
- Accessibility of electronic resources in Russian language on the Internet shall be a requirement for the visually impaired (general requirements and requirements in respect of Internet resources components).<sup>9</sup>

In 2016, through the *Instituto federal de telecomunicaciones* (IFT) (Federal Telecommunications Institute), **Mexico** issued General guidelines on accessibility to telecommunication services for users with disabilities, in order to guarantee the rights of these users and promote access

<sup>8</sup> ITU-D SG1 Document [SG1RGQ/79](#) from China

<sup>9</sup> ITU-D SG1 Document [SG1RGQ/83](#) from the Russian Federation

to such services and technologies.<sup>10</sup> The status of implementation of the measures foreseen in the guidelines is reviewed in reports on access to telecommunication services by persons with disabilities, the first of which was published by IFT in December 2018,<sup>11</sup> and the second on 4 December 2019.<sup>12</sup>

The **Democratic Republic of the Congo** proposes a set of measures and a national framework to improve access to telecommunication products for persons with disabilities in order to guarantee that their rights as prescribed by the prevailing international legal instruments are fulfilled. One of the key challenges the Democratic Republic of the Congo is facing is ensuring the provision of accessible products and services for persons with disabilities, who account for 15 per cent of the population. As a result, it was requested that ITU support the country's efforts to assess digital accessibility by developing appropriate resources, policies and/or strategies.<sup>13</sup>

Strengthening their collaborative approach, ITU and the commission of the **Economic Community of West African States** (ECOWAS) organized a workshop in Abuja, Nigeria, to validate the policy of telecommunication/ICT accessibility for people with disabilities within the ECOWAS area in West Africa. The Ministry of Digital Economy and Posts of **Côte d'Ivoire**, through its *Direction de l'Economie et de La Poste* (DENUP) (Directorate of Economy and Posts), reviewed the conclusions of the workshop on the design of the policy.

The objective of the policy is to ensure that telecommunication/ICT products and services are accessible for use by people with disabilities. It comprises the following sections:

- General and legal policy
- Difficulties faced by persons with disabilities
- Priority areas of application:
  - Systematically integrating accessibility when modifying policies and laws related to telecommunications/ICT
  - Accessibility of telephony products and services
  - Web accessibility
  - Accessibility of television broadcasting
  - Integrating accessibility in public procurement mechanisms
  - Public access.
- Funding of telecommunication/ICT accessibility
- Monitoring and evaluation mechanisms.

It was concluded that the proposed accessibility policy should be sent to experts from the member countries for a final reading, comment and validation ahead of the meeting of ECOWAS ministers.<sup>14</sup>

<sup>10</sup> ITU-D SG1 Document [1/192](#) from Mexico. For the guidelines: *Lineamientos generales de accesibilidad a servicios de telecomunicaciones para los usuarios con discapacidad*. [in Spanish]

<sup>11</sup> ITU-D SG1 Document [1/191](#) from Mexico. For the report: *Primer informe en materia de accesibilidad*. [in Spanish]

<sup>12</sup> ITU-D SG1 Document [1/350](#) from Mexico. For the report: *Segundo informe en materia de accesibilidad* [in Spanish]

<sup>13</sup> ITU-D SG1 Document [1/365](#) from the Democratic Republic of the Congo [in French]

<sup>14</sup> ITU-D SG1 Document [1/176](#) from Côte d'Ivoire [in French]

Particularly encouraging is the trend towards making accessibility legislation compulsory, as is the case in **Europe**, where a significant breakthrough has been made by adopting several pieces of specific accessibility legislation as tools for implementation of CRPD. Specifically, the European Union (EU) Directive on the accessibility of websites and mobile applications requires EU member states to make sure their websites and mobile apps meet common accessibility standards. The EU member states were obliged to transpose the directive into law by 23 September 2018, and non-compliance could result in sanctions.<sup>15</sup>

Laws, policies and regulations on telecommunications/ICTs which have been issued and/or amended as described above will foster universal access and service for people with disabilities, by establishing a framework that facilitates the implementation of ICT networks, promotes services and affordable products, ensures consumer protection and provides reliable emergency services, on an equal footing.

#### 1.4. Good practices, challenges and available case studies

While some countries and regions have made moves to institute some form of telecommunication/ICT accessibility policy and regulatory framework in order to foster the implementation of accessibility within their jurisdiction, overcoming the difficulties associated with this task means that it is still a work-in-progress. To facilitate further advances, the following contributions were considered.

In the light of **India's** experience of projects under its Universal Service Obligation Fund, it is recommended that, in order to achieve equitable access to ICTs, Member States should ensure accessibility of all hardware and software and telecommunication equipment; accessibility of public access communication devices and services; accessible customer services, premises and facilities; accessibility of mobile networks and services provided to the public in urban, suburban and rural areas; and availability of accessible and affordable mobile devices (where bundled) and services for persons with disabilities.<sup>16</sup>

**Mali** has implemented activities to promote accessibility of telecommunications/ICTs for persons with disabilities with the aim of establishing a "charter of voluntary commitment" among different players (ITU, telecommunication operators, organizations and associations of persons with disabilities, regulators, universal service fund management departments, telecommunication ministries, and other relevant stakeholders). The purpose is to support the timely and efficient implementation of ITU's ICT accessibility guidelines and good practices made available to the membership.<sup>17</sup>

In standardizing and commercializing ICTs, it is important to consider accessibility as from the design stage. However, when accessibility of standard systems and devices cannot be factored in at the design stage (e.g. non-standard products), it is essential to evaluate the products after commercialization, by means of checklists. As a good practice in this regard, **Japan** has considered methods for identifying products and services that are accessibility friendly. The amount and range of ICT equipment, such as mobile phones, has been growing year after year. Moreover, they are also tending to become more complicated to use. There are also an increasing number of products that support accessibility. For persons with disabilities and

<sup>15</sup> European Union. EUR-Lex. [Directive \(EU\) 2016/2102](#) of the European Parliament and of the Council of 26 October 2016, on the accessibility of the websites and mobile applications of public sector bodies.

<sup>16</sup> ITU-D SG1 Document [1/27+Annexes](#) from India

<sup>17</sup> ITU-D SG1 Document [1/37](#) from Mali

older persons with age-related disabilities, in particular, it is important for products which accommodate accessibility considerations to be easily recognizable when buying or using telecommunication services and devices. Accordingly, to make it easy to understand for persons with disabilities, products with accessibility features in Japan are being marked with a "U" (universal). This work was carried out by the Info-communication Access Council (IAC) within the Communications and Information Network Association of Japan (CIAJ). In its work for the enhancement of accessibility for persons with disabilities and older persons with age-related disabilities, IAC is joined by accessibility associations, industry, academia and administrations.<sup>18</sup>

The Government of **China** has issued a series of policies to protect information accessibility rights. Thanks to the government's advocacy efforts, several Chinese operators provide special services available to persons with disabilities to ensure the affordability of mobile services. Some professional enterprises for the blind and social welfare NGOs in China have developed assistive software and provided services to assist visually-impaired persons (such as image recognition, video assist, trip companion, etc.). Software and terminal development enterprises have improved their products to make them more accessible. However, the concept of information accessibility needs to be promoted further, in order to encourage more information product development enterprises and information service providers to enhance their products and services accessible to persons with disabilities in China.<sup>19</sup>

Access to telecommunication/ICT services by persons with disabilities in the **Russian Federation** relies on the revision of legislation to bring it in line with CRPD. The principal piece of legislation prescribing accessible environment, information and ICTs is Federal Law No. 181-FZ, on the social protection of persons with disabilities in the Russian Federation.<sup>20</sup>

A contribution from **Bosnia and Herzegovina** reports activities undertaken by the regulatory authority with a view to ensuring accessible ICTs through multistakeholder engagement.<sup>21</sup> To support the development of the legal and regulatory framework, the ITU Joint Coordination Activity on accessibility and human factors (JCA-AHF) devoted a session to discussing challenges and opportunities in ensuring accessible ICTs in the countries of the Western Balkans (Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia).<sup>22</sup>

**Côte d'Ivoire** implemented awareness-raising activities and events, such as the E-HANDICAP forum, organized in partnership with the E-handicap Association, the telecommunication/ICT ministry and the *Bureau national d'études techniques et de développement* (BNETD) (National Bureau for Technical and Development Studies), which was recognized as a platform for presenting the opportunities offered by accessible ICTs for ensuring social inclusion of persons with disabilities and raising awareness of all stakeholders.<sup>23</sup>

**Mali** has promoted telecommunication/ICT accessibility for persons with disabilities. A regional workshop was organized by the ICT Department of ECOWAS in collaboration with ITU. Participants included ICT experts and persons with disabilities from the following 10 ECOWAS

<sup>18</sup> ITU-D SG1 Document [SG1RGQ/71](#) from Japan

<sup>19</sup> ITU-D SG1 Document [SG1RGQ/79](#) from China

<sup>20</sup> ITU-D SG1 Document [SG1RGQ/83](#) from the Russian Federation

<sup>21</sup> ITU-D SG1 Document [SG1RGQ/16](#) from Bosnia and Herzegovina

<sup>22</sup> ITU-D SG1 Document [SG1RGQ/93](#) from the ITU Joint Coordination Activity on accessibility and human factors (JCA-AHF)

<sup>23</sup> ITU-D SG1 Document [SG1RGQ/13](#) from Côte d'Ivoire

Member States: Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Liberia, Mali, Niger, Nigeria and Senegal.<sup>24</sup>

The *Instituto federal de telecomunicaciones* (IFT) (Federal Telecommunications Institute), a regulatory body in **Mexico**, devised and implemented measures to promote appropriate access to telecommunication services and ICTs for persons with disabilities, such as the General guidelines on accessibility to telecommunication services for users with disabilities. These guidelines establish mechanisms that contribute to due protection of the rights of users with disabilities and set out the obligations of licensed and authorized telecommunication service providers to allow users with disabilities access to telecommunication services on an equal footing.<sup>25</sup>

**Côte d'Ivoire** has implemented actions and contributed to events for validation of the telecommunication/ICT accessibility policy for people with disabilities in the ECOWAS region, which was the subject of a workshop in Abuja, Nigeria.<sup>26</sup> There is a need to put in place a focal point for ICT accessibility in each country, to liaise with ITU and ensure appropriate follow-up of related activities that ITU is carrying out, and ensure implementation of the policy.

To strengthen the involvement of persons with disabilities, **Côte d'Ivoire** also held a workshop on a draft voluntary commitment charter engaging operators and equipment manufacturers, organized by the Ministry of the Digital Economy and Post, as part of the activities under the E-HANDICAP programme. It emphasized that voluntary commitment is an important tool for providing telecommunication/ICT products and services to persons with disabilities.<sup>27</sup>

The *Agence de gestion du fonds d'accès universel* (AGEFAU) (Universal Access Fund Management Agency) in **Mali** finances ICT/telecommunication accessibility projects targeting disadvantaged groupings (women, rural areas, schools) in general and associations of persons with disabilities (Malian Union for the Blind (UMAV), persons with physical disabilities) in particular.<sup>28</sup>

**Cameroon** has conducted initiatives aimed at developing infrastructures to promote widespread digitization and overcome digital exclusion in rural areas, encouraging and developing the learning of ICT skills, and accompanying civil-society organizations in combating digital exclusion of persons with disabilities, especially the visually impaired.<sup>29</sup>

In **Haiti**, the Haitian administration drafted a national ICT initiative document, incorporating a strategy for development through the digital economy. The regulatory authority signed an agreement with the Secretary of State for persons with specific needs, with a view to implementing the strategy to mainstream the inclusiveness perspective.<sup>30</sup>

Access to telecommunication services for persons with disabilities and other persons with specific needs in the **Central African Republic** is enshrined in the new law on electronic communications.<sup>31</sup>

<sup>24</sup> ITU-D SG1 Document [1/182](#) from Mali [in French]

<sup>25</sup> ITU-D SG1 Document [1/192](#) from Mexico

<sup>26</sup> ITU-D SG1 Document [1/176](#) from Côte d'Ivoire [in French]

<sup>27</sup> ITU-D SG1 Document [1/337](#) from Côte d'Ivoire

<sup>28</sup> ITU-D SG1 Document [SG1RGQ/142](#) from Mali

<sup>29</sup> ITU-D SG1 Document [SG1RGQ/137](#) from Cameroon

<sup>30</sup> ITU-D SG1 Document [SG1RGQ/149](#) from Haiti

<sup>31</sup> ITU-D SG1 Document [SG1RGQ/161](#) from the Central African Republic



In 2019, the national regulatory authority (Anatel) in **Brazil**, pursuant to the General Regulation on Accessibility (RGA) and on the basis of newly published accessibility rankings, awarded the Anatel Prize for Accessibility to the top-ranked company.<sup>32</sup>

---

<sup>32</sup> ITU-D SG1 Document [SG1RGQ/196](#) from Brazil



## Chapter 2 – Technologies and solutions in an ICT- accessible ecosystem

ICT accessibility is an essential condition for the development of inclusive societies. Governments, the private sector, industry, academic institutions and regional and international organizations must therefore work together to forge a holistic approach encompassing all people without discrimination and ensure that an ICT-accessible ecosystem is created in every country and region.

**Oslo Metropolitan University** in **Norway** examined the theoretical implications of universal design, and posed a new framework for achieving its ambitious aims in the information society era. It also argued that a universal design model for the information society provides an essential reframing of the traditional and sometimes conflicting principles of universal design, and takes account of the imperative role of access to and use of ICTs for realizing the human rights of all disadvantaged persons. This new set of unified, universal design principles for the information society may redirect the trajectory of universal design and channel our understanding of it towards greater attention to its application to ICT and sustainable development. These principles recognize that universal design is rooted in human rights and disability rights and provide a framework for eliminating the barriers that persons are confronted with in accessing and using ICT across the diverse range of human experience.<sup>33</sup>

Even though the spread of new ICTs is seen as exerting a positive impact on sustainable development, it may also be a source of risks that require policy responses. Given that half of the world's population is not yet using the Internet, technological change, including the impact of AI or the emergence of smart cities and society, may create new divisions. Therefore, timely implementation of the right enabling environments (i.e. policies, strategies, regulatory frameworks) is key to ensuring that the contribution of ICTs to sustainable development is positive and leaves no one behind.

**Oslo Metropolitan University** likewise examined the need for policy-makers to consider intersectionality in policies and programmes to close the digital divide and promote universal design. Since such policies and programmes have yet to consider the intersectional experiences of persons with disabilities fully, future efforts must explicitly recognize and attempt to eliminate the barriers that persons who hold intersectional identities experience.<sup>34</sup>

The **Global System for Mobiles Association** (GSMA) has published reports which highlight best-practice case studies in ICTs and accessibility. The Assistive Tech programme works with the mobile industry and key stakeholders to address the digital inclusion gap of persons with disabilities and to identify innovation opportunities for making mobile technologies enablers of assistive technologies (ATs). Research shows that, in many countries, a disability and development gap is growing. Unless people with disabilities are routinely included in

<sup>33</sup> ITU-D SG1 Document [1/183](#) from Oslo Metropolitan University (Norway)

<sup>34</sup> ITU-D SG1 Document [1/393](#) from Oslo Metropolitan University (Norway)

development efforts, their socio-economic status often remains static while the status of their peers without disabilities surges ahead.<sup>35</sup>

To mitigate risks, the **Global Initiative for inclusive information and communication technologies** (G3ict) addresses the problem of spammers and phishers who target persons with disabilities, and provides useful tips on what to do in such cases: 1) Contact the service provider to inform it of the highjacking of your e-mail address. 2) Try to give information on the spammer's/hacker's contact details with an example e-mail, e.g. by forwarding the suspect e-mail to its fraud section. 3) Ask to have a violated e-mail blocked. 4) Change e-mail address. 5) Let other contacts know about the e-mail being hacked. 6) Do not click on any web addresses unless verified.<sup>36</sup>

In another contribution, **G3ict** provides an update on captioning for accessible meetings, and underlines that involving persons with disabilities representing specific disabilities, such as for example the deaf and hard of hearing, in the planning of any high-level event is crucial to ensuring equal access.<sup>37</sup>

**Japan** shared a case study on how to distinguish products that are accessible for persons with disabilities. It was recommended that the guidelines standardized in ITU-T by Recommendation ITU-T F.790 be used as a baseline.<sup>38, 39</sup>

The **World Health Organization** (WHO) has developed a Toolkit for safe listening standards. It is estimated that there are around 466 million people with disabling hearing loss globally. In this context, WHO and ITU have provided their members with a practical guide on the implementation and follow-up of global standards for safe listening devices adopted by all countries and industry partners worldwide. A particular purpose of developing this guide is to raise awareness on this important topic among WHO and ITU members and key stakeholders.<sup>40</sup>

The **Iran University of Science and Technology** (IUST) in the **Islamic Republic of Iran** proposes that a survey concerning ICT development for persons with disabilities be carried out in order to understand the challenges faced and ascertain good practices.<sup>41</sup>

In **China**, the **China Academy of Information and Communications Technology** (CAICT) has been researching information accessibility standards since 2006. In respect of standards development, CAICT has established a wide range of cooperative relations with social welfare organizations and technology-development enterprises to ensure that information accessibility standards fit the interests of users and are implementable. In 2007, CAICT took the lead in developing China's first information accessibility technology standard, and in 2008 CAICT set China's first web accessibility standard. The Ministry of Industry and Information Technology (MIIT) has issued a series of information accessibility standards developed under the leadership or with the participation of CAICT over the years.<sup>42</sup>

<sup>35</sup> ITU-D SG1 Document [1/385](#) from GSMA

<sup>36</sup> ITU-D SG1 Document [1/60](#) from G3ict

<sup>37</sup> ITU-D SG1 Document [1/87](#) from G3ict

<sup>38</sup> ITU-D SG1 Document [SG1RGQ/71](#) from Japan

<sup>39</sup> ITU-T. Recommendation [ITU-T F-790](#) (01/2007), on telecommunication accessibility guidelines for older persons and persons with disabilities.

