Report on ICT Accessibility for Persons with Disabilities International Communication Union

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Abstract

This document of the International Telecommunication Union is the outcome Report of the Rapporteur's group led by Clara Luz Alvarez (2006-2010) of study question 20/1 on ICT accessibility by persons with disabilities. ICTs have an impact in almost every aspect of life; as such, are considered an instrument for productivity, economic growth, employment generation, good government, dialogue between persons and nations, as well as for improving the quality of life. This document is based on the decision of the ITU Council to approve that the subject for the World Telecommunications and Information Society Day (May 17) of 2008 be "Connecting People with Disabilities: ICT Opportunities for All". Hence, it was determined that each type of disability may require special considerations when designing an ICT public policy. The document presents different types of assistive devices, revises special legislation in several countries and poses some useful policy recommendations for the nations on the matter.

Keywords: Information and communication technologies, the right for non discrimination, information society.

Resumen

Este documento de la Unión Internacional de Telecomunicaciones (ITU) es el resultado del informe presentado por la Relatoría encabezada por Clara Luz Álvarez (2006-2010) sobre el estudio de la interrogante 20/1 sobre el acceso a las TIC (tecnologías de la información y la comunicación) por parte de personas con discapacidades. Las TICs tienen un impacto en casi cada aspecto de la vida humana; como tales, son consideradas un instrumento para la productividad, el crecimiento económico, la generación de empleos, el buen gobierno, el diálogo entre las personas y las naciones, así como en mejorar la calidad de vida. Este documento se funda en la decisión del Consejo de la ITU de aprobar el tema del Día Mundial de las Telecomunicaciones y la Sociedad de la Información (Mayo 17) en el 2008 como "Conectar a las personas con discapacidades: las oportunidades de las tecnologías de la información y la comunicación (TIC) para todos". Se determinó que cada ti

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po de discapacidad requiere consideraciones especiales cuando se diseñan políticas de TIC. En el documento se presentan diversos tipos de dispositivos asistenciales, revisa la legislación especial en algunos países, y propone a las naciones recomendaciones específicas para diseñar políticas en la materia.

Palabras clave: Tecnologías de la información y la comunicación; derecho a la no discriminación, sociedad de la información.

1. Introduction

ICTs have been acknowledged as essential for social, cultural, economic, political and democratic development, as well as for exercising several fundamental rights. Within the World Summit on the Information Society ("WSIS"), both the Declaration of Principles[1] and the Tunis Commitment[2] emphasized the immense impact that ICTs have in almost every aspect of life, and are considered an instrument for productivity, economic growth, employment generation, good government, dialogue between persons and nations, as well as for improving the quality of life. It is also expressly stated that the right to participate in the Information Society is only possible through effective access to ICTs. Through ICT access, a person obtains information to exercise his/her civil rights, the communities become socially integrated, and a region may benefit because ICTs are an input for any activity.

ICTs face constant challenges: being accessible and affordable by the population in general. The lack of access to ICT in equal terms is not only an obstacle for development, but also a factor that increases the social, education and economic divide. Telecommunication infrastructure in a given country does not represent effective accessibility, since (1) there are areas that do not have any or all the services, and (2) the access to ICTs are not for all either because the price is unaffordable or the services are not accessible for a person with disability. On the other hand, liberalization of the ICT sector in most countries has

1 World Summit on the Information Society, *Declaration of Principles, Building the Information Society: a global challenge in the new Millennium*, http://www.itu.int/wsis/docs/geneva/official/dop.html, Dec. 12, 2003 (access date: Nov. 12, 2007).

2 World Summit on the Information Society, *Tunis Commitment, http://www.itu.int/wsis/docs2/tunis/off/7.html, noviembre* 18, 2005 (access date: 12 de noviembre de 2007).

not provided accessible ICTs for persons with disabilities ("PwD").

WSIS also acknowledged that special attention should be given to the needs of elder persons and PwD: (1) when elaborating national cyberstrategies, including educational, administrative and legislative measures, (2) for using ICT in education and human resources development, (3) in order that equipment and services offer easy and affordable access, under the principles of universal design and assistive technology, (4) to promote telework and to increase employment opportunities for PwD, (5) for creation of content that is pertinent to PwD, and (6) to create the required abilities for the use of ICT by PwD.[3]

The need to have public policies for promoting and implementing services and solutions which provide access to ICT services for PwD, resolved during the World Telecommunications Development Conference held in Doha, Qatar in 2006 ("WTDC-06"), to create a new study question for the "analysis of strategies and policies for the promotion and development of systems that allow access to telecommunication services to persons with disabilities".[4] The rationale behind these types of strategies and policies is that ICTs must not discriminate, and PwD are entitled to enjoy equal access as the rest of the population. Accessibility means "For the telecommunications area, the usability of a product, service, environment or facility by the widest possible range of users and especially users with disabilities".[5] The WTDC-06 also requested the Telecom-

3 *Cfr*. UIT, *World Summit on the Information Society*: (1) Declaration of Principles, numbers 13 and 30; (2) Action Plan of May 12, 2004, numbers 9 e) and f), 19 and 23; (3) Tunis Commitment numbers 18 and 20; and (4) Tunis Action Program number 90 c) and e).

4 WTDC-06, Resolution 56.

5 ITU-T, *Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities*, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 3.7.

munication Development Bureau to support training and capacity building in all its programme activities and to promote more participation of PwD, among other underserved groups.[6] In recognition of this fact, the ITU Council meeting approved that the theme for the World Telecommunications and Information Society Day (May 17) of 2008 be "Connecting People with Disabilities: ICT Opportunities for All". Following is the report of the Study Question 20/1 that should be enriched with relevant information and updated as may be deemed appropriate.

2. Population with disabilities and ICTs

A. General

There are different types of disabilities which vary in nature and extent (i.e., hard of hearing and deaf, blind and low vision, physical and mental disabilities). In general, a person with disability is deemed as a: (1) a person that presents one physical, mental, intellectual or sensorial impairment, (2) that is permanent or long term, and (3) that limits his/her capacity to perform one or more essential activities of daily life or that hinders his/her full, effective and equal participation in society, due to or aggravated by the social and economic context.[7] There are different types of disabilities, namely, physical disabilities, mental disabilities, and sensorial disabilities that include visual, hearing and speech disabilities. Each type of disability may require special considerations when designing an ICT public policy.

6 WTDC-06, number 3.4, section II, subsection a), number 12.

7 *Cfr*. article 1, second paragraph C*onvention on the Rights of Persons with Disabilities*, and article 2, section XI, of the *General Law for Persons with Disabilities* (Mexico).

B. Statistics

Statistics is one of the main challenges for the design and implementation of public policy for making ICTs accessible to PwD. The World Health Organization estimates that 10% of the world's population has some type of disability. "People with disabilities constitute about 15% of the European population and many of them encounter barriers when using ICT products and services".[8] Nonetheless, overall, each country's statistics do not reflect the actual persons that have a disability or the available data is too generic without distinguishing between each type of disability or if a person has multiple disabilities (i.e., a blind and deaf person). Moreover, within the research there appears to be no statistics that reflect access or use of ICT by PwD.

ITU included in its indicators questionnaire for 2007, some questions aimed at initiating collection of data on the number of PwD that have access to ICT. The objective of including such indicators is to start developing suitable indicators which would contribute to placing ICT accessibility on the public agenda, generate awareness and monitor any progress in this regard. The data collected by the indicators questionnaire for 2007 was very limited due to the few responses received. Therefore, from such data no meaningful analysis may be done. Nonetheless, it is important that ITU continues requesting and collecting data on ICT access by PwD so that in the near future relevant statistics may be developed.

Within the work performed by ITU-D Study Question 20/1, a questionnaire with pertinent questions regarding ICT accessibility by PwD was sent to ITU State Members. However, only 14 countries responded the questionnaire.

8 UE, *eAccessibility*, Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee, and the Committee of Regions, COM (2005) 425, Bruxelles, September 13, 2005.

Absence of a significant response to such questionnaire may be due to several factors that go from lacking the information requested or by State Members having other activities which may be considered more relevance by a given country.