<sup>40</sup> ITU-D SG1 Document [SG1RGQ/86+Annex](#) from WHO

<sup>41</sup> ITU-D SG1 Document [SG1RGQ/95](#) from the Iran University of Science and Technology (Islamic Republic of Iran)

<sup>42</sup> ITU-D SG1 Document [SG1RGQ/352](#) from China

**Burundi** presented a study evaluating the use of ICTs in centres for persons with disabilities and determining their connectivity needs. The study was conducted by the *Agence de régulation et de contrôle des télécommunications* (ARCT) (Telecommunication Regulatory and Control Agency) of Burundi.<sup>43</sup> Furthermore, to promote connectivity and digital inclusion in the country, **Burundi** intends to implement strategies or launch projects on connecting centres for persons with disabilities, so as to instil a digital culture in those individuals and foster ICT entrepreneurship.<sup>44</sup>

The **State of Palestine**, which participates in ITU work under Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, is deploying efforts to ensure that telecommunication services are available, accessible and affordable (reduced access line charges, lower device prices, convenient device payment plans to suit persons with specific needs, preferential rates for telephone calls, reduced rates for all Internet services and monthly interactive television subscriptions).<sup>45</sup>

## 2.1. Mobile communication accessibility policy framework

There are more mobile phones in the world than any other form of ICT. According to ITU estimates, there are 7 billion mobile phones in use. Mobile phones range from simple handsets that receive and make calls and texts to sophisticated smartphones that support access to the Internet and other applications. Increasingly, mobile phones are not used just for telephone calls, but have become the primary means by which people access the Internet. ITU estimates that, at the end of 2018, 51.2 per cent of the global population, or 3.9 billion people, were using the Internet.<sup>46</sup>

The Model ICT Accessibility Policy report contains practical guidelines on how regulators and other policy actors can implement policies that will help ensure conditions are in place to improve the availability of accessible mobile phones and services. It also contains a Model code of conduct for the mobile industry and a set of Model regulations for regulators. Policy guidelines include:

- Policies should be developed in consultation with persons with disabilities.
- Regulators should use funding from the universal service/access fund to subsidize the provision of a national relay service by phone operators.
- Regulators should work with appropriate emergency services and the mobile phone operators to ensure equitable access to emergency services for persons with disabilities.
- Mobile phone operators should ensure the availability of affordable and accessible mobile phones for persons with disabilities.
- Mobile phone operators should provide information on these mobile phones, including their compatibility with assistive technologies such as hearing aids.
- Mobile phone operators should provide data- or SMS-only packages to deaf users who may not otherwise use voice services.<sup>47</sup>

The **Mobile & Wireless Forum** (MWF) in **Belgium** established the Global Accessibility Reporting Initiative (GARI) to help promote mobile accessibility at national level. GARI can assist in fulfilling

<sup>43</sup> ITU-D SG1 Document [SG1RGQ/129](#) from Burundi

<sup>44</sup> ITU-D SG1 Document [SG1RGQ/168](#) from Burundi

<sup>45</sup> ITU-D SG1 Document [SG1RGQ/156](#) from the State of Palestine, under Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference.

<sup>46</sup> ITU-D. [Statistics](#).

<sup>47</sup> ITU. Digital inclusion. [Model ICT Accessibility Policy report](#). (op. cit.)

the requirements of Article 9 of CRPD on accessibility. Its mission is to raise awareness about existing accessibility features and help consumers find a device that best suits their needs.<sup>48</sup> Today, GARI has developed into an online database containing information on the accessibility features in over 1 500 devices. The data are freely available to Member States to use on their websites in order to raise awareness about existing accessibility features in wireless devices and to help users find a device that best suits their needs and facilitates full and independent living.<sup>49</sup>

**India** put forward the case of Sanchar Shakti, the Indian Universal Service Obligation Fund (USOF) scheme for mobile value-added services for rural women, as an example of a collaborative business model. The business model or approach adopted for this scheme is very different from the usual competitive bidding model followed in public-private partnership/universal service fund projects. The legal framework of USOF India allows pilot projects to be exempted from the mandatory bidding process for the selection of service providers, making it possible to focus on qualitative and collaborative aspects of such innovative projects.<sup>50</sup>

**Japan** presented a case study on cellphones that support conversation among people with disabilities and persons with age-related disabilities and specific needs. The speech content is automatically recognized and converted by the mobile network system into text. It is a real-time telephone function that supports communication for persons who are deaf or hard of hearing or are unable to speak.<sup>51</sup>

The **Russian Federation** outlined best practices established in the Russian Federation for ensuring that Internet resources are perceivable, operable, understandable and robust for persons with disabilities, by developing and introducing national standards for accessibility of Internet resources for the blind and visually impaired.<sup>52</sup>

The **Russian Federation** also seeks to provide a comfortable and accessible environment for persons with disabilities through cooperation between mobile operators and research laboratories to develop mobile applications to help blind and deaf-blind users. Under the "banknote reader" project, for example, a mobile application was developed that allows blind and deaf-blind users to quickly and easily identify the banknote they have in front of them. Blind people cannot visually recognize the denomination of a banknote, and only very few of today's banknotes have convenient tactile identifiers. This makes it extremely important to ensure that blind and deaf-blind people can identify banknotes with a mobile application.<sup>53</sup>

Furthermore, special mobile communication tariffs have been introduced in the **Russian Federation** for categories of the population entitled to preferential treatment. One package, for example, includes free online sign-language interpretation and unlimited traffic on the portal of the mayor and municipal government of Moscow; and in June 2019, the offer was extended to the rest of the country.<sup>54</sup>

<sup>48</sup> ITU-D SG1 Document [SG1RGQ/19](#) from Mobile & Wireless Forum (MWF) (Belgium)

<sup>49</sup> ITU-D SG1 Document [1/352](#) from MWF (Belgium)

<sup>50</sup> ITU-D SG1 Document [SG+RGQ/32+Annex](#) from India

<sup>51</sup> ITU-D SG1 Document [SG1RGQ/78](#) from Japan

<sup>52</sup> ITU-D SG1 Document [1/139](#) from the Russian Federation

<sup>53</sup> ITU-D SG1 Document [1/138](#) from the Russian Federation

<sup>54</sup> ITU-D SG1 Document [1/318](#) from the Russian Federation

**China**, where the government has encouraged IT corporations to develop accessible IT products for persons with disabilities and provided standards for guiding related work, submitted several contributions for the work of Question 7/1:

- Xiaomi corporation, which is actively engaged in accessibility work, outlined planning proposals in the field of information accessibility in the three dimensions of user bridge building, scientific and technological empowerment and third-party constraints, and shared Xiaomi's achievements and experience in information accessibility activities in those three dimensions as well as suggestions on future accessibility-related work worldwide.<sup>55</sup>
- China launched the technical requirements for accessible terminals, stressing that the design of mobile phones should respond to the design needs of persons with disabilities. The China Disabled Persons' Federation, the China Association of the Blind and the China Association of the Deaf and Hard of Hearing have participated in the study process and contributed to the formulation of the related standards from their professional perspective.<sup>56</sup>
- Huawei has undertaken secondary development on Android's TalkBack feature in order to make mobile devices as friendly and accessible as possible for the visually impaired, incorporating these groundbreaking advances into its EMUI operating system. The accessibility features in EMUI have been tested and reviewed by professional accessibility institutions and visually-impaired users to ensure that they are as effective in practice as they are advanced in nature. Huawei's Mate20 series phones passed the accessibility tests. The China Telecommunication Technology Labs (CTTL) certified them as the first smartphone models to comply with the "Technical requirements of accessible mobile communication terminal" standard (YD/T 3329-2018) issued by the China Ministry of Industry and Information Technology (MIIT).<sup>57</sup>
- To assist the visually impaired in accessing the Internet, some specialized Chinese enterprises, often with the help of professional associations for the blind, have taken the following three active steps:
  - Developing (or improving on the Chinese version of) PC screen readers (such as the YongDe, YangGuang, ZhengDu, etc. screen readers) to help the visually impaired access the Internet via PC
  - Developing mobile screen readers (such as the BaoYi, DianMing, TianTan, etc. screen readers) and providing the visually impaired with more convenient and practical apps and information services
  - Developing information service auxiliary systems to help the visually impaired solve problems encountered in daily life, such as the BangBang image listener, the I'm Your Eyes system, etc.<sup>58</sup>

China Telecom, China Mobile, China Unicom and other operators provide special services for people with disabilities, including the donation of communication terminals, providing cards that contain free call time for users with disabilities, providing special discount packages for deaf users, etc. Taking into account also that persons with disabilities often have difficulty with travel, customer managers may go to their homes to facilitate the process of applying for the services.<sup>59</sup>

**Japan** presented a case study on the use of voice recognition to support telephone communication. The system, which stemmed from an employee of a Japanese telecommunication company who was hard of hearing, is a real-time telephone service that can be used for conversation between the hearing-impaired and people without hearing problems. The person with hearing loss will

<sup>55</sup> ITU-D SG1 Document [1/167+Annex](#) from China

<sup>56</sup> ITU-D SG1 Documents [SG1RGQ/355](#) and [SG1RGQ/336](#) from China

<sup>57</sup> ITU-D SG1 Document [SG1RGQ/355](#) from China

<sup>58</sup> ITU-D SG1 Document [1/332](#) from China

<sup>59</sup> ITU-D SG1 Document [SG1RGQ/79](#) from China

see text converted from the other party's speech, and the latter will listen to speech converted from text created by the person with hearing loss.<sup>60</sup>

**G3ict** discussed the limitations of voice recognition, which many deaf people cannot use because it does not understand their voices due to the level of speech intelligibility, given that the pronunciation of words and sentences needs to be of sufficient quality for voice recognition to work.<sup>61</sup>

**GSMA** shared a report aimed at leveraging the potential of mobile for persons with disabilities. The report could assist members in: (a) gathering insights on the current ecosystem, including the issues persons with disabilities face today and how mobile technology could improve their lives; (b) mapping promising initiatives and start-ups in the field of mobile technology and disability, in both emerging and developed markets; (c) identifying key areas of focus for the GSMA Mobile for Development team, in terms of both research/insights and the provision of technical advice.<sup>62</sup>

**Mali** shared information about the project developed by the *Association malienne des artisans en situation de handicap* (AMASH) (Malian Association of Artisans with Disabilities), which aims to use OTTs as a means of access to telecommunication/ICT services. To facilitate AMASH's work, Android telephones are provided to persons with disabilities, in particular women.<sup>63</sup>

## 2.2. Television/video programming accessibility policy framework

Under the inclusive societies model, accessibility is for all users. It is important to understand that accessibility is not an exclusive service for a relatively small segment of the population. Media access services are also a powerful educational tool for learning languages, for social inclusion, for the population at risk of exclusion, for people with autism, dyslexia, etc. Accessibility is for everyone, including specifically: persons with disabilities, older persons with age-related disabilities and those with learning disabilities, or people who live in a place where the language is different from their own. Increasingly, each country is bringing in its laws and regulations to implement accessibility services. Access service quotas are set. How to scale the services to aim at 100 per cent is a challenge, since issues such as production cost, workflows, technology or real-life delivery are not easy to solve. According to the DARE Index 2017-2018: Global progress by CRPD States Parties, the most advanced sectors on a global basis, by area of ICT accessibility, are (in decreasing order of progress measured as a percentage of countries in the process of implementing policies at various stages):<sup>64</sup>

<sup>60</sup> ITU-D SG1 Document [SG1RGO/78](#) from Japan

<sup>61</sup> ITU-D SG1 Document [1/240](#) from G3ict

<sup>62</sup> ITU-D SG1 Document [1/249](#) from GSMA

<sup>63</sup> ITU-D SG1 Document [1/283](#) from Mali

<sup>64</sup> [G3ict, DARE Index 2017-2018: Global progress by CRPD States Parties.](#)

1	Television	48%
2	Web	45%
3	Inclusive ICTs in education	44%
4	E-books	40%
5	Enabling ICTs for employment	39%
6	E-government and smart cities	35%
7	ATs and ICTs for independent living	34%
8	Promotion of Internet usage	33%
9	Mobile	32%
10	Public procurement	31%

The Model ICT Accessibility Policy report also provides a practical guide for ICT policy-makers and regulators to transpose the CPRD's broad ICT and television accessibility requirements ("States Parties [...] shall take all appropriate measures to ensure that persons with disabilities [...] enjoy access to television programmes, films [...] in accessible formats") at the national level. It also aims to assist policy-makers and regulators in building their capacity by identifying the concrete steps they can take to ensure that accessible ICTs are widely available to persons with disabilities in their countries.

Considering that audiovisual media is a highly regulated area, regulators and legislators play a key role in implementing provisions on accessible services and harmonizing national requirements with international standards.

The **University of Geneva** in **Switzerland** presented a research proposal for assessing the impact of video remote sign-language interpreting in healthcare. The aim is to connect disability theory with the empirical challenges of public health research, by gathering empirical evidence on the health needs of deaf persons and testing a technology-based intervention that responds to the structural and societal factors associated with their impairments, so as to determine how an individual experiences health and disability. The study will be conducted in **Colombia**, to map the challenges faced by persons with disabilities and the solutions available to improve their lives in a national ecosystem.<sup>65</sup>

A contribution from **G3ict** discusses sign-language interpretation, its use and the pros and cons of the use of signing avatars instead of human interpreters.<sup>66</sup> It includes, in annex, the World Federation of the Deaf (WFD) and World Association of Sign Language Interpreters (WASLI) statement of best practices on sign language and current problems in using avatars for sign-language interpretation. The deaf community categorically rejects the idea of using avatars for signing instead of human beings who are qualified sign-language interpreters. The community of manufacturers and ICT creators, governments, ITU and other United Nations agencies need to work with and listen to persons with disabilities and use the professionals who interpret for them and assist them. Also, the contribution aims to increase knowledge about the use of

<sup>65</sup> ITU-D SG1 Document [1/156](#) from the University of Geneva (Switzerland)

<sup>66</sup> ITU-D SG1 Document [1/67+Annex](#) from G3ict



sign-language interpretation in general and its use at ITU for persons with hearing impairments, so as to ensure their inclusion in the work of ITU pursuant to Resolution 175 (Rev. Dubai, 2018) of the Plenipotentiary Conference,<sup>67</sup> and its predecessor Resolution 175 (Rev. Busan, 2014),<sup>68</sup> as well as the ITU Accessibility policy for persons with disabilities.<sup>69</sup>

To help persons with disabilities overcome the hurdles and challenges involved in watching TV and video programmes, several assistive technologies<sup>70</sup> are used in international practice. Traditionally,<sup>71</sup> these assistive technologies include:

- **Audio description:** An audio track to aid persons with visual impairments who cannot follow the visual content.
- **Subtitles/captioning:** A real-time transcription of spoken words, sound effects, relevant musical cues and other relevant audio information in live or pre-recorded events. Captions can be open, not adjustable by the user, or closed where they can be turned on and off by the users at will. **Audio captioning** relates to captions that are read aloud and reflected as speech, and may also be called “audio subtitles” or “spoken subtitles” in the case of foreign-language dialogue. It can also be used to designate the audio content of an audiovisual work or sequence in any language along with action. Captions are read aloud by a human or a specific apparatus that converts the text into speech.
- **Sign language:** A natural language that, instead of relying on acoustically conveyed sound patterns, uses signs made by moving the hands combined with facial expressions and postures of the body to convey meaning.<sup>72</sup>

A set of general guidelines for standardizing, planning, developing, designing and distributing all forms of telecommunication equipment/software and associated telecommunication services to ensure their accessibility for people with the broadest possible range of abilities, including older persons with age-related disabilities and persons with permanent or temporary disabilities, have been adopted at the international level:<sup>73</sup>

- Where multimedia content is supported, provision should be made to enable information providers to supply text or other alternatives to non-text information if technically feasible.
- Avoid excessive line length on the display and overly detailed information.
- Visual information should be understandable in other sensory ways.
- The size, typeface, character spacing, line spacing and colour of text should be made adjustable for ease of use.

Accessibility of TV and video programmes have become a key consideration in the social policy agenda of Member States. For instance, the **Russian Federation** adopted a federal law that

<sup>67</sup> ITU. Plenipotentiary Conference. Resolution [175 \(Rev. Dubai, 2018\)](#), on telecommunication/ICT accessibility for persons with disabilities and persons with specific needs.