In the Convention on the Rights of Persons with Disabilities, States undertake to collect information (including statistics) for formulating and implementing the Convention's policies. Such information must be disaggregated and should help identify and address barriers faced by PwD in exercising their rights.[9]

3. Legal instruments and standards

A. Convention on the Rights of Persons with Disabilities

On December 13, 2006, the United Nations General Assembly approved the Convention on the Rights of Persons with Disabilities (hereinafter the "CRPD"), and it is the first human rights treaty of the XXI century. The CRPD was opened for signature on March 30, 2007, and as of February 16, 2009, 137 countries had signed it, while 81 had signed the Optional Protocol. Out of these, 48 had ratified the Convention and 28 the Optional Protocol. Depending on each country's internal legal system, the CRPD may require signature and further ratification by the legislative branch or other formal process, before it is mandatory for such country. Nonetheless, the CRPD establishes basic principles and also State's obligations to ensure equal access to ICTs including internet by PwD.

The CRPD considers that there is discrimination on the basis of disability, if there is a denial of reasonable accom-

9 *Cfr.* article 31 CRPD.

modation. Reasonable accommodation implies that there must be appropriate modification or adjustments that are not disproportionate or which burden is undue, in order to ensure that PwD enjoy or exercise all human rights and fundamental freedoms (i.e., freedom of speech, access to information).[10]

Pursuant to the CRPD, the States shall take appropriate measures to: (1) ensure ICT and emergency service access to PwD on an equal basis,[11] (2) promote access for PwD to new ICT, including internet,[12] (3) promote design, production and distribution of accessible ICT at an early stage[13], (4) ensure that PwD can exercise the right to freedom of expression and opinion,[14] (5) provide information in accessible formats and technologies appropriate to different kinds of disabilities in a timely manner and without additional cost,[15] (6) urge private entities that render services to the public to provide information and services in accessible and usable formats for PwD,[16] and (7) encourage mass media (including information providers through internet) to make their services accessible.[17]

B. National legal systems

Among the challenges for ICT accessibility from a legal standpoint are: (1) in many countries there no are specific legal provisions for ICT accessibility, and it would be the result of interpreting anti-discrimination laws, disabilities law or telecommunications laws, for example, (2) that

10 Article 2 CRPD.
11 Article 9, section 1, paragraph b) of the CRPD.
12 Article 9, section 2 of the CRPD.
13 Article 9, section 2, paragraph h) of the CRPD.
14 Article 21 of the CRPD.
15 Article 21, paragraph a) of the CRPD.
16 Article 21, paragraph c) of the CRPD.
17 Article 21, paragraph d) of the CRPD.

some of the legal provisions have been enacted considering disability issues from a medical standpoint that considers disability as a "defect" rather than addressing disability with emphasis on ability and integration, and (3) the effectiveness of legal and regulatory provisions, that is, turning good accessibility provisions into reality.

Several countries have recognized in their Constitutions that no person may be discriminated by any reason, including due to a disability. Some countries have enacted legal provisions prohibiting discrimination and special laws addressing the rights of PwD. There are also countries that have included certain provisions in their telecommunications laws that relate to making services and equipment accessible to PwD. The degree of effectiveness of such provisions may vary. Following are some examples of legal provisions in national context.

The Bolivarian Republic of Venezuela's Constitution expressly recognizes that all PwD have right to full and autonomous exercise of its capacities. The Constitution also mandates television broadcasters to incorporate subtitles and translation in sign language. This obligation is also included in the Radio and Television Social Responsibility Law. On December 18, 2007, the Venezuelan National Assembly passed a new Law for Persons with Disabilities that will guarantee medical assistance to PwD and will ensure they are adequately represented in the work place. The law includes physical, hearing, mental and visual disabilities.[18] There is a project of regulation that pretends to mandate television broadcasters to include a sign language interpreter and close caption in information programs and emergency messages.

In Brazil, the Law on Accessibility (L. 10.098) enacted in 2000 requires accessibility in communication and barrier removal and expressly guarantees the right of persons with

18 See *http://www.venezuelanalysis.com/news/2067*.

disabilities to ICTs. There are several laws, decrees and plans that address ICT accessibility by persons with disabilities.[19] In 2004, Decree 5.296 provided more detailed provisions for implementation and requires all governmental websites to be accessible to persons with disabilities.[20] Public telephones must have a dot on key number 5, must be at certain height, and there most be also some adapted with keyboard to allow persons with audition disability to communicate. Plans for universal service: (1) include a provision that at least 2% of public telephones must be accessible, (2) establish that persons with disabilities are entitled to request that a public telephone be adapted in a term of 7 days, and (3) provide since 2007 that the universal service fund be used to provide fix telephones that are accessible to persons with hearing disabilities in not for profit institutions.

The Democratic Republic of Congo estimates that there are around 2 million Congolese with disabilities due to war, old age, disease and accidents. The Democratic Republic of Congo's Constitution provides that the authorities shall protect PwD, and that all Congolese have a right to decent housing. The Telecommunications Act has provisions for allocating revenue from the telecommunications sector for telecommunication development. Therefore, the Democratic Republic of Congo recommended the establishment of ICT learning and access centers within centers for PwD, as well as full exemption of any tax on import of telecommunication equipment for people with disabilities.

The European Union Universal Service Directive[21] sets forth the obligation for its Member States to "take specific

19 *Cfr*. ITU-D, Document 1/166 from ANATEL (Brazil) to the *Third Meeting of ITU-D Study Group 1*, Geneva, September 9-12, 2008.

20 Waddell, Cynthia D., "Worldwide Accessibility Laws and Policies", *Web Accessibility: Web Standards and Regulatory Compliance*, Apress 2006.

21 EU, Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic com-

measures for disabled end-users in order to ensure access to and affordability of publicly available telephone services, including access to emergency services, directory enquiry services and directories, equivalent to that enjoyed by other end-users".[22] Member States may also take measures which allow users with disabilities to take advantage of the choices that are available to other end users.[23] The quality of service for users with disabilities may have additional quality of service standards for assessing its performance.[24] Public phones must be accessible to users with disabilities.[25]

France has regulation regarding accessibility to persons with disabilities to mobile services. The regulation was to complement the obligations that the mobile operators imposed to themselves (see below section VI), and it provides that each operator must publish annually a report to describe the advances had in the accessibility in mobile services, both regarding the equipment/devices and the services.

Mexico's Constitution prohibits discrimination against any person on the basis of a disability. Mexico ratified the CRPD which implies that its provisions are fully enforceable in Mexico, and the Mexican State is obliged to comply with them. There is also a Law on the Rights of Persons with Disabilities that deals with different types of accessibility issues, but since the CRPD recognizes more rights of PwD and duties of States and private parties, therefore, the CRPD is therefore deemed to have superseded that law. However, as of the date of this Report no regulation or measure to make effective the CRPD has been enacted.

munications networks and services (Universal Service Directive).

22 EU, article 7, paragraph 1 of the Universal Service Directive.

23 EU, article 7, paragraph 2 of the Universal Service Directive.

24 EU, article 11, paragraph 2 of the Universal Service Directive.

25 EU, article 6, paragraph 1 of the Universal Service Directive.

In Sri Lanka the Protection of Rights of Persons with disabilities Act No. 28 of 1996 is the legal ground for providing accessible facilities for PwD. Licenses granted to fixed access and cellular service providers have obligations to ensure the provision of telecommunication facilities to PwD.

In the United States of America (USA) Section 508 of the Rehabilitation Act of 1973, as amended and the regulations issued by the US Access Board contains the Electronic and Information Technology Accessibility Standards which are broad in scope (i.e., software, operating systems, Internet/Intranet applications, hardware, telecommunications, televisions, phones, fax machines, text telephones or TTY, multimedia, closed systems, ITMS). This law is having significant international impact and is identified as one of the best practices. Accessible telecommunication services were mandated with the Americans with Disabilities Act of 1990. The Communications Act mandates that, if readily achievable (easily accomplishable and able to be carried out without much difficulty or expense), (1) the manufacturer of telecommunications equipment must ensure that they are designed so as to be usable by PwD, and (2) the service providers must ensure that their services are accessible to PwD.[26] Federal departments and agencies must have electronic and information technology that allows: (1) their employees with disabilities to have access to information that is comparatively equal to those to which employees without disabilities have, and (2) PwD of the public to have access to information and services in a comparable manner to the access by persons without disabilities.[27] There is an obligation to guarantee that

26 USA, section 255 [47 U.S.C. 255] of the *Communications Act*, in connection with section 301(9) [42 U.S.C. 12181(9)] of the *Americans with Disabilities Act* of 1990.