<sup>68</sup> ITU. Plenipotentiary Conference. Resolution [175 \(Rev. Busan, 2014\)](#), on telecommunication/ICT accessibility for persons with disabilities and persons with specific needs

<sup>69</sup> For the ITU Accessibility policy for persons with disabilities, see: ITU. [Making ITU an accessible organization for persons with disabilities](#).

<sup>70</sup> *Assistive technology* is defined as: “Piece of equipment, product system, hardware, software or service that is used to enable, maintain or improve functional capabilities of individuals with disabilities”. See ITU-T. Recommendation [ITU-T.F.790](#) (01/2007), on telecommunication accessibility guidelines for older persons and persons with disabilities.

<sup>71</sup> According to previous final reports on the corresponding ITU-D Question for past study periods, e.g. [Final Report on Question 7/1 for the sixth study period \(2014-2017\)](#) and [Final Report on Question 20-1/1 for the fifth study period \(2010-2014\)](#).

<sup>72</sup> These assistive technologies are defined in Recommendation [ITU-T.F.791](#) (08/2018), on accessibility terms and definitions.

<sup>73</sup> Recommendation [ITU-T.F.790](#) (01/2007), on telecommunication accessibility guidelines for older persons and persons with disabilities.



ensures the accessibility of TV and video programmes in cinematography. The law prescribes two basic requirements:

- National feature-length films produced with the financial support of the government shall be created and distributed with mandatory subtitling and audio description.
- Cinema theatres and other public places for movie screenings shall be accessible for persons with disabilities.

Additionally, the Ministry of Culture of the Russian Federation has defined the requirements for subtitling and audio description of national feature-length films and cartoons.<sup>74</sup>

### Audio description

Videos with audio description (AD) are now gaining popularity across the globe. Today, broadcasters are increasingly recognizing the importance of AD in driving viewership growth. Current practices in many countries foresee the provision of accessibility to audiovisual content: theatres, museums, TV broadcasters and web designers, among others, are endeavoring to make their content accessible for persons with disabilities. For users with visual disabilities, AD gives access to visual information appearing on screen which they would otherwise miss. In the natural gaps between dialogue, the AD track explains what is happening on the screen, right down to details about the characters' appearance, gestures and facial expressions.

Today, audio description is widely used as an assistive technology for TV and video accessibility in **Belarus, Brazil, Canada, China, France, Germany, Italy, Poland, the Russian Federation, Spain, the United Kingdom, the United States** and many other countries.<sup>75</sup>

To ensure the accessibility of TV and video content, the **Russian Federation** provides AD for films, cartoons and other TV programmes, including sports matches. A national standard was developed to identify a set of terms and definitions and basic principles for the AD service. The wireless audio system Fidelio (Dolby) – a transmitter connected to the server via audio cable and USB – is used to provide the AD service. In parallel, the Russian Association of the Blind provides professional training for audio descriptors. Additionally, online cinemas and mobile applications are being developed to screen films with AD.

### Subtitles/captioning

Subtitles used to increase the accessibility of TV and video programmes for people who are deaf or hard of hearing often also reflect the important sound effects besides the main narration. Subtitles that are not displayed on the screen by default and have to be activated when watching TV or video programmes are called closed subtitles/captions. In contrast, subtitles integrated into the programme and which cannot be deactivated are open subtitles/captions.

Subtitling/captioning and AD are becoming an integral part of the TV and video accessibility policy for people with hearing disabilities or hearing loss at the national level.

Pursuant to the State Programme 2011-2020 entitled “The accessible environment”, the **Russian Federation** takes measures to develop the ecosystem of closed subtitles for TV programmes on the first multiplex channels. General technical requirements and guidelines are provided in the

<sup>74</sup> ITU-D SG1 Documents [SG1RGO/247](#) and [SG1RGO/203](#) from the Russian Federation

<sup>75</sup> For some detailed examples from these countries, see ITU-D SG1 Document [SG1RGO/247](#) from the Russian Federation

National Standard “Closed captions for the hearing-impaired. General technical requirements”. This standard defines the criteria that subtitles should satisfy, namely accuracy, consistency of style, comprehensibility, readability and inclusiveness, as well as the requirements governing the displayed text (size and colour of the letters, positioning of the letters on the screen, etc.) and the methods for making audio content readable. The annex to the standard includes examples of how to create accessible subtitles in line with the requirements and guidelines. Furthermore, people with hearing disabilities in the Russian Federation are provided with TV that supports teletext and TV programmes with closed subtitles if this is included in their rehabilitation programme. In 2018, a law was signed prescribing that the total amount of subtitled programmes in the Russian Federation be increased to 5 per cent of the total broadcasting time. This requirement was included in the channel licensing requirements and applies to news, films and entertainment programmes. On-air TV programmes are provided with the crawling line.<sup>76</sup>

### Accessibility in IPTV<sup>77</sup>

Internet protocol television (IPTV) delivers television content over Internet protocol (IP)-based networks. This is in contrast to delivery through traditional terrestrial, satellite and cable-television formats. Unlike with downloaded media, IPTV offers the ability to stream the source media continuously. As a result, a client media player can begin playing the content (such as a TV channel) almost immediately. This is known as streaming.

Although IPTV uses the Internet protocol, it is not limited to television streamed from the Internet (Internet TV). IPTV is widely deployed in subscriber-based telecommunication networks with high-speed access channels into end-user premises via set-top boxes or other customer-premises equipment. IPTV is also used for media delivery around corporate and private networks.

IPTV services may be classified into three main groups:

- Live television and live media, with or without related interactivity
- Time-shifted media: e.g. catch-up TV (replays a TV show that was broadcast hours or days before), start-over TV (replays the current TV show from its beginning)
- Video on demand (VoD): browse and view items in a stored media catalogue.

IPTV can provide persons with disabilities the following benefits:

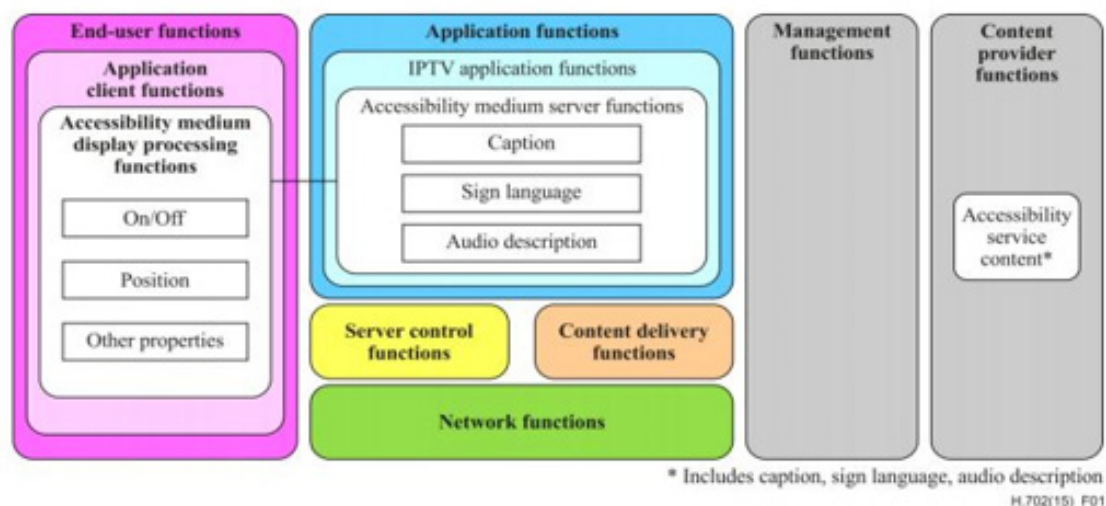
- In principle, it can be seen anywhere in the world, as it is based on IP, and there are international standards.
- It provides an easy interface for persons with disabilities and persons with specific needs to access multimedia content without any special training.
- It is currently available on IPTV terminals in the open retail market, and it has the potential capability to provide accessibility features without any special devices.
- To spread IPTV services enhanced with accessibility functions, standardization of IPTV terminals with accessibility enhancements (ITA) is extremely important. This means that interoperability, conformance and definition of profiles are required for these terminals.

<sup>76</sup> ITU-D SG1 Document [SG1RGQ/247](#) from the Russian Federation

<sup>77</sup> Full information on accessibility in IPTV is provided in Recommendation [ITU-T H.702](#) (08/2020), on accessibility profiles for IPTV systems.

The architecture for obtaining the accessibility medium<sup>78</sup> within a derivative of the IPTV architecture as defined in Recommendation ITU-T Y.1910, on IPTV functional architecture,<sup>79</sup> is illustrated in Figure 1. The accessibility medium server functions deliver caption, sign language and audio description. End users can display the accessibility medium on terminal devices using the accessibility medium terminal functions.

Figure 1: Functional blocks of accessibility service



Source: Recommendation ITU-T H.702 (08/2020)

## 2.3. Policy approaches to web accessibility

In today's digital era, it is difficult to overestimate the role that the Internet plays and the benefits it brings in a person's daily life. People with disabilities may benefit more than most from the Internet, as sometimes the Internet becomes the only way for them to participate actively in social, economic and cultural life on equal footing. Assistive technologies help persons with disabilities to benefit fully from the advantages of the Internet.

According to the World Wide Web Consortium (WC3),<sup>80</sup> web accessibility means that websites, tools and technologies are designed and developed so that people with disabilities can use them.<sup>81</sup> To support the development and dissemination of web accessibility, W3C instituted the Web Accessibility Initiative (WAI) which develops standards and support materials to help understand and implement accessibility.<sup>82</sup> The WAI website provides information on:

- web accessibility in general;<sup>83</sup>
- essential components of web accessibility;<sup>84</sup>
- accessibility principles;<sup>85</sup>

<sup>78</sup> *Accessibility medium*: The media stream containing accessibility information, such as audio stream with audio description, text stream with closed captions, and video stream with sign-language interpretation. Recommendation [ITU-T H.702](#) (08/2020), on accessibility profiles for IPTV systems. (op. cit.)

<sup>79</sup> Recommendation [ITU-T Y.1910](#) (09/2008), on IPTV functional architecture.

<sup>80</sup> World Wide Web Consortium (WC3). [Leading the web to its full potential](#).

<sup>81</sup> W3C. Accessibility fundamentals. [Introduction to web accessibility](#).

<sup>82</sup> W3C. [Making the web accessible](#).

<sup>83</sup> W3C. [Introduction to web accessibility](#).

<sup>84</sup> W3C. [Essential components of web accessibility](#).

<sup>85</sup> W3C. [Accessibility principles](#).

- how people with disabilities use the web;<sup>86</sup>
- accessibility for the needs of ageing web users;<sup>87</sup>
- substance of “accessibility”, “usability” and “inclusion”.<sup>88</sup>

## Standards and guidelines

### WCAG 2.1

W3C’s Web Content Accessibility Guidelines (WCAG) provide web accessibility recommendations at the international level. The latest WCAG edition (WCAG 2.1) was updated in 2018.<sup>89</sup> WCAG 2.1 aims to provide guidance on aspects that were previously absent or underrepresented in WCAG 2.0. To this end, WCAG 2.1 includes one new overarching guideline (Guideline 2.5: Input modalities) with six success criteria, and 11 new success criteria under the existing guidelines already present in WCAG 2.0. These, in all, 17 new success criteria aim to address issues that affect:

- people using “mobile” devices (though note that this term is somewhat archaic, as the boundaries between traditional categorizations of “desktop”, “mobile” and “tablet” are constantly blurring);
- people with low vision who may be using screen magnification or large text/zoom;
- people with cognitive and learning disabilities;
- people using speech input/dictation software.

According to WCAG 2.1, the accessible web should be:

- perceivable;
- operable;
- understandable;
- robust.

WCAG 2.1 is already translated in Chinese and Italian, while WCAG 2.0 is translated in 21 languages, including the six ITU official languages.<sup>90</sup>

The Authoring Tool Accessibility Guidelines (ATAG) is the toolkit for web developers, designers, etc. developed under the Web Accessibility Initiative.<sup>91</sup>

### ITU-T Recommendations

Recommendation ITU-T F.790 (01/2007), on telecommunication accessibility guidelines for older persons and persons with disabilities<sup>92</sup>, sets out the requirements for terminal equipment, mainly concerning visual or aural characteristics of:

*Displays:*

- Text shall be as easy to read as possible.

<sup>86</sup> W3C. [How people with disabilities use the web](#).

<sup>87</sup> W3C. [Older users and web accessibility: Meeting the needs of ageing web users](#).

<sup>88</sup> W3C. Accessibility fundamentals. [Accessibility, usability and inclusion](#).

<sup>89</sup> W3C. [Web content accessibility guidelines \(WCAG\) 2.1](#) (5 June 2018).

<sup>90</sup> W3C. [WCAG 2 translations](#).

<sup>91</sup> W3C. [Authoring tool accessibility guidelines \(ATAG\) 2.0](#). W3C Recommendation, 24 September 2015.

<sup>92</sup> Recommendation [ITU-T F.790](#) (01/2007), on telecommunication accessibility guidelines for older persons and persons with disabilities.

- Display content shall be colour-independent.
- Surface reflection shall as far as possible not create any difficulty in seeing the screen.
- Brightness and contrast shall be adjustable as far as possible.
- The size, typeface, character spacing, line spacing and colour of text should be made adjustable for ease of use.
- Visual information should be understandable in other sensory ways.
- Standard position (or starting position) should be verifiable both visually and aurally.

*Ringling tones:*

- The volume and frequency of ringing tones shall be designed as far as possible to make the tone easy to hear depending on the hearing characteristics of users.
- The sound level shall be adjustable and be able to be muted. Also, the current status of the level shall be able to be confirmed visually.
- It should be possible to choose tones, patterns and melodies for ringing tones.
- Information provided by ringing tones shall be available not only in an aural way but also in other sensory ways.

*Alert tones and voice guidance system:*

- The volume and frequency of alert tones shall be designed as far as possible to make the tone easy to hear depending on the hearing characteristics of users.
- The voice guidance system shall use plain and clearly-enunciated language, and employ logical procedures based on the thought processes of users.

Supplement 17 to the ITU-T H-series Recommendations, containing a guide for addressing accessibility in standards,<sup>93</sup> presents descriptions of (and design considerations for) human abilities and characteristics, and strategies for addressing user accessibility needs and design considerations in standards, and is technically aligned with ISO/IEC Guide 71 (2014).<sup>94</sup>

The standard-specific requirements and recommendations based on user accessibility needs and design considerations include:

- provision of multiple means of information presentation;
- provision of multiple means of user interaction ;
- setting fixed parameters to accommodate the widest range of users;
- setting adjustable parameters to accommodate the widest range of users;
- minimizing unnecessary complexity;
- provision of individualized access to a system, etc.

In 2006, the Ministry of Industry and Information Technology (MIIT) of **China** scheduled work on accessibility of information in its "sunny green project" plan, and launched research tasks on related standards. Since then, MIIT has issued a series of standards on access to information technology, facilities, services, products, etc. pertaining to the telecommunication network and Internet. Standard YD/T 1761-2012, on technical requirements for web accessibility, issued by MIIT in 2012, is the primary technical basis for developing accessible websites in China. Standard YD/T 3329-201, on technical requirements for accessible mobile communication

<sup>93</sup> ITU-T. [Supplement 17 \(11/2014\) to the ITU-T H-series Recommendations. Guide for addressing accessibility in standards.](#)

<sup>94</sup> International Organization for Standardization (ISO). Online browsing platform. [ISO/IEC Guide 71:2014. Guide for addressing accessibility in standards](#); International Electrotechnical Commission (IEC). [Guide 71. Second edition 1 December 2014. Guide for addressing accessibility in standards.](#)

terminals, issued in 2018, is set to become the primary technical basis for developing mobile communication terminals accessible to native enterprises in China.