27 USA, section 508 [29 U.S.C. 798] of the *Rehabilitation Act*.

persons with hearing disabilities may use their assistive devices with telephones.[28]

In the USA there are relay services (see section IV hereunder), through TTY, Internet and video. Users of these relay services pay the same tariffs for telecommunication services as any other user (i.e., same long distance rate). All common carriers that provide interstate telecommunication services must provide relay services by themselves or through third parties. Among the relay services there are: text to voice for users with hearing disabilities, hearing carry over for speech disabilities but when the person wants to use his/her hearing capability, voice carry over for a person with hearing disabilities but wants to use his/her voice to communicate, and speech-to-speech for persons with language disabilities.[29] In 2007, the Federal Communication Commission recognized that migration to VoIP services, needs to ensure that disability access provisions are also implemented in interconnected VoIP services. In this regard, interconnected VoIP providers have to contribute to the Interstate Telecommunication Relay Services Fund and provide abbreviated dialling to 711 (number for accessing the relay services).[30]

All advertisement produced or financed by the USA government that will be transmitted by television must include subtitles of the verbally expressed content.[31] Pursuant to a calendar set forth by the Federal Communications Commission, television programs must have closed caption.[32]

28 USA, Section 710 [47 U.S.C. 610] of the *Communications Act*.

29 *Cfr*. USA, 47 C.F.R. § 64.601 - 64.605, *Regulations for the Provision of Telecommunications Relay Services (TRS)* of the Federal Communications Commission.

30 USA, Federal Communications Commission, Report and Order 07-110, released on June 15, 2007, *http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-07-110A1.doc*.

31 USA, Section 711 [47 U.S.C. 611] of the *Communications Act*.

32 USA, Section 713 [47 U.S.C. 613] of the *Communications Act,* in connection with 47 C.F.R. Part 79.1.

Regarding emergency information, radio and television stations (both broadcasted or paid), are obliged to include subtitles in television and distinctive sounds that alert a PwD that there is an emergency situation.

C. Accessibility standards

Accessibility standards are essential insofar as it makes possible that equipment and services (1) may be usable for the broadest range of persons, (2) are interoperable, and (3) provide the necessary quality of service. The ITU Telecommunication Standardization Sector (ITU-T) has prepared several recommendations and documents that provide information on a wide range of accessibility standards.

The general principles to ensure and improve telecommunications accessibility mandate that developers of telecommunications equipment and services: (1) make *inclusive design* which considers elder persons' and PwD's needs so that they may use such equipment and services as much as possible, (2) provide accessibility through optional equipment or assistive technology[33] that is functional equivalent to the original service, when the standard configuration is not adequately accessible, (3) ensure the safety and information security of users, and (4) make equipment and services operable and usable without excessive load on cognitive or memory capabilities.[34]

33 "Assistive technology: Piece of equipment, product system, hardware, software or service that is used to enable, maintain or improve functional capabilities of individuals with disabilities". ITU-T, *Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities*, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 3.8.

34 *Cfr.* ITU-T, *Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities*, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 6.

ITU-T has also published a Telecommunications Accessibility Checklist[35] for standardization activities to be applied since the beginning of the standardization process until its end. It is important to incorporate accessibility criteria on development of new technology, or on the evolution of current technology otherwise, new technologies may present new barriers for PwD.

Information Technology Standards JTC 1 of the International Organization for Standarization (ISO) and the International Electrotechnical Commission (IEC) established a Special Working Group on Accessibility.[36] This group's terms of reference include collection of user requirements, publishing an inventory of all known accessibility standards, tracking laws and policies to ensure that necessary standards are available.

Lack of accessibility standards may lead to severe interoperability problems that may prevent communication between and with PwD. This problem has already been identified in the European Union where users cannot communicate through text telephones among its Member States.