Some professional enterprises for the blind in **China** have developed PC screen-reader software; some have improved the Chinese version of Android-based screen-reader software. To build a bridge between visually-impaired persons and volunteers through the mobile Internet, a number of enterprises have developed information service systems and related apps which can support services that are urgently needed by visually-impaired persons, such as image recognition, video assist, trip companion, etc. Usually, the enterprises also carry out operating and maintenance work for these services. Some IT enterprises have made information accessibility improvements to software commonly used in life, such as instant communication, financial payment, online shopping, taxi booking, etc. Some mobile phone manufacturers have actively participated in research and development of accessible mobile phone products.<sup>95</sup>

**Facebook** views accessibility as a horizontal function and has undertaken a cross-functional effort – including research, design, engineering, legal, compliance and policy teams – to promote accessibility in its products. Facebook contributes to web accessibility standards through W3C, and to Accessibility Rich Internet Applications (ARIA), the essential accessibility-focused web framework for making HTML/JS/CSS-based websites more accessible. Facebook has invested in web accessibility in the following ways:

- Launch of automatic Alt Text or “AAT,” a feature that uses object recognition to describe photos to people who use screen readers. With this feature, people using screen readers can hear a description of items an image may contain as they scroll through photos on their newsfeed.
- Launch of a face-recognition tool that can tell people with vision loss which friends appear in photos in their newsfeed, even if they are not tagged (if that person has authorized this in their settings).
- Introduction of several closed-captioning features, helping people who are hearing-impaired: closed captions for videos via text file upload, automatic video captioning for ads and pages, and real-time captioning in Facebook live broadcasts.<sup>96</sup>

In 2004, the Protection of Disabled Persons Act was adopted by the Islamic Consultative Assembly of the **Islamic Republic of Iran**. However, the text was not comprehensive and did not cover the issue of access to ICTs for persons with disabilities. In 2018, a revised version of the act was adopted by the Islamic Consultative Assembly in order to correct the prevailing deficiencies. This amended version includes the following major chapters:

- Chapter 1: General
- Chapter 2: Suitability, accessibility and mobility
- Chapter 3: Health services, therapy and rehabilitation
- Chapter 4: Sports, cultural, artistic and educational affairs
- Chapter 5: Entrepreneurship and employment
- Chapter 6: Housing
- Chapter 7: Culture and promotion of public awareness
- Chapter 8: Judicial support and tax facilities
- Chapter 9: Livelihoods and administrative support and employment
- Chapter 10: Planning, monitoring and financial resources

<sup>95</sup> ITU-D SG1 Document [SG1RGO/79](#) from China

<sup>96</sup> ITU-D SG1 Document [1/239](#) from Facebook (United States)

As a result, the Disability Protection Act of 2018 can be considered as marking good progress in protecting persons with disabilities in the Iranian legal system. With respect to standardization, it should be mentioned that activities have been initiated on localization of the relevant standards in ISO 40500 and WCAG 2.0. These activities have been operationalized under a consultative working group comprising both the governmental and private sectors.<sup>97</sup>

Since 2014, the **Republic of Korea** has been implementing its Web Accessibility (WA) Quality Certification system. Based on Article 32, paragraph 2, of the National Information Act of the Republic of Korea, the WA quality certification system grants quality certification to those websites which have attained a certain level of accessibility of their information and telecommunication services, in order to promote access to and user convenience of those services by persons with disabilities and other persons with specific needs. Technical evaluation, the core of WA quality certification, is carried out based on the Korean Web Content Accessibility Guidelines 2.1 (KWCAAG 2.1), which is the national web accessibility standard. Detailed criteria refer to the Standard Evaluation Guidelines established by the Ministry of Science and ICT as the minimum standards, and the evaluation consists of expert assessment and usability tests. Since the introduction of the WA certification system in 2014, a total of 5 003 websites have been certified.<sup>98</sup>

The *Instituto federal de telecomunicaciones* (IFT) (Federal Telecommunications Institute) of **Mexico**, following instructions handed down by the Federal Telecommunications and Broadcasting Law, has contributed to telecommunication/ICT accessibility by implementing various projects, such as the General guidelines for accessibility to telecommunication services for users with disabilities.<sup>99</sup> These guidelines establish the necessary mechanisms and specific obligations for authorized dealers and telecommunication service providers related to accessibility features in websites, which allow people with disabilities to consult them. The first report on accessibility of telecommunication services for persons with disabilities, showing the advances in accessibility of telecommunication services in Mexico a year after enforcement of the measures set out in the guidelines, was published in December 2018.<sup>100</sup> The second report was published in December 2019.<sup>101</sup>

In the **Russian Federation**, requirements for the accessibility of Internet resources are laid down in the National Standard "Internet resources. Accessibility requirements for the visually impaired" (GOST R 52872-2012). This national standard covers Russian-language electronic Internet resources, and sets out general requirements in respect of access by the visually impaired using the computer as a technical tool for rehabilitation. It was developed on the basis of a previous draft (GOST R 52872-2007) and taking into account WCAG 2.0.

The National Standard defines three levels of Internet resource accessibility:

- Level A: Minimal accessibility – Enables the visually impaired to access the Internet resource without information loss.
- Level AA: Full accessibility – Enables the visually impaired to access all structural elements of the Internet resource.

<sup>97</sup> ITU-D SG1 Document [SG1RGQ/12](#) from the ICT Research Institute (Islamic Republic of Iran)

<sup>98</sup> ITU-D SG1 Document [SG1RGQ/91](#) from the Republic of Korea

<sup>99</sup> ITU-D SG1 Document [1/192](#) from Mexico

<sup>100</sup> ITU-D SG1 Document [1/191](#) from Mexico.

<sup>101</sup> ITU-D SG1 Document [1/350](#) from Mexico



- Level AAA: Access to specialist Internet resources for the visually impaired – Enables the visually impaired to access the Internet resource using the specialized technologies of that resource developed for this user category.

Internet resources that promote the social inclusion of persons with disabilities include the following:

- Websites of public authorities and institutions
- Public service sites
- Sites of educational institutions (in particular those providing distance-learning courses)
- Major search engines
- Electronic payment systems
- E-mail, etc.

These sites are set up with the following functions to display information under the National Standard on the accessibility of Internet resources for the visually impaired:

- Adjustability of font size (normal, large, extra-large)
- Adjustability of the background colour (white, black, dark blue, light blue, green)
- Ability to enable and disable images
- Adjustability of character spacing (0, 2, 5).<sup>102</sup>

Despite the adoption of laws and policies on web accessibility in national disability rights legislation and regulations in many countries, however, the web remains largely inaccessible to persons with disabilities. State-of-the-art research shows that web accessibility laws “on the books” have failed to be translated into laws “in action”. This means that the implementation of web accessibility laws and policies has been insufficient to ensure access to the web for persons with disabilities in practice.

There are four key requirements for practical implementation of web accessibility policies:

- a) To support the fulfilment of Article 8 of CRPD, governments must ensure that service providers are aware of their web accessibility obligations under the law.
- b) Under Article 32 of CRPD, government agencies and national and international organizations for people with disabilities (DPOs) must share knowledge and good practice with other key stakeholders, including the private sector, civil society and the academic sector.
- c) Governments must promote participatory processes to ensure that key stakeholders, including DPOs, have the capacity and opportunity to make a substantive contribution to the design and implementation of web accessibility policies, in line with Articles 4 and 29 of CRPD.
- d) Governments must actively promote, protect and monitor the implementation of web accessibility policies in collaboration with DPOs and in ways that are transparent, accessible and accountable.

These four considerations can help translate web accessibility policy into action.

---

<sup>102</sup> ITU-D SG1 Document [1/139](#) from the Russian Federation



## 2.4. Accessible ICT public procurement policies and strategies

Public procurement plays a significant role in the expansion of ICT accessibility. Different countries employ various policies and strategies in this regard.

For instance, **India** emphasizes the following significant points:

- Equitable access to ICTs should be made a part of the legal definition of universal service.
- Schemes for persons with disabilities may require a more flexible and collaborative approach as compared with other universal service fund schemes, and this flexibility should be permissible within the rules, along with safeguards to ensure transparency.
- To achieve equitable access to ICTs, Member States should provide for:
  - accessibility of all hardware and software and telecommunication equipment;
  - accessibility of public access communication devices and services;
  - accessible customer services, premises and facilities;
  - accessibility of mobile networks and services provided to the public in urban, suburban and rural areas;
  - availability of accessible and affordable (bundled) mobile devices and services for persons with disabilities.<sup>103</sup>

**Mexico** shared the progress made and results achieved in implementing its General guidelines for accessibility to telecommunication services for users with disabilities. Within the scope of these guidelines, Mexico's *Instituto federal de telecomunicaciones* (IFT) (Federal Telecommunications Institute) has carried out several actions to monitor and verify compliance with the accessibility obligations placed on licensed and authorized operators of telecommunication services, in order to assess the impact of such regulation and to provide a real picture of Mexico's progress on accessibility of telecommunication services.<sup>104</sup>

A study by the ICT Research Institute in the **Islamic Republic of Iran** shows the status of existing ICT-based activities in favour of persons with disabilities in the country, in terms of e-health businesses and centres serving persons with disabilities; and maps types of intelligence (emotional, motional, perceptual and rational) onto centres for persons with disabilities and e-health businesses. The ICT Research Institute held workshops to raise awareness among universities and research institutes, governmental and non-governmental organizations and e-health businesses on providing accessibility and developing assistive hardware/software systems for persons with disabilities. The first workshop focused on the role of ICT for persons with disabilities from the four perspectives (the four Cs) of "Creating jobs", "Creating access", "Creating skills" and "Creating tranquillity", including a variety of corresponding information and best practices.<sup>105</sup>

With a view to making the content of government agencies' websites more attractive, the *Commission d'accès à l'information d'intérêt public et aux documents publics* (CAIDP) (Commission on access to information of public interest and public documents) of **Côte d'Ivoire** organized a capacity-building seminar for IT managers and webmasters from ministries and bodies reporting to ministries. The topic of the seminar was "Information access and proactive

<sup>103</sup> ITU-D SG1 Document [1/27+Annexes](#) from India

<sup>104</sup> ITU-D SG1 Documents [1/191](#) and [1/350](#) from Mexico

<sup>105</sup> ITU-D SG1 Document [1/149](#) from the Islamic Republic of Iran

dissemination: Contributions of the IT services within government agencies". The subtopic was "Web accessibility for persons with disabilities".<sup>106</sup>

As part of the implementation of projects under the E-HANDICAP programme, which fall within the Priority Action Programme (PAP 2019) of the Government of **Côte d'Ivoire**, the Ministry of the Digital Economy and Post has begun equipping four sites to adapt them for persons with disabilities. These sites obtained funding from telecommunication/ICT operators and providers for research, standardization, education, awareness-raising and studies.<sup>107</sup>

In order to gauge the information divide, the Government of the **Republic of Korea** conducted a digital information divide survey. According to the survey results, in 2018 the digital informatization rate of the four information-disadvantaged groups studied (persons with disabilities, low-income persons, rural residents, older persons) stood at 68.9 per cent. In addition, according to the results of a survey on web accessibility in respect of the private sector announced by the Government of the Republic of Korea for 2018, the average web accessibility score was 66.6, which indicates the urgent need to improve accessibility of private-sector websites.<sup>108</sup>

The Government of **China** has issued a series of policies to protect the information accessibility rights of persons with disabilities. These policies outline accessibility requirements, and encourage IT corporations to develop accessible IT products for persons with disabilities.

WeChat and QQ from Tencent Technologies are the two IM tools most used by visually-impaired persons in **China**, playing a significant role in their daily life.<sup>109</sup>

- Tencent's WeChat team incorporates accessibility into their routine research and development process for product updates. Based on the test results from the third-party accessibility research team, the product R&D team optimizes the product features for accessibility on an ongoing basis to cater for the needs of visually-impaired persons, allowing them to use this IM tool accessibly via a screen reader. By leveraging a variety of channels such as images, text, moments and videos, this accessible IM tool makes it easier for visually-impaired persons to integrate into society.
- Tencent's QQ team has been promoting accessibility optimization of products since 2009, and significant improvements have been made in terms of the in-depth adaptation of screen readers, with the provision of multiple features such as accessibility emoticons, optical character recognition (OCR) and voice description of image. The team aims to provide the visually impaired with a better online social experience, bring them the benefits of technological development and thereby better integrate them into the mainstream society.

Alipay in **China** has always believed in the inclusive nature of technology and has been fully committed to making technology more accessible. A specialized engineering group on accessibility was set up seven years ago, carrying out product developer training, product testing and quality control. After years of effort, Alipay provides one-stop digital service to visually-impaired users, enabling them to travel around without cash, pay utility fees, make doctor's appointments, purchase movie and train tickets, order take-outs, grab a taxi and access other life services on this platform. Its benefit has been highly visible during the COVID-19 pandemic: with people being obliged to follow social distancing guidelines and stay at home,

<sup>106</sup> ITU-D SG1 Document [SG1RGQ/163](#) from Côte d'Ivoire

<sup>107</sup> ITU-D SG1 Document [SG1RGQ/164](#) from Côte d'Ivoire

<sup>108</sup> ITU-D SG1 Document [SG1RGQ/255](#) from the Republic of Korea

<sup>109</sup> ITU-D SG1 Document [SG1RGQ/354](#) from China

their daily life and needs have depended heavily on the digital platform. Alipay's experience in accessibility development is also influencing its massive ecological chain with mini-apps and third-party developers and partners.<sup>110</sup>

Also in **China**, Alibaba set up an independent full-time team to support the current and future accessibility optimization of Alibaba's various app products. In the Taobao app, it enables visually-impaired users to operate the app through screen-reader software. They choose from the same product pool as ordinary users, using OCR technology to recognize the introduction pictures, check past reviews and ask former buyers questions. After confirming the shopping decision, they specify the delivery address and make the online payment, after which they just have to wait for express delivery of the package containing the selected goods. The ability to rely on e-commerce has dramatically improved the shopping experience of the visually impaired.<sup>111</sup>

Beijing DiDi Infinity Technology Development, Co. in **China** optimizes the accessibility of app products on an ongoing basis in pursuit of the purpose of its corporate philosophy: "Let everyone travel better". The company has made accessibility improvements to support screen readers, enabling the visually impaired to book a car online using the DiDi app. When a visually-impaired person orders, nearby drivers receive relevant vehicle dispatching information. At present, the visually impaired can use the DiDi app independently and freely choose their starting location and destination seamlessly to place an order. At the same time, they can freely select a variety of other products in the app. DiDi specifically approached third-party public welfare agencies and recruited visually-impaired employees to pursue and optimize the accessibility aspects of the app.<sup>112</sup>

---

<sup>110</sup> ITU-D SG1 Document [SG1RGQ/349](#) from China

<sup>111</sup> ITU-D SG1 Document [SG1RGQ/350](#) from China

<sup>112</sup> ITU-D SG1 Document [SG1RGQ/351](#) from China

## Chapter 3 – Requirements and guidelines to promote, implement and use accessible public telecommunication and ICT spaces

### 3.1. Requirements for relay services for persons with disabilities and other persons with specific needs

The ITU-T Joint Coordination Activity on accessibility and human factors (JCA-AHF) submitted a contribution to Question 7/1 on real-time relay services.<sup>113</sup>

Relay services are telephone services that enable persons who are deaf, hard of hearing or have speech difficulties, including deaf-blind persons, to make a voice call with a hearing person in real time. Relay services started in the United States in the late 1960s, and there are now many throughout the world giving persons with disabilities access to voice telephony in real time.

Relay services have a human interface called a communication assistant (CA) to provide functional equivalence, and this is imperative. Many countries and telecommunication companies believe that relay services are too expensive to implement and that an app will suffice. It has been discovered that many administrations and telecommunication companies wanting to reduce costs have sought to advocate the use of smart apps instead of recourse to real-time relay services, with the attitude that “this is better than nothing”. The JCA-AHF contribution emphasizes that this is not the case, and that the situation has to be clarified.

There is a need for relay services, consistent with CRPD and with Resolution 175 (Rev. Dubai, 2018) of the ITU Plenipotentiary Conference, on telecommunication/ICT accessibility for persons with disabilities and persons with specific needs. ITU has developed a standard on the subject, Recommendation ITU-T F.930, on multimedia telecommunication relay services.<sup>114</sup> It is widely observed that, for the inclusion of persons with disabilities in society, allowing them to work and enjoy a good quality of life, the implementation of real-time relay services is vital. When persons with disabilities participate in life with tools that confer functional equivalence, this costs administrations far less than having to grant them lifelong financial assistance. Relay services also provide employment for citizens of developing countries with and without disabilities.

#### Terminology:

- *Relay service*: A telephone service that enables a person who is deaf or hard of hearing or whose speech is not clearly understood to place and receive a telephone call with a hearing person. This includes voice-to-voice, text-to-text, text-to-speech, sign-to-sign and sign-to-speech or text.

<sup>113</sup> ITU-D SG1 Document [1/215+Annex](#) from the ITU-T Joint Coordination Activity on accessibility and human factors (JCA-AHF)

<sup>114</sup> ITU-T. Recommendation [ITU-T F.930](#) (03/2018), on multimedia telecommunication relay services.

- *Communication assistant (CA)*: A human interface between the caller and the person being called.
- *Application (app)*: Usually found on smartphones, some with text-to-voice using automatic speech recognition (ASR).
- *Real-time telephone call*: The ability to make a call via the telephone with functional equivalence to persons with disabilities.

**Japan** presented a case study on assisting communication between a person with hearing loss and a hearing person via a real-time telephone network with speech recognition/synthesis. The service stemmed from an employee in a Japanese mobile-phone company who was hard of hearing. In this system, the party to the call with hearing loss will see text converted from the hearing party's speech; on the other hand, the hearing party will hear the speech converted from text created by the party with hearing loss. The system operates 24/7 all year round. It can be used with an ordinary mobile phone.<sup>115</sup>

Furthermore, in June 2020, **Japan** enacted legislation to provide telecommunication relay service to people who are unable to use telephones, such as the deaf or hard of hearing. Video-relay service and text-relay service are provided by the designated relay service provider and the cost will be shared by all telephone companies. The official service will start from July 2021.

**G3ict** draws attention to the statement clarifying the official position of the International Federation of the Hard of Hearing (IFHOH) and World Federation of the Deaf (WFD) with regard to the misconception that automatic speech recognition (ASR) can be used instead of human interfaces for relay services and other communication services for persons who are deaf and hard of hearing. It is argued that, since the technology is not advanced enough, efforts should focus on creating real-time relay services for persons with disabilities.<sup>116</sup>

China Unicom in **China** provides an innovative product and service for accessible calling for the hearing-impaired, in which speech content can be converted into text in real time by ASR (speech-to-text (STT) technology) and displayed on a WeChat applet on the deaf or hard-of-hearing user side; and the content that the person wants to express can be converted from text to voice by text-to-speech (TTS) technology and played on the other side of the call. This product and service enables deaf and hard-of-hearing persons to place and receive calls freely with persons who do not have their disability. The China Disabled Persons' Federation and the China Association of the Deaf and Hard of Hearing have been deeply involved in designing and verifying the product's functions and product experience.<sup>117</sup>

### 3.2. ICT accessibility in education

Nowadays, as a key enabling infrastructure, ICTs provide appropriate media to facilitate access to knowledge and information, especially for persons with disabilities. The use of ICTs can support independence in learning skills and education, not only for persons with physical disorders but also those suffering from mental illnesses.

To better exploit ICT facilities for achieving accessible e-education objectives, advanced methodologies and technologies such as AI, computational intelligence (CI) and visualization, augmented reality and virtual reality can be considered.

<sup>115</sup> ITU-D SG1 Document [1/232](#) from Japan

<sup>116</sup> ITU-D SG1 Document [SG1RGQ/211+Annex](#) from G3ict

<sup>117</sup> ITU-D SG1 Document [SG1RGQ/336](#) from China

Methods and tools within the realm of AI/CI can help in creating educational content that is compatible with the learners' models/conditions and in providing professional solutions for mentors to handle contingent situations confronted in their mentoring. AI/CI may likewise be expected to help in designing/planning courseware that is meaningfully beneficial from the standpoint of knowledge in the underlying domain.

In the case of disability, the courseware required for upgrading knowledge and understanding of persons with disabilities in terms of the beneficial formats of daily activities should be designed/planned so as not to cause any serious conflict with their mental, affective and physical conditions. Visualization/virtual reality/augmented reality methods and tools can also make the entire process of promoting knowledge and understanding of persons with disabilities more tangible/attractive in relation to their priorities and interests.

### **Accessibility tools for people who have difficulties hearing, reading and writing**

Lack of ICT accessibility can become a barrier to accessing content, media, public services and even the job market for persons with disabilities. In overcoming this problem, both technologists, from the perspective of developing intelligent interactive tools/equipment, and education specialists for persons with disabilities, from the standpoint of planning educational/training curricula and content, have a significant responsibility to provide accessible, compatible and usable content as well as tools/equipment for promoting knowledge and skills of persons with disabilities.

The widespread use of computers and cellphones, especially by those who experience vision impairments or hearing difficulties, are prompting the development of accessible/assistive applications and tools. As mentioned in the previous section, AI and augmented/virtual reality can be of great value in this regard.

Intelligent virtual assistants and human-computer interaction tools equipped with TTS or STT capabilities support persons with vision and hearing impairments. Gesture-based screen readers benefiting from those systems/applications, audio descriptors, screen magnifiers, tactile markers, alternative keyboards, etc. can be enhanced by developing new technologies to assist persons with vision impairments in reading and writing. Other facilities such as captioning and signing, video-relay services, SMS and MMS, hearing-aid compatibility, speech-to-text and volume adjustment similarly assist persons with hearing difficulties to the same end.

The ICT Research Institute in the **Islamic Republic of Iran** examines issues arising in regard to the interaction between persons with disabilities and assistant systems. It demonstrates how a simple automated assistant system like a screen reader or mini-robot can provide persons with disabilities with helpful services and how an information retrieval system can provide valuable information to users.<sup>118</sup>

### **Good practices in respect of practical applications for accessible e-education**

E-education/e-learning/mobile learning opens up an excellent opportunity for persons with disabilities to access information and knowledge and reap the benefit of learning, teaching, shaping and transferring new skills whenever they want and wherever they are. It can thus be

---

<sup>118</sup> ITU-D SG1 Document [1/280](#) from the Islamic Republic of Iran

a valuable means for persons with disabilities to overcome social and geographical isolation and other prevailing limitations and barriers.

New technologies and tools can help design and present attractive and interactive multimedia content (including text, audio, video, 3D objects, etc.) and courseware based on accessibility standards and universal design for learning (UDL) principles.

Indeed, new technologies such as augmented reality and virtual reality can significantly improve the lives of persons with disabilities. It is also recommended that human-computer interaction (HCI) be used in addition to augmented/virtual reality tools to enhance the learning performance of persons with disabilities in both online and blended learning.

The ITU Regional Office for Africa and the *Autorité malienne de régulation des télécommunications et des postes* (AMRTP) (Malian Regulatory Authority for Telecommunications/ICTs and Posts) held a training programme in **Mali** for about 50 women with disabilities focusing on capacity building and awareness-raising in techniques for seeking ICT-related employment. It is to be noted in this connection that a United Nations agency donated 20 portable computers for women with disabilities.<sup>119</sup>

A case study on literacy actions to promote access to telecommunication/ICT services for persons with disabilities and older persons with age-related disabilities is reported by **Mexico**. The *Instituto Federal de Telecomunicaciones* (IFT) (Federal Telecommunications Institute of Mexico) has implemented several actions to raise digital literacy among older persons with age-related disabilities and persons with disabilities in order to promote access to and use of telecommunication/ICT services, through various courses (face-to-face and remote) that are designed to teach this target audience how to use their devices (cellphones, computers, tablets, etc.) by taking advantage of the accessibility features and all available technologies.<sup>120</sup>

**Japan** puts forward a case study, based on guidelines prepared by the Info-Communication Access Council (IAC) within the Communications and Information network Association of Japan (CIAJ), describing a method by virtue of which older persons and persons with disabilities can easily recognize accessible products when using telecommunication services and ICT devices. In this context, the IAC secretariat is responsible for creating checklists and reviewing the results achieved.<sup>121</sup>

In the **Islamic Republic of Iran**, a national training programme run by the ICT ministry's Office for Women and Family Affairs was held in 270 regions, including states, cities and villages, to empower women by applying ICT tools and services for the purpose of entrepreneurship and creating jobs for women.<sup>122</sup>

In the **Russian Federation**, children with disabilities or their legal representative may choose the form (distance or face-to-face) of school, college or university education. For distance learning, specific equipment is required, namely a computer with Internet access and a video camera. If a child with a disability does not possess such equipment, they or their legal representative may apply to the local education authority to be assigned to the distance-learning programme and provided with the requisite equipment. The local education authority then contracts this service with the Internet provider.

<sup>119</sup> ITU-D SG1 Document [SG1RGQ/7](#) from Mali

<sup>120</sup> ITU-D SG1 Document [1/190](#) from Mexico

<sup>121</sup> ITU-D SG1 Document [SG1RGQ/71](#) from Japan

<sup>122</sup> ITU-D SG1 Document [SG1RGQ/12](#) from the Islamic Republic of Iran



Unified standards and approaches are now also being developed to create an accessible environment and universal design. For this purpose, the system of voluntary certification – "Accessible world for everyone" – has been established within the framework of the All-Russian Society for Persons with Disabilities.<sup>123</sup>

The China Braille Library in **China** has made good use of multimedia information processing technologies in providing descriptive video services, with a full understanding of the needs of the visually impaired. Taking the original movies, they have added dubbing and commentary to the pictures. Using synthetic technologies related to programme recording, descriptive video products are produced that are specially tailored for the visually impaired. In 2011, a descriptive video cinema for the visually impaired was built in the China Braille Library, which serves to enhance the target audience's access to cultural, recreational and entertainment films and thereby improve their quality of life.<sup>124</sup>

With the support of the China Disabled Persons' Federation and the China Association of the Blind, some professional enterprises for the blind in **China** have developed screen-reading software, including PC screen-reading software such as, *inter alia*, YangGuang, YongDe and ZhengDu, and mobile phone screen-reading software based on the Android system such as, *inter alia*, BaoYi, DianMing and TianTan. Using these tools, visually-impaired persons can access the distance/e-education platforms of special education schools over the Internet, acquire professional knowledge in areas such as, for instance, acupuncture and massage, and improve their ability to find a job and make a living.<sup>125</sup>

### 3.3. Requirements for accessible mobile phones and apps for older persons with age-related disabilities

World Population Prospects 2019, published by the **United Nations Department of Economic and Social Affairs** (UNDESA), confirmed that the world's population is growing older due to increasing life expectancy and falling fertility levels. In 2019, approximately 9 per cent of people were aged 65 or over worldwide. Compared with this average level, the percentage is much higher in Europe and Northern America (18 per cent), Australia/New Zealand (15.9 per cent) and Eastern and South-Eastern Asia (11.2 per cent). The report also predicted that the proportion of older persons worldwide would grow continuously and climb to nearly 12 per cent in 2030 and 16 per cent in 2050.<sup>126</sup>

Mobile phones and apps are indispensable tools for older persons with age-related disabilities to participate in social life. It is thus necessary to improve the accessibility of mobile terminals and application software products in order to adapt them to the physical characteristics of older persons with age-related disabilities. Helping older persons with age-related disabilities to use mobile phones and apps is beneficial in terms of convenience in their daily lives and affording them and their families more protection in the event of public health emergencies. Mobile payment allows contactless payment when trading in basic goods, so if older persons with age-related disabilities can use mobile phones and apps instead of paper money to buy and sell products, their chances of contracting viruses will be reduced, and in turn the chances of them infecting relatives living in the same household.

<sup>123</sup> ITU-D SG1 Document [SG1RGQ/83](#) from the Russian Federation

<sup>124</sup> ITU-D SG1 Document [SG1RGQ/188](#) from China

<sup>125</sup> ITU-D SG1 Document [SG1RGQ/335](#) from China

<sup>126</sup> UNDESA. [World Population Prospects 2019](#). 17 June 2019.



Older persons with age-related disabilities face all the problems associated with declining sight, hearing, mobility and other physical functions. Accordingly, it proposed that the following information accessibility requirements be considered in the development of mobile phones and apps:

- Support the font-amplification function to provide convenience for older persons with declining vision
- Support the screen-reading function to provide convenience for older persons with severely declining vision or total loss of sight
- Support text annotation for multimedia information and audio information to provide convenience for older persons with severely declining hearing or total hearing loss
- Develop voice-control technology to provide convenience for older persons with declining vision and decreased ability to operate equipment
- While developing voice-control technology, retain non-voice-control operating modes (such as text command or touch operation) to ensure that the products can also be used by older persons with declining hearing or total hearing loss
- Develop products suitable for single-hand operation to provide convenience for older persons with a physical disability (such as the effects of a stroke).

Providing accessible mobile phones and apps does not mean developing a specific product solely for older persons with age-related disabilities, but rather providing products that both older people and young people can use by adjusting the display styles. For example, the young can use a small font style; older people can set the display to a large font style. By offering such a combination, IT products can be accessible for everyone regardless of their age. To achieve this, it is important to ensure that older persons keep up with technological progress and master new skills needed in order to live an independent life in the information age, without being isolated from social life because they lack the required knowledge to use modern technology.

## Chapter 4 – Conclusions and general recommendations

### 4.1. Key issues to be considered for implementing a telecommunication/ICT accessibility policy and regulatory framework for persons with disabilities and persons with specific needs in all countries

Article 9 of CRPD calls upon States Parties to promote the design, development, production and distribution of accessible ICTs. In the SDG framework, ICT is viewed as an essential tool for achieving the transformation to sustainable development by 2030. A holistic approach to ensuring ICT accessibility is necessary in order to ensure that persons with disabilities and their representative organizations can participate in national development efforts. Governments must therefore consider a full range of policy options, including regulation of the market through public procurement and legislation that obligate service providers to ensure ICT accessibility, and redistributive policies to build capacity in DPOs and provide knowledge on how persons with disabilities can participate in policy processes.

The changes that need to be included in existing ICT legislation to promote ICT accessibility for persons with disabilities include:

- Revising existing ICT policies, legislation and regulations to promote ICT accessibility
- Consulting with persons with disabilities on the formulation of such revised ICT policies, legislation and regulations, for instance through the establishment of a committee on ICT accessibility, or by any other appropriate means
- Making persons with disabilities and DPOs aware of revised ICT policies, legislation and regulations
- Adopting technical and quality-of-service standards for ICT accessibility
- Adding and revising key definitions in ICT legislation to promote ICT accessibility
- Ensuring that quality-of-service requirements take into account the specific needs of persons with disabilities and set the quality-of-service standards for accessible services
- Revising legal frameworks for emergency communications to ensure that emergency services are accessible for persons with disabilities
- Setting clear targets and reporting annually on their implementation
- Amending disability legislation to refer to ICT accessibility.

### 4.2. Promoting accessibility in public ICT spaces, such as telecentres and public payphones

Public ICT spaces, such as telecentres and community access points or standalone communication facilities such as payphones, are essential for guaranteeing people's access to telecommunication/ICT services, particularly in remote and rural areas. Given the need to establish a barrier-free information space to reduce the digital divide, it is vitally important that public telecommunication/ICT centres and telecommunication facilities be adapted to the needs of users with disabilities.

Ensuring the accessibility of public telecommunication/ICT centres and standalone communication facilities involves completing the following tasks:

<b>Task 1:</b>	Providing unobstructed access and entry to, and exit from, public telecommunication/ICT centres and telecommunication facilities
<b>Task 2:</b>	Ensuring that the premises of public telecommunication/ICT centres are adapted to persons with disabilities
<b>Task 3:</b>	Equipping public telecommunication/ICT centres with technology adapted for use by persons with disabilities
<b>Task 4:</b>	Raising awareness and involvement of stakeholders.

The performance of each task entails the following set of measures:

***To provide unobstructed access and entry to, and exit from, public telecommunication/ICT centres and telecommunication facilities, it is recommended to:***

- Post a sign or other notice signalling the accessibility of a public telecommunication/ICT centre or telecommunication facility for a specific category or all categories of disability.
- Install a wide ramp with handrails for wheelchair access to a public telecommunication/ICT centre or telecommunication facility.
- Where necessary, post signs to warn visitors about any obstacles on the premises.
- Ensure that doors between rooms open and close freely in both directions.
- Ensure that a lift or elevator is available for wheelchair users to facilitate movement between floors or up and down staircases, or implement another solution to the same effect.
- Equip entrance doors with audio signals (open/closed).
- Install tactile walking surface indicators (TWSIs) to direct and facilitate movement around the premises of public telecommunication/ICT centres or telecommunication facilities.
- Install tactile name signs at the entrance, inside the facility, and, where necessary, at the entrance to each room to facilitate orientation around the premises of public telecommunication/ICT centres and telecommunication facilities.

***To ensure that the premises of public telecommunication/ICT centres are adapted to persons with disabilities, it is recommended to:***

- Ensure that a person in a wheelchair can move around public telecommunication/ICT centres and telecommunication facilities. Where possible, avoid sharp turns and inclines and declines on the premises.
- Use assistive technologies, tactile plans, tactile arrows and signs in Braille, or another means of conveying written information to users with vision impairments around the premises.
- Use induction loop systems (hearing loops) for the remote transmission of audio information using a transmitter (microphone).
- Make sure there is at least one workstation designed for use by a person in a wheelchair (the desk should be sufficiently high and not have any restrictive side panels).
- Ensure the presence at public telecommunication/ICT centres and telecommunication facilities of at least one employee who can communicate by sign language or remote video interpretation facility to guarantee that information concerning the operation of the centre or facility and the services available there can be conveyed to sign-language users. Where this is not possible, such information should also be available on paper or in electronic text.

- Ensure the availability of a transcription service for persons who are deaf or hard of hearing who do not benefit from sign language or hearing loops (deafened people) Where this is not possible, such information should also be available on paper.
- Ensure that there are copies of documents, announcements and procedural instructions for providing services (including at the information desk) available in Braille, on high-contrast background or by another means of conveying written information to users with vision impairments, including screen readers or electronic video magnifiers.

***To equip public telecommunication/ICT centres and telecommunication facilities with technology adapted for use by persons with disabilities, it is recommended to:***

- Configure the input devices, e.g. mouse and/or keyboard, on at least one computer in such a way as to facilitate the use of the computer by persons with disabilities. For ease of use, it is advisable to adjust the mouse's sensitivity and double-click speed. On the keyboard, it is advisable to set keyboard shortcuts, which will reduce the need to use the mouse or similar controller.
- Make sure that public telecommunication/ICT centres and telecommunication facilities have Braille displays to facilitate the use of modern computers by persons who are blind or have vision impairments.
- Provide at least one Braille printer that can produce not only texts in Braille but also high-quality tactile graphics.
- Equip at least one computer with screen-reader software designed for persons with vision impairments. Such software conveys the information displayed on the screen to the user through the vocalization of text and the use of Braille. Existing screen magnification software also helps to make the most of computers.
- Equip at least one computer with voice recognition software for data entry and voice navigation allowing users to control several operating system applications, in order to facilitate access for persons with reduced dexterity or no hands.
- Provide for the use on at least one computer of navigation software potentially including on-screen controls and simple controllers, such as a switch, trackball or joystick.

***To raise awareness and involvement of a larger circle of stakeholders in the establishment of accessible public telecommunication/ICT centres and telecommunication facilities, it is necessary to:***

- Provide comprehensive information on the availability and capabilities of telecommunication facilities and centres and the services available.
- Ensure that trained staff are available who can assist and advise visitors to telecommunication/ICT centres and facilities on how to operate user equipment.
- Expand cooperation with organizations, funds, educational institutions and other stakeholders to generate greater interest in establishing accessible public telecommunication/ICT centres and telecommunication facilities.

Separate detailed conditions are required for the accessibility of **payphones**, which remain essential telecommunication/ICT facilities, in particular in remote and rural areas:

- Physical accessibility should be taken into account when designing a payphone booth (whether inside a building or standalone).
- The payphone terminal must be positioned at a height that makes it easy to use for a person in a wheelchair.
- The subscriber number assigned to the payphone, rates and other information necessary for the use of telecommunication services must be presented in an easily readable and understandable form and rendered in Braille.
- Identifiers on the buttons of the payphone terminal must also be rendered in Braille.

### 4.3. Promoting accessibility tools for accessible e-education, which can be used for people who have difficulties mastering reading and writing

- Promote the procurement of mainstream ICTs incorporating accessibility and assistive technology for education and public areas such as schools, universities, libraries and telecentres.
- Ensure that any initiatives and programmes to procure and provide accessible ICTs for education and training are based on the actual needs of the consumers as expressed through the organizations representing persons with disabilities.
- Ensure that initiatives and programmes to procure and provide accessible ICTs for education and training consider the ongoing maintenance and upgrading of accessible ICTs.
- Ensure that initiatives and programmes to procure and provide accessible ICTs for education and training take into account the training of persons with disabilities in the use of these ICTs.
- Create a field of study on adaptive IT, which will empower IT teachers in respect of accessibility.
- For the field of study on adaptive IT, it is recommended that:
  - a) The necessary tools in this field of study should be identical for persons with disabilities and those without; although other tools may be used that reflect the specific characteristics of telecommunications/ICTs for persons with disabilities.
  - b) The programmes should be based on software which can be broken down into two categories: ordinary software and adaptive software and equipment.
- Universities are important allies for mainstreaming progress and education on accessibility issues.

### 4.4. Key policy considerations for web accessibility

Web accessibility policy should be aligned with web accessibility obligations under international human rights and disability rights laws, including Article 9 of CRPD, taken in conjunction with the General Comment on said Article 9 issued by the Committee on the Rights of Persons with Disabilities.<sup>127</sup> Web accessibility policy can eliminate the barriers that persons come up against in accessing and using the web, across the whole diversity of human experience. Having said that, the adoption of web accessibility under human rights and disability rights law and policy often limits its scope of application to persons with disabilities, without recognizing the fundamental principles of universal design and its accompanying obligations under Article 4 of CRPD.

Universal design provides a richer, more comprehensive approach to realizing web accessibility. It extends web accessibility obligations to other socially disadvantaged groups and recognizes intersectional and multiple forms of discrimination. As a result, the experiences of persons who hold intersectional identities and who are subject to intersecting forms of discrimination on multiple grounds, including disability, are taken into account, so they can access and use the web on an equal footing with others.

<sup>127</sup> United Nations. Human Rights. Office of the High Commissioner. Committee on the Rights of Persons with Disabilities. [General Comment No. 2](#) (11 April 2014).

Web accessibility policy must also recognize the overlap between access to and use of the web. Internet access is related to connectivity, while accessibility is related to how websites and applications are designed and developed following the international standard – WCAG 2.1.<sup>128</sup>

Ensuring access to web technologies, including the Internet, does not obviate the need to ensure that websites and multimedia web content are used for persons with disabilities. Similarly, providing access to assistive technologies does not obviate the need to ensure that websites are designed to be compatible with those assistive technologies.

Clear definitions should be incorporated in the policies to guarantee accessibility:

- **Accessible ICTs:** The equipment or the service has embedded accessibility features from the design/production stage. As a result, all users can use ICTs based on their capabilities, needs and/or circumstances. Accessible ICTs are compatible with assistive technologies. Accessibility requirements consider the extent to which information can be accessed, understood and used by persons with the most comprehensive range of characteristics and capabilities. ICT accessibility, therefore, enables digital inclusion for the broadest range of people, including persons with disabilities and other persons with specific needs. To achieve digital accessibility, ICTs should not only be available and affordable, they must be designed to respond to the needs and abilities of as many people as possible.
- **Assistive technology:** Assistive technology is separate hardware or software added to equipment or services to enable persons with more severe disabilities to overcome the barriers they face in respect of access to information and communication. They are used to enable or compensate users with functional, motor, sensory or intellectual limitations.

Finally, web accessibility policy should be designed and implemented in collaboration with persons with disabilities and their representative organizations. The policies should help build capacity and allow persons with disabilities to participate substantively in the design and development of new web technologies. Ultimately, web accessibility policies aim to ensure that persons with disabilities can access the web on an equal footing with others. In conjunction with universal design, web accessibility policies can help realize all human rights, promote social equality and eliminate discrimination, recognize the diversity and social disadvantages that affect persons with disabilities and others, ensure that the web is usable and accessible, and support the active participation of persons with disabilities in ICT and policy design, development and implementation.

Additional guidelines could also be provided as follows:

- Increase the accessibility of governmental bodies' and other organizations' websites which can contribute to social and economic inclusion.
- Build up strong collaboration between governmental bodies and national societies for the blind (where they exist) to create a sustainable policy framework for web accessibility.
- Raise awareness on apps, services and devices for web accessibility among persons with disabilities.
- Develop national standards and guidelines to provide and unify the general principles for web accessibility at national level.
- Develop training and related knowledge certifications at national level in order to build capacity among professionals for the development of accessible websites and mobile applications.

<sup>128</sup> ITU. W3C. [Web content accessibility guidelines \(WCAG\) 2.1](#), 5 June 2018. (op. cit.).

#### 4.5. Key policy considerations for accessible mobile phones and services

- All policies should be developed in consultation with persons with disabilities.
- Regulators should consider using funding from the universal service/access fund to subsidize the provision by phone operators of a national relay service for persons who are unable to hear and to use the telephone in the usual way.
- Regulators should work with mobile phone operators and other stakeholders to develop text-relay services and video-relay services for sign language for persons with disabilities.
- Regulators should work with appropriate emergency services and mobile phone operators and manufacturers to ensure equitable access to emergency services for persons with disabilities.
- Regulators should liaise with mobile phone operators and manufacturers to ensure availability, affordability and accessibility of mobile phones for persons with disabilities.
- Regulators should liaise with mobile phone operators to ensure adequate provision of information on mobile phones, including in respect of their compatibility with assistive technologies such as hearing aids.
- Mobile phone operators should consider providing data/SMS-only packages to deaf users who cannot or may not wish to use voice services.
- ICT operators and manufacturers have a key role to play in promoting the development of accessible services and equipment for persons with disabilities and fostering entrepreneurial innovation in ICT accessibility.

#### 4.6. Key issues identified by members in regard to developing policies and services for accessibility of audiovisual media content

The following guidelines can be specified:

- Recommend policy-makers to consult with persons with disabilities when developing policy on TV and video programmes.
- Raise awareness among persons with disabilities in respect of applications, services and devices for TV and video programmes .
- Encourage service providers to deliver audio description, subtitles/captions and signing.
- Include audio description, subtitles/captions and signing in broadcasting licence requirements.
- [Develop national standards and guidelines to provide and unify](#) the general principles of TV and video programme accessibility at national level.
- Adopt criteria for quality of service of accessible TV and video programmes.
- Provide adequate funding to public broadcasters to enable them to provide accessible TV and video programmes.
- View accessibility as a horizontal process involving all contributing stakeholders.

#### 4.7. Key considerations in the area of public procurement

- A mix of policy and regulation should be progressively implemented to put in place the regulatory building blocks (including, but not limited to, for example, policy standards and awareness-raising) required to ensure that public authorities procure accessible ICTs.
- Accessibility requirements should be based on standards agreed by all stakeholders, including policy-makers, industry and persons with disabilities and their representative bodies.
- Public procurement policy, legislation and regulation should be updated in consultation with relevant stakeholders to incorporate accessibility as a public procurement principle.



- Accessibility requirements referenced in public procurement policy, legislation and regulation should be based on harmonized and commonly agreed international standards.
- Initiatives should be put in place to promote awareness and capacity building in respect of policy and standards among public procurement officials, industry and persons with disabilities.

#### 4.8. Final comments – Food for thought

- Accessibility offers an excellent opportunity to work towards social inclusion and empowerment for everyone.
- The COVID-19 pandemic has re-emphasized the need for the ITU Member States to reposition ICT accessibility topics and escalate them in governments' political priorities and agendas to ensure that information, products and services are available, affordable and accessible.
- Timely implementation of ICT accessibility could be vital for everyone, not least persons with disabilities.
- To meet ITU Strategic goal 2 (Inclusiveness) and its Target 2.9 ("By 2023, enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities should be established in all countries"), activities towards the implementation of ICT accessibility should be intensified and accelerated.
- Digital accessibility should be leveraged as a priority at the country and regional level (to ensure that all citizens, including those with disabilities, can access and benefit from e-government and other public digital information products and services).
- National programmes and strategies in place should be developed so as to ensure that education and training for persons with disabilities and other persons with specific needs in the use of telecommunications/ICTs are considered at the country level.
- Developing digital accessibility resources, including education and training, to increase expertise at national, regional and global level in this domain and facilitating the appropriate implementation of policies and strategies will ensure that persons with disabilities are able to use telecommunications/ICTs, including for access to education and employment opportunities.
- Encouraging innovative, accessible digital solutions and ICT applications for persons with disabilities will help them lead an independent life.
- There should be an attempt at making access services commercially profitable.
- Accessibility should be included in all standardization, since it is a fundamental precondition for avoiding market fragmentation.
- Recognition and awards serve to promote ICT accessibility and act as incentives to leverage the right to communicate for all.
- Collaboration is crucial for promoting ICT accessibility, notably among persons with disabilities, governments, operators, manufacturers, universities and all related stakeholders: "Nothing about us without us".
- In the ICT accessibility ecosystem, everyone contributes to making it a reality; it should be considered as a tool for education and employment of persons with disabilities and an enabler for social and economic development and independent living.
- Disability is a social condition rather than a medical one.
- Capabilities of end-users enable them to use the available accessibility functionalities and benefit from web accessibility, equipment and applications.
- Understanding the value of the disability market is crucial.
- Sharing successful experiences among countries worldwide is beneficial for persons with disabilities.



- Follow-up and monitoring of the results of implementing ICT accessibility policies, practices and technological solutions will empower all stakeholders in creating an inclusive environment for persons with disabilities worldwide.
- To respond adequately to the changing requirements arising from development of the digital ecosystem, the title of ITU-D Question 7/1 could be amended to **"ICT accessibility to enable inclusive communication"**.

## Annex 1: Overview of good practices and achievements in ICT accessibility worldwide

### Impact of COVID-19 on telecommunication/ICT accessibility:

In **Bosnia and Herzegovina**, measures have been taken to ensure that all information, including emergency information related to COVID-19, is available in accessible formats to all. ([Document SG1RGQ/301](#))

In the **Islamic Republic of Iran**, activities undertaken have included tele-guidance for prevention and treatment purposes, tele-education and e-learning, and tele-rehabilitation. ([Document SG1RGQ/305](#))

**China** has made available an accessible Internet diagnosis and treatment app to help the visually impaired seek medical treatment without leaving home. ([Document SG1RGQ/353](#))

**Japan** has imposed measures that include promoting accessibility features within the digital transformation process and increasing online education facilities and new technologies that enable language conversion and translation conversion. ([Document SG1RGQ/376](#))

The **Republic of Korea** has carried out a survey on the digital information divide and web accessibility, and categorized persons with disabilities into key target groups based on their vulnerabilities and unique needs, so as to be able to improve their access to information concerning epidemics. ([Document SG1RGQ/381](#))

### Chapter 1 - Telecommunication/ICT accessibility policy and regulatory framework

The Government of **Mauritania** stresses that it is necessary to work on designing dedicated programmes and to conduct field activities at national and regional levels. ([Document 1/299](#))

[The Global Initiative for Inclusive Information and Communication Technologies \(G3ict\)](#) launched its DARE Index to measure and compare progress on implementation of the main features of the ITU-G3ict Model ICT Accessibility Policy report. ([Document 1/80](#))

The Ministry of Industry and Information Technology of **China** scheduled work on accessibility of information in its "sunny green project" plan and launched research tasks on related standards. ([Document SG1RGQ/79](#))

[In the Russian Federation](#), Federal Law No. 181-FZ, on social protection of persons with disabilities in the Russian Federation, is the principal legislation providing an accessible environment, information and ICT. ([Document 1/83](#))

Among measures devised and implemented to promote adequate access to telecommunication services and ICTs for persons with disabilities, in 2016, through the *Instituto federal de telecomunicaciones* (IFT) (Federal Telecommunications Institute), **Mexico** issued General guidelines on accessibility to telecommunication services for users with disabilities, to guarantee the rights of these users and promote access to such services and technologies ([Document 1/192](#))

The **Democratic Republic of the Congo** proposes a set of measures and a national framework to improve access to telecommunication products for persons with disabilities in order to

guarantee that their rights are met as prescribed by the prevailing international legal instruments. ([Document 1/365](#))

**Côte d'Ivoire** has invested efforts in designing policy that takes into account accessibility of telecommunication/ICT products and services for use by people with disabilities, and implemented awareness-raising activities and events such as the E-HANDICAP forum in partnership with the E-handicap association, the telecommunication/ICT ministry and the *Bureau national d'études techniques et de développement* (BNETD) (National Bureau for Technical and Development Studies). ([Document SG1RGQ/13](#))

**India** shares the experience of its Universal Service Obligation Fund. ([Document SG1RGQ/32+Annex](#))

**Mali** has implemented activities to promote accessibility of telecommunications/ICTs for persons with disabilities with the aim establishing a "charter of voluntary commitment". ([Document 1/37](#))

**Japan** has considered methods for selecting products and services that are accessibility-friendly. This work was done by the Info-communication Access Council (IAC) within the Communications and Information Network Association of Japan (CIAJ). ([Document SG1RGQ/71](#))

The Government of **China** has issued a series of policies to protect information accessibility rights. ([Document SG1RGQ/79](#))

Challenges and opportunities in ensuring accessible ICTs in the countries of the Western Balkans (Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia) are outlined by **Bosnia and Herzegovina**. ([Document SG1RGQ/16](#))

Actions and events for validation of the telecommunication/ICT accessibility policy for people with disabilities in the ECOWAS region were implemented in **Côte d'Ivoire**. ([Document 1/176](#)).

The *Agence de gestion du fonds d'accès universel* (AGEFAU) (Universal Access Fund Management Agency) in **Mali** finances ICT/telecommunication accessibility projects targeting disadvantaged groupings (women, rural areas, schools) in general and associations of persons with disabilities (Malian Union for the Blind (UMAV), persons with physical disabilities) in particular. ([Document SG1RGQ/142](#))

**Cameroon** has launched initiatives aimed at developing infrastructures to promote widespread digitization and overcome digital exclusion in rural areas. ([Document SG1RGQ/137](#))

In **Haiti**, the administration drafted a national ICT initiative document, which incorporates a strategy for development through the digital economy. ([Document SG1RGQ/49](#))

Access of persons with disabilities and other persons with specific needs to telecommunication services in the **Central African Republic** is defined by the new law on electronic communications. ([Document SG1RGQ/161](#))

The national regulatory authority (Anatel) in **Brazil**, pursuant to the General Regulation on Accessibility (RGA) and on the basis of the newly published accessibility rankings, awarded the Anatel Prize for Accessibility to the top-ranked company. ([Document SG1RGQ/196](#))

In order to respond to the needs of persons with disabilities as well as older persons with age-related disabilities, the Government of **China** issued a series of policies and regulations. Besides outlining the government's responsibilities, these policies and regulations also provide

guidance for enterprises in ensuring ICT/telecommunication accessibility, thus creating a positive impact. ([Document 1/431](#))

The ICT Research Institute in the **Islamic Republic of Iran** conducted a survey to investigate the status, challenges and recommendations to help policy-makers promote ICT accessibility for women. The major objective of this study was to answer to the question: "How can women's empowerment be developed in the field of ICTs?". Analysing the results obtained, it can be seen that both structural problems and opportunities generated by ICT play a significant role. ([Document 1/430](#))

## Chapter 2 - Technologies and solutions in an ICT accessible ecosystem

**Oslo Metropolitan University** in **Norway** examines the theoretical implications of universal design and poses a new framework for achieving the ambitious aims of universal design in the information society era. ([Document 1/183](#))

**Oslo Metropolitan University** likewise examines the need for policy-makers to consider intersectionality in policies and programmes to close the digital divide and promote universal design. ([Document 1/393](#))

**GSMA** has published reports which highlight best-practice case studies in ICTs and accessibility. ([Document 1/385](#))

**G3ict** addresses the problem of spammers and phishers who target persons with disabilities. ([Document 1/60](#))

**G3ict** provides an update on captioning for accessible meetings, and underlines that involving persons with disabilities representing specific disabilities, such as for example the deaf and hearing-impaired, in the planning of any high-level event is crucial to ensuring equal access. ([Document 1/87](#))

**Japan** shares a case study on how to distinguish products that are accessible for persons with disabilities. ([Document SG1RGQ/71](#))

The **Iran University of Science and Technology** (IUST) in the **Islamic Republic of Iran** proposes that a survey concerning ICT development for persons with disabilities be carried out in order to understand the challenges faced and ascertain good practices. ([Document SG1RGQ/95](#))

In **China**, the **China Academy of Information and Communications Technology** (CAICT) has researched information accessibility standards. ([Document SG1RGQ/352](#))

**Burundi** presents a study evaluating the use of ICTs in centres for persons with disabilities and determining their connectivity needs. ([Document SG1RGQ/129](#))

To promote connectivity and digital inclusion in the country, **Burundi** intends to implement strategies or launch projects on connecting centres for persons with disabilities, so as to instil a digital culture in those individuals and foster ICT entrepreneurship. ([Document SG1RGQ/168](#))

The **State of Palestine**, which participates in ITU work under Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, is deploying efforts to ensure that telecommunication services are available, accessible and affordable (reduced access line charges, lower device prices, convenient device payment plans to suit persons with specific needs, preferential rates

for telephone calls, reduced rates for all Internet services and monthly interactive television subscriptions). ([Document SG1RGQ/156](#))

The **Mobile & Wireless Forum** (MWF) in **Belgium** established the Global Accessibility Reporting Initiative (GARI) to help people find devices that best suit their needs and promote mobile accessibility at national level. GARI has evolved into an online database containing information on the accessibility features in over 1 500 devices. ([Document SG1RGQ/19](#))

**India** puts forward the case of Sanchar Shakti, the Indian Universal Service Obligation Fund scheme for mobile value-added services for rural women. ([Document SG+RGQ/32+Annex](#))

**Japan** presents a case study on cellphones that support conversation among people with disabilities and persons with age-related disabilities and specific needs. ([Document SG1RGQ/78](#))

The **Russian Federation** outlines good practices in providing an accessible environment for persons with disabilities through cooperation between mobile operators and research laboratories to develop mobile applications to help blind and deaf-blind users identify the denomination of banknotes. ([Document 1/138](#))

Special mobile communication tariffs have been introduced in the **Russian Federation** for categories of the population entitled to preferential treatment. ([Document 1/318](#))

The Government of **China** encourages IT corporations to develop accessible IT products for persons with disabilities and has provided standards for guiding related work. ([Document 1/167+Annex](#))

Huawei (**China**) has undertaken secondary development on Android's TalkBack feature in order to make mobile devices as friendly and accessible as possible for the visually impaired, incorporating these groundbreaking advances into its EMUI operating system. ([Document SG1RGQ/355](#))

**China** shares its practices to assist visually-impaired people in accessing the Internet. ([Document 1/332](#))

Also in **China**, the Chinese operators China Telecom, China Mobile and China Unicom provide outstanding services for persons with disabilities. ([Document SG1RGQ/79](#))

**Japan** presents a case study on support for telephone communication with voice recognition. ([Document 1/232](#))

**G3ict** discusses the fact that many deaf people could not use voice recognition because it does not understand their voices due to the level of speech intelligibility, given that the pronunciation of words and sentences needs to be of sufficient quality for voice recognition to work. ([Document 1/240](#))

**GSMA** shares a report aimed at leveraging the potential of mobile for persons with disabilities. ([Document 1/249](#))

**Mali** shares information about the project developed by the *Association malienne des artisans en situation de handicap* (AMASH) (Malian Association of Artisans with Disabilities), which aims to use OTTs as a means of access to telecommunication/ICT services. ([Document 1/283](#))

In the **Russian Federation**, a Federal Law was adopted that ensures the accessibility of TV and video programmes. ([Document SG1RGQ/203](#))

The **University of Geneva** in **Switzerland** presents a research proposal to assess the impact of video remote sign-language interpreting in healthcare. ([Document 1/156](#))

A contribution from **G3ict** discusses sign-language interpretation, its use and the pros and cons of the use of signing avatars instead of human interpreters. ([Document 1/67 + Annex](#))

The Ministry of Industry and Information Technology in **China** scheduled work on information accessibility in its “sunny green project” plan and launched research tasks on related standards. ([Document 1/79](#))

**Facebook** views accessibility as a horizontal function and has undertaken a cross-functional effort – including research, design, engineering, legal, compliance and policy teams – to promote accessibility in its products. ([Document 1/239](#))

The **Islamic Republic of Iran** presents a revision of the Act adopted by the Islamic Consultative Assembly, to cover the issue of access to ICTs for people with disabilities. ([Document SG1RGQ/12](#))

The **Republic of Korea** reports on the implementation of its Web Accessibility (WA) Quality Certification system. ([Document SG1RGQ/91](#))

**Mexico** is engaged in the implementation of various projects, including the General guidelines for accessibility to telecommunication services for users with disabilities, in regard to which it shares progress made and results achieved ([Documents 1/191](#), [1/192](#) and [1/350](#))

In the **Russian Federation**, requirements for the accessibility of Internet resources are laid down in National Standard GOST R 52872-2012. ([Document 1/139](#))

**India** considers that equitable access to ICTs should be made a part of the legal definition of universal service and of schemes for persons with disabilities. ([Document 1/27](#))

A study by the **ICT Research Institute** in the **Islamic Republic of Iran** shows the status of existing ICT-based activities for persons with disabilities (e-health businesses, centres for persons with disabilities); maps types of intelligence onto centres for persons with disabilities and e-health businesses; and reports on awareness-raising workshops for universities and research institutes, governmental and non-governmental organizations and e-health businesses. ([Document 1/149](#))

**Mexico** [has](#) implemented several actions to monitor and verify compliance with the obligations of licensed and authorized operators of telecommunication services in terms of accessibility. ([Document 1/191](#))

The *Commission d'accès à l'information d'intérêt public et aux documents publics* (CAIDP) (Commission on Access to Information of Public Interest and Public Documents) of **Côte d'Ivoire** organized a capacity-building seminar for IT managers and webmasters. ([Document SG1RGQ/163](#))

The Ministry of the Digital Economy and Post of **Côte d'Ivoire** has begun equipping four sites to adapt them for persons with disabilities. ([Document SG1RGQ/164](#))

The **Republic of Korea** has carried out a survey on the digital information divide and web accessibility. ([Document SG1RGQ/255](#))

Tencent Technologies' WeChat and QQ are the two IM tools most widely used by visually-impaired persons in **China**, playing a significant role in their daily life. ([Document SG1RGQ/354](#))

Alipay is a one-stop digital service for visually-impaired users in **China**, enabling them to travel around without cash. ([Document SG1RGQ/349](#))

Alibaba in **China** has set up an independent full-time team to support current and future accessibility optimization of Alibaba's various app products. Visually-impaired users can operate the Taobao app by means of screen-reader software. ([Document 1/350](#))

Beijing Didi Infinity Technology Development, Co. in **China** optimizes the accessibility of app products on an ongoing basis in pursuit of the purpose of its corporate philosophy: "Let everyone travel better". ([Document 1/351](#))

In **China**, in order to solve various problems facing persons with disabilities and older persons in using mobile terminals, CTTL-Terminals, China Academy of Information and Communications Technology, has worked with relevant institutions of the China Disabled Persons' Federation and various mobile terminal manufacturers to start drafting two standards. ([Document 1/457](#))

### **Chapter 3 – Requirements and guidelines to promote, implement and use accessible public telecommunication and ICT spaces**

The ITU-T Joint Coordination Activity on accessibility and human factors (JCA-AHF) presents real-time relay services, which are telephone services that enable deaf and hearing-impaired and/or speech-impaired persons to make a voice call with a hearing person. ([Document 1/215](#))

**Japan** presents a case study on assisting communication between a hearing-impaired person and a hearing person via a real-time telephone network with speech recognition/synthesis. ([Document 1/232](#))

**G3ict** draws attention to the statement clarifying the official position of deaf and hearing-impaired with regard to the misconception that automatic speech recognition (ARS) can be used instead of human interfaces for relay services and other communication services for persons who are deaf and hard of hearing. ([Document SG1RGQ/211+Annex](#))

China Unicom in **China** provides an innovative product and service for accessible calling for the hearing-impaired, in which speech content can be converted into text in real time by ASR technology. ([Document SG1RGQ/336](#))

The ICT Research Institute in the **Islamic Republic of Iran** demonstrates how a simple automated assistant system like a screen reader or mini-robot can provide persons with disabilities with helpful services. ([Document 1/280](#))

A training programme was held in **Mali** for some 50 women with disabilities focusing on capacity building and awareness-raising in techniques for seeking ICT-related employment. ([Document SG1RGQ/7](#))

Literacy actions have been undertaken in **Mexico** to promote access to telecommunication/ICT services for people with disabilities and older persons. ([Document 1/190](#))

A case study from **Japan**, based on a document prepared by the Info-communication Access Council (IAC) within the Communications and Information Network Association of Japan (CIAJ), presents a method by which older people and persons with disabilities can easily

recognize accessible products when using telecommunication services and ICT devices. ([Document SG1RGQ/71](#))

A national training programme run by the ICT ministry's Office for Women and Family Affairs was held in the **Islamic Republic of Iran** to empower women by applying ICT tools and services for the purpose of entrepreneurship and creating jobs for women. ([Document SG1RGQ/12](#))

In the **Russian Federation**, children with disabilities or their legitimate representative may choose the form (distance or face to face) of school, college or university education. ([Document SG1RGQ/83](#))

In providing descriptive video services, the [China](#) Braille Library in **China** has made good use of multimedia information processing technologies, with a full understanding of the needs of the visually impaired. ([Document SG1RGQ/188](#))

In **China**, with the support of the China Disabled Persons' Association and the China Association of the Blind, some professional enterprises for the blind have developed screen-reading software. ([Document SG1RGQ/335](#))



## Annex 2: ITU-D resources on ICT accessibility

**Activities, events and resources relating to ICT accessibility organized by BDT** serve to support ITU members in implementing ICT accessibility for persons with disabilities and in ensuring an inclusive ICT ecosystem. ([Document 1/38](#))

**ITU-D key resources** serve to support ITU members in developing and implementing relevant national policies and strategies in their respective countries and share good practices and lessons learned for the implementation of national ICT accessibility policies, legal frameworks, directives, guidelines, strategies and technological solutions to improve the accessibility, compatibility and usability of telecommunication/ICT services and the use of accessible telecommunications/ICTs to promote the employment of persons with disabilities and thereby empower all stakeholders in their efforts to create an inclusive environment for persons with disabilities worldwide. ([Document 1/24](#))

An overview of the key events and resources is given below:<sup>129</sup>

- **ITU-D national programme on web accessibility “Internet for @ll”.** This programme is aimed at raising awareness among government representatives and national stakeholders in regard to the necessity and benefit of providing accessible websites and digital content to all citizens, without discrimination. <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Internet-for-%40ll.aspx>
- **Self-paced online courses entitled “ICT Accessibility: The key to inclusive communication”.** These three free online training courses nurture a good understanding of ICT accessibility among all relevant stakeholders, focusing in particular on relevant policies, regulations, technology trends and public procurement rules. They comprise three modules: 1) Enabling communication for all through ICT accessibility; 2) ICT accessibility policy regulations and public procurement standards; 3) Achieving ICT accessibility through public procurement. <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Self-Paced-Online-Training-on-ICT-Accessibility.aspx>
- **Video tutorials on the creation of accessible digital documents.** These five video tutorials develop an understanding of accessibility criteria and provide guidelines for generating documents in any office format or PDF. <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Video-Tutorials-on-Accessible-Digital-Content.aspx>
- **Capacity-building sessions on ICT accessibility.** These in-depth sessions focus on trends, tools and key resources to support the implementation of ICT accessibility at the global level. Topics have included: The role of ICT accessibility in building inclusive societies in the digital economy; The 3As: Accessible, assistive and affordable technologies; ICT accessibility legal, policy and regulatory framework; ICT accessibility framework on public access; Accessibility policy framework for mobile communications; ICT accessibility policy framework for television/video programming; Web accessibility policy framework and implementation; Accessible ICT public procurement policy framework. <https://www.itu.int/en/ITU-D/Study-Groups/2018-2021/Pages/meetings/session-Q7-1-sept18.aspx>
- **ITU Forum: ICT accessibility – A requisite towards an inclusive society** (within the framework of the Zero Project Conference, Vienna (Austria), 23 February 2018). The forum focused on presenting the substantial resources available to support countries in their ICT accessibility policies, products and services. <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2018/ZPC/ITU-Forum-ICT-Accessibility-a-Requisite-Towards-an-Inclusive-Digital-Society.aspx>
- **Accessible Americas: ICT for ALL.** The Accessible Americas series of events serve to encourage governments, industry, academia and other stakeholders to promote ICT

129 See also the ITU-D website. [Resources on ICT accessibility](#).

accessibility with the aim of creating fair and equal opportunities for all citizens (persons with disabilities, women and girls, older persons, indigenous people and others who are still unserved) and to support a regional development agenda by treating ICT accessibility as a cross-cutting development issue.

o **Accessible Americas V: ICT for ALL**

The fifth edition of Accessible Americas: ICTs for ALL, jointly organized by ITU-BDT and the Ministry of Science, Energy and Technology of Jamaica, was held in Montego Bay, Jamaica, from 28 to 30 November 2018. A total of 214 participants from 23 countries from Latin America and the Caribbean demonstrated the Americas region's commitment to working towards a more inclusive society. Since the Accessible Americas regional events adopt a holistic approach to addressing digital inclusion, the sessions were also attended by other persons with specific needs: older persons, women and girls, youth and indigenous people or people living in remote areas, thus ensuring that "no one is left behind". The event also included the development of regional expertise in ICT accessibility through a half-day [executive training session on the fundamentals of ICT accessibility](#)<sup>130</sup> to develop a pool of experts on this topic in the Americas region. <https://www.itu.int/en/ITU-D/Regional-Presence/Americas/Pages/EVENTS/2018/20545.aspx>

o **Accessible Americas VI: ICT for ALL**

The sixth edition of Accessible Americas: ICTs for ALL was held in Quito, Ecuador, from 20 to 22 November 2019. Key topics discussed during the event included the role of AI as a tool to improve the quality of life of persons with disabilities; labour inclusion and the development of digital skills; ICT and quality of life for older persons; ICT accessibility as a business opportunity; web accessibility and women in ICT: equity and equal opportunities. [https://www.itu.int/en/ITU-D/Regional-Presence/Americas/Pages/EVENTS/2019/23940.aspx#:~:text=Regional%20Presence-,Accessible%20Americas%202019%3A%20ICTs%20for,%2C%2020%2D22%20November%202019.&text=This%20regional%20event%20for%20the,Society%20\(MINTEL\)%20from%20Ecuador.](https://www.itu.int/en/ITU-D/Regional-Presence/Americas/Pages/EVENTS/2019/23940.aspx#:~:text=Regional%20Presence-,Accessible%20Americas%202019%3A%20ICTs%20for,%2C%2020%2D22%20November%202019.&text=This%20regional%20event%20for%20the,Society%20(MINTEL)%20from%20Ecuador.)

o **Accessible Americas VII: ICT for ALL**

The seventh edition of Accessible Americas was held virtually from 25 to 27 November 2020. During the event, ITU members and stakeholders indicated that economic and social activities were being altered due to the COVID-19 pandemic and, as a result, the speed of the digital transformation had changed, drastically increasing the risks of leaving vulnerable groups behind and of a wider digital divide. <https://www.itu.int/en/ITU-D/Regional-Presence/Americas/Pages/EVENTS/2020/24667.aspx>

- **Accessible Europe: ICT for ALL.** The Accessible Europe series of events are held within the framework of implementation of the Regional Initiative for Europe on accessibility, affordability and skills development for all to ensure digital inclusion and sustainable development, adopted by the World Telecommunication Development Conference (Buenos Aires, 2017).<sup>131</sup> They serve to encourage governments, industry, academia and other stakeholders to promote ICT accessibility with the aim of creating fair and equal opportunities for all citizens (persons with disabilities, women and girls, older persons, indigenous people and others who are still unserved) and to support a regional development agenda by treating ICT accessibility as a cross-cutting development issue.

o **Accessible Europe I: ICT for ALL**

<sup>130</sup> Accessible Americas V: ICTs for ALL. [Executive training on ICT accessibility: The key to inclusive communication](#). Montego Bay, Jamaica, 28-30 November 2018.

<sup>131</sup> ITU. Europe regional initiatives. Buenos Aires Action Plan 2018-2021. [Initiative EUR 3: Accessibility, affordability and skills development for all to ensure digital inclusion and sustainable development](#).

The first edition of Accessible Europe: ICT for ALL, jointly organized by ITU-BDT and the European Commission (EC), and hosted by United Nations Office in Vienna, was held in Vienna, Austria, from 12 to 14 December 2018. This regional event brought together over 150 participants representing all types of stakeholders (governments, regulatory authorities, industry, academia, non-governmental associations representing persons with disabilities) from more than 30 countries in and outside Europe. The forum focused on further promoting the development of accessibility in countries and institutions, through the effort and cooperation of stakeholders and by sharing successful outcomes of projects and initiatives already implemented, in order to exchange resources and solutions and make the Europe region a more inclusive society. As can be seen from the outcome report,<sup>132</sup> the event comprised 10 sessions, during which around 50 speakers delivered their presentations and shared expertise; interactive networking opportunities; and bilateral meetings. <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2018/AE/AccessibleEurope.aspx>

o **Accessible Europe II: ICT for ALL**

The second edition of Accessible Europe: ICT 4 ALL, jointly organized by ITU-BDT and the European Commission (EC), and hosted by the Maltese Parliamentary Secretariat for Persons with Disability and Active Ageing (PSDAA), took place in St George's Bay, St. Julian's, Malta, from 4 to 6 December 2019. As can be seen from the outcome report,<sup>133</sup> over 240 participants from more than 30 countries attended, including high-level representatives of national regulators from the ITU Europe region, the Maltese Government, the European Commission, the United Nations CRPD Committee and the European Disability Forum. <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2019/AE/AccessibleEurope.aspx>

o **Accessible Europe III: ICT for ALL**

The event Towards Digitally Accessible Europe was held on 3 December 2020, as part of ITU's joint efforts with several partner organizations to promote digital accessibility in the Europe region and commemorate the International Day of Persons with Disabilities. <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2020/AE21/PreEvent.aspx>

o **Accessible Europe IV: ICT for ALL**

The fourth edition of Accessible Europe: ICT for ALL was held virtually from 23 to 25 March 2021. The event promoted the rights and well-being of persons with disabilities and raised awareness on the need to guarantee that persons with disabilities are included in every aspect of political, social, economic, and cultural life. <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2020/AE21/default.aspx>

- WSIS thematic workshop on practical applications of ICTs supporting inclusion and access to information and services, livelihoods for people with disabilities. This thematic workshop was organized by the eWorldwide Group as part of the WSIS Forum 2019. Its purpose was to share information with all stakeholders on what can be done to leverage breakthroughs in ICT applications across different parts of the world. Practical guidelines were produced to support policy-makers in accelerating the adoption of ICTs for inclusion and the empowerment of persons with disabilities in communities across the globe. <https://www.itu.int/net4/wsis/forum/2018/Pages/Agenda/Session/130#intro>
- **Global Disability Summit.** This first Global Disability Summit, co-hosted in London in July 2018 by the United Kingdom's Department for International Development (DFID), the International Disability Alliance (IDA) and the Government of Kenya, generated sustainable commitments from developing-country governments, donors, civil society, foundations and

<sup>132</sup> ITU. [Accessible Europe: ICT for ALL](#). Outcome report, 2018. Vienna, Austria, 12-14 December 2018

<sup>133</sup> ITU. [Accessible Europe: ICTs for ALL](#). Outcome report, 2019. St Julian's, Malta, 2019

the private sector towards inclusive education, employment and livelihood opportunities, technology/innovation and tackling stigma and discrimination. <https://www.internationaldisabilityalliance.org/content/global-disability-summit-july-2018>

- Toolkit on making listening safe. This toolkit was developed jointly by ITU-D, ITU-T and WHO and launched on 14 February 2019. It provides practical guidance to support Member States, industry partners and civil-society groups in using and implementing the WHO-ITU H.870 global standard on safe listening devices and systems. [https://www.itu.int/en/ITU-D/Digital-Inclusion/Pages/Digital\\_Inclusion\\_Resources/Strategies%2c%20policies%2c%20toolkits/Toolkit\\_safe\\_listening\\_devices/safe\\_listening.aspx](https://www.itu.int/en/ITU-D/Digital-Inclusion/Pages/Digital_Inclusion_Resources/Strategies%2c%20policies%2c%20toolkits/Toolkit_safe_listening_devices/safe_listening.aspx)
- Online training course: Web accessibility – The cornerstone of an inclusive digital society. In celebration of 30 years since the creation of the world wide web and the 25th anniversary of the World Wide Web Consortium (W3C) in October 2019, the ITU Digital Inclusion programme developed and made available for ITU members, stakeholders and other interested parties a free self-paced training course on web accessibility. <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Web-Accessibility-Cornerstone-Training.aspx>
- Within the framework of the United Nations policy brief: A disability-inclusive response to COVID-19<sup>134</sup> and with the aim of supporting ITU members' efforts in the implementation of ITU Target 2.9 under the Connect 2030 Agenda, which calls for enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities to be established in all countries by 2023,<sup>135</sup> a series of resources aimed at advancing global implementation in ICT accessibility were developed and shared, including:
  - **ITU Guidelines on how to ensure that digital information, services, and products are accessible by all people, including persons with disabilities during COVID-19** (available in Arabic, Chinese, English, French, Russian, Spanish and 22 other languages). <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/COVID-19-Guidelines.aspx>
  - New updated versions of self-paced training courses, such as **ICT accessibility: The key to inclusive communication**, made available in English, French and Spanish (other languages to come). <https://academy.itu.int/index.php/training-courses/full-catalogue/ict-accessibility-key-inclusive-communication-0>
  - Updated version of the online self-paced training in **Web accessibility – The cornerstone of an inclusive digital society**. <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Web-Accessibility-Cornerstone-Training.aspx>
  - New training in **How to ensure inclusive communication during crises and emergency situations**. <https://academy.itu.int/index.php/training-courses/full-catalogue/how-ensure-inclusive-digital-communication-during-crises-and-emergency-situations>
  - BDT developed the **ITU Self-Assessment and Toolkit for ICT Accessibility Implementation –Towards building Inclusive Digital Communities**. The Toolkit, available in digital format (PDF) as well as in an interactive format, aims to enable Member States and Sector Members (private sector, academia, operators, etc.) to obtain, in response to a survey that they can complete online, immediate expert advice including guidelines and good practices for any of the identified five levels of implementation. In future, through the use of the toolkit and collection of relevant information, ITU-D Question 7/1 can play a catalytic role in monitoring progress in digital/ICT accessibility implementation at the global level.

<sup>134</sup> United Nations. COVID-19 response. [A disability-inclusive response to COVID-19](#).

<sup>135</sup> ITU. [Connect 2030 – An agenda to connect all to a better world](#). Target 2.9.

- Relevant information on ICT and digital accessibility and *research and available resources* can be found on the ITU-D website at [ICT / Digital Accessibility](#) and [Resources on ICT Accessibility](#), respectively.

### Annex 3: Accessibility-related information pertaining to the other ITU Sectors and cooperation with the Joint Coordination Activity on accessibility and human factors (JCA-AHF)

The Joint Coordination Activity on accessibility and human factors (JCA-AHF)<sup>136</sup> coordinates activities related to accessibility and human factors in order to avoid duplication of work and to ensure that the needs of persons with disabilities and persons with specific needs are taken into account, in line with Resolution 70 (Rev. Hammamet, 2016) of the World Telecommunication Standardization Assembly (WTSA)<sup>137</sup> and Resolution 175 (Rev. Dubai, 2018) of the Plenipotentiary Conference.<sup>138</sup>

The JCA-AHF mandate includes:

- a) increase awareness and help standard writers to mainstream 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;
- b) assist study groups in the identification of standardization opportunities and solutions that improve the accessibility and human factors aspects of their work;
- c) communicate, cooperate and collaborate on accessibility-related activities with:
  - i. all study groups of ITU-T, ITU-D and ITU-R as well as all relevant ITU groups;
  - ii. external organizations, including other United Nations organizations, the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), standards-development organizations (SDOs), industry groups, academia and disability organizations;
- d) encourage and promote self-representation by persons with disabilities in the standardization process to ensure their experiences, views and opinions are taken into account in all the work of all ITU study groups;
- e) provide advice to improve and ensure the accessibility of ITU facilities and services, including, but not limited to, electronic means and ITU buildings as a whole, to facilitate the full participation of persons with disabilities in ITU events.

To support the above mentioned, JCA-AHF outlines additional sources on accessibility for enabling an inclusive society:

**a) Accessibility terms and definitions**

- 1) Recommendation ITU-T F.791, on accessibility terms and definitions<sup>139</sup>

**b) Guidelines**

- 1) *Accessibility guidelines*

<sup>136</sup> ITU. [Joint Coordination Activity on accessibility and human factors \(JCA-AHF\)](#).

<sup>137</sup> ITU-T. Resolution [70 \(Rev. Hammamet, 2016\)](#) of the World Telecommunication Standardization Assembly (WTSA), on telecommunication/ICT accessibility for persons with disabilities.

<sup>138</sup> ITU. Resolution [175 \(Rev. Dubai, 2018\)](#) of the Plenipotentiary Conference, on telecommunication/ICT accessibility for persons with disabilities and persons with specific needs. (op. cit.)

<sup>139</sup> Recommendation [ITU-T F.791](#) (08/2018), on accessibility terms and definitions.

Recommendation ITU-T F.790, on telecommunication accessibility guidelines for older persons and persons with disabilities<sup>140</sup>

2) ***Guidelines for supporting remote participation in meetings for all***

ITU-T technical paper: FSTP-ACC-RemPart – Guidelines for supporting remote participation in meetings for all<sup>141</sup>

3) ***Guidelines for accessible meetings***

ITU-T technical paper: FSTP-AM – Guidelines for accessible meetings<sup>142</sup>

4) ***Accessibility checklist***

ITU-T technical paper: FSTP-TACL – Telecommunication accessibility checklist (Guide for addressing accessibility in standards)<sup>143</sup>

5) ***Accessibility profiles for IPTV systems***

Recommendation ITU-T H.702: Accessibility profiles for IPTV systems.<sup>144</sup>

<sup>140</sup> ITU-T. Recommendation [ITU-T F.790](#) (01/2007), on telecommunication accessibility guidelines for older persons and persons with disabilities.

<sup>141</sup> ITU-T technical paper (2015). FSTP-ACC-RemPart – [Guidelines for supporting remote participation in meetings for all](#).

<sup>142</sup> ITU-T technical paper (2015). FSTP-AM – [Guidelines for accessible meetings](#).

<sup>143</sup> ITU-T technical paper (2006). FSTP-TACL – [Telecommunications accessibility checklist](#).

<sup>144</sup> ITU-T. Recommendation [ITU-T H.702](#) (08/2020), on accessibility profiles for IPTV systems.

**Office of the Director**  
**International Telecommunication Union (ITU)**  
**Telecommunication Development Bureau (BDT)**  
Place des Nations  
CH-1211 Geneva 20  
Switzerland

Email: [bdttdirector@itu.int](mailto:bdttdirector@itu.int)  
Tel.: +41 22 730 5035/5435  
Fax: +41 22 730 5484

**Digital Networks and Society (DNS)**

Email: [bdt-dns@itu.int](mailto:bdt-dns@itu.int)  
Tel.: +41 22 730 5421  
Fax: +41 22 730 5484

**Digital Knowledge Hub Department (DKH)**

Email: [bdt-dkh@itu.int](mailto:bdt-dkh@itu.int)  
Tel.: +41 22 730 5900  
Fax: +41 22 730 5484

**Office of Deputy Director and Regional Presence**  
**Field Operations Coordination Department (DDR)**  
Place des Nations  
CH-1211 Geneva 20  
Switzerland

Email: [bdtdeputydir@itu.int](mailto:bdtdeputydir@itu.int)  
Tel.: +41 22 730 5131  
Fax: +41 22 730 5484

**Partnerships for Digital Development Department (PDD)**

Email: [bdt-pdd@itu.int](mailto:bdt-pdd@itu.int)  
Tel.: +41 22 730 5447  
Fax: +41 22 730 5484

## Africa

### Ethiopia

**International Telecommunication Union (ITU) Regional Office**  
Gambia Road  
Leghar Ethio Telecom Bldg. 3<sup>rd</sup> floor  
P.O. Box 60 005  
Addis Ababa  
Ethiopia

Email: [itu-ro-africa@itu.int](mailto:itu-ro-africa@itu.int)  
Tel.: +251 11 551 4977  
Tel.: +251 11 551 4855  
Tel.: +251 11 551 8328  
Fax: +251 11 551 7299

### Cameroon

**Union internationale des télécommunications (UIT)**  
**Bureau de zone**  
Immeuble CAMPOST, 3<sup>e</sup> étage  
Boulevard du 20 mai  
Boîte postale 11017  
Yaoundé  
Cameroon

Email: [itu-yaounde@itu.int](mailto:itu-yaounde@itu.int)  
Tel.: + 237 22 22 9292  
Tel.: + 237 22 22 9291  
Fax: + 237 22 22 9297

### Senegal

**Union internationale des télécommunications (UIT)**  
**Bureau de zone**  
8, Route des Almadies  
Immeuble Rokhaya, 3<sup>e</sup> étage  
Boîte postale 29471  
Dakar - Yoff  
Senegal

Email: [itu-dakar@itu.int](mailto:itu-dakar@itu.int)  
Tel.: +221 33 859 7010  
Tel.: +221 33 859 7021  
Fax: +221 33 868 6386

### Zimbabwe

**International Telecommunication Union (ITU) Area Office**  
TelOne Centre for Learning  
Corner Samora Machel and Hampton Road  
P.O. Box BE 792  
Belvedere Harare  
Zimbabwe

Email: [itu-harare@itu.int](mailto:itu-harare@itu.int)  
Tel.: +263 4 77 5939  
Tel.: +263 4 77 5941  
Fax: +263 4 77 1257

## Americas

### Brazil

**União Internacional de Telecomunicações (UIT)**  
**Escritório Regional**  
SAUS Quadra 6 Ed. Luis Eduardo  
Magalhães,  
Bloco "E", 10<sup>o</sup> andar, Ala Sul  
(Anatel)  
CEP 70070-940 Brasília - DF  
Brazil

Email: [itubrasilia@itu.int](mailto:itubrasilia@itu.int)  
Tel.: +55 61 2312 2730-1  
Tel.: +55 61 2312 2733-5  
Fax: +55 61 2312 2738

### Barbados

**International Telecommunication Union (ITU) Area Office**  
United Nations House  
Marine Gardens  
Hastings, Christ Church  
P.O. Box 1047  
Bridgetown  
Barbados

Email: [itubridgetown@itu.int](mailto:itubridgetown@itu.int)  
Tel.: +1 246 431 0343  
Fax: +1 246 437 7403

### Chile

**Unión Internacional de Telecomunicaciones (UIT)**  
**Oficina de Representación de Área**  
Merced 753, Piso 4  
Santiago de Chile  
Chile

Email: [itusantiago@itu.int](mailto:itusantiago@itu.int)  
Tel.: +56 2 632 6134/6147  
Fax: +56 2 632 6154

### Honduras

**Unión Internacional de Telecomunicaciones (UIT)**  
**Oficina de Representación de Área**  
Colonia Altos de Miramontes  
Calle principal, Edificio No. 1583  
Frente a Santos y Cía  
Apartado Postal 976  
Tegucigalpa  
Honduras

Email: [itutegucigalpa@itu.int](mailto:itutegucigalpa@itu.int)  
Tel.: +504 2235 5470  
Fax: +504 2235 5471

## Arab States

### Egypt

**International Telecommunication Union (ITU) Regional Office**  
Smart Village, Building B 147,  
3<sup>rd</sup> floor  
Km 28 Cairo  
Alexandria Desert Road  
Giza Governorate  
Cairo  
Egypt

Email: [itu-ro-arabstates@itu.int](mailto:itu-ro-arabstates@itu.int)  
Tel.: +202 3537 1777  
Fax: +202 3537 1888

## Asia-Pacific

### Thailand

**International Telecommunication Union (ITU) Regional Office**  
Thailand Post Training Center  
5<sup>th</sup> floor  
111 Chaengwattana Road  
Laksi  
Bangkok 10210  
Thailand

*Mailing address:*  
P.O. Box 178, Laksi Post Office  
Laksi, Bangkok 10210, Thailand

Email: [ituasiapacificregion@itu.int](mailto:ituasiapacificregion@itu.int)  
Tel.: +66 2 575 0055  
Fax: +66 2 575 3507

### Indonesia

**International Telecommunication Union (ITU) Area Office**  
Sapta Pesona Building  
13<sup>th</sup> floor  
Jl. Merdan Merdeka Barat No. 17  
Jakarta 10110  
Indonesia

*Mailing address:*  
c/o UNDP – P.O. Box 2338  
Jakarta 10110, Indonesia

Email: [ituasiapacificregion@itu.int](mailto:ituasiapacificregion@itu.int)  
Tel.: +62 21 381 3572  
Tel.: +62 21 380 2322/2324  
Fax: +62 21 389 5521

## CIS

### Russian Federation

**International Telecommunication Union (ITU) Regional Office**  
4, Building 1  
Sergiy Radonezhsky Str.  
Moscow 105120  
Russian Federation

Email: [itumoscow@itu.int](mailto:itumoscow@itu.int)  
Tel.: +7 495 926 6070

## Europe

### Switzerland

**International Telecommunication Union (ITU) Office for Europe**  
Place des Nations  
CH-1211 Geneva 20  
Switzerland

Email: [euregion@itu.int](mailto:euregion@itu.int)  
Tel.: +41 22 730 5467  
Fax: +41 22 730 5484



International Telecommunication Union  
Telecommunication Development Bureau  
Place des Nations  
CH-1211 Geneva 20  
Switzerland

ISBN 978-92-61-34651-5



Published in Switzerland  
Geneva, 2021