The World Telecommunication Standardization Assembly held in Johannesburg in 2008 adopted Resolution 70 whereby, *inter alia*, invited ITU Member States and Sector Members to develop nationally guidelines and mechanisms for accessibility, compatibility and usability of ICT services, products and terminals, as well as invited to consider introducing telecommunication relay services to enable persons with hearing and speech disabilities to use telecommunication services.

35 ITU-T, *FSTP-TACL Telecommunications Accessibility Checklist*, *http://www.itu.int/publ/T-TUT-FSTP-2006-TACL/en*.

36 JTC 1 Special Working Group on Accessibility, *http://www.jtc1access.org/swga_home.htm*.

D. Declarations on ICT accessibility

As of the date of this Report, there have been three Declarations on ICT accessibility and one directly dealing with emergency situations (tsunami). The Cairo Declaration (November 2007)[37] and the Lusaka Declaration (July 2008)[38] on Supporting Access to Information and Communication Technology Services for Persons with Disabilities were the result of regional BDT workshops. These Declarations acknowledged the importance of ICT accessibility for e-learning, suitable jobs, tele-health, among others. Also, they expressly recognized that ICT accessibility should be achieved through cooperation of government, non governmental organizations, civil society and the private sector, being important that concerned United Nations bodies coordinate and exchange information.

The Phuket Declaration on Tsunami Preparedness for Persons with Disabilities (March 2007)[39] highlighted the importance of infrastructure construction for a timely warning of a disaster, and that infrastructure must be disability friendly.

The Hyderabad Declaration on IGF [Internet Governance Forum] Accessibility for Persons with Disabilities (December 2008).[40] The Hyderabad Declaration noted that "the disability perspective has not been fully integrated into the proceedings of the Internet Governance Forum partly due to both physical and programmatic barriers to participation by persons with disabilities". Additionally, it requests that IGF programs, funding or assistance "be made disability-inclusive, both through mainstreaming and disability-specific approaches", and to promote equal in-

37 See *http://www.ituarabic.org/2007/Disabilities/Cairo%20Declaration%20English%20Final.doc*.

38 *http://www.itu.int/ITU-D/sis/PwDs/Seminars/Zambia/index.html*.

39 Available on *http://www.dinf.ne.jp/doc/english/prompt/ws070112_2.html*.

40 *http://www.itu.int/dms_pub/itu-t/oth/36/05/T36050000010001MSWE.doc*.

volvement of PwD in IGF projects. Finally, the Declaration urges to tackle the problems faced by PwD "in their participation at IGF meetings and in their access to the IGF website and remote access hubs".

F. Stakeholders participation

Stakeholders of ICT accessibility for PwD should be involved in the process of elaborating legal/regulatory provisions, public policy and standards. As simple and of common sense as this appears to be, in practice, it can present several challenges. These can be:

Having an unorganized or passive civil society, especially in connection with civil society organizations of or for PwD. This challenge will depend on each country's civil society and the support or encouragement of governments to the formation of non governmental organizations, for example:

- Lack of knowledge by policy makers of how to effectively communicate with PwD individuals or groups.
- Lack of interest of congresspersons and governments to make consultations with PwD before implementing policies or enacting legal provisions.
- Holding consultations, seminars, meetings or forums that are not accessible for PwD.

F. Other participating entities

a. ITU-Joint Coordinating Activity on Accessibility and Human Factors

The ITU-T Joint Coordinating Activity on Accessibility and Human Factors[41] (JCA-AHF) was created by in December of 2007 (TSAG TD/482) to increase awareness on the need of access to the information society by people with varied capabilities, as persons with disabilities through reporting to ITU-T Study Groups. The JCA-AHF provides advice concerning the accessibility to ITU facilities, services and events to the Director of the Telecommunications Standarization Bureau, and has a mandate to act as a single point of contact within the ITU.

b. Dynamic Coalition on Accessibility and Disability (DCAD)

The Internet Governance Forum (IGF) formed the Dynamic Coalition on Accessibility and Disability[42] (DCAD) where all the ITU sectors (ITU-D, ITU-T and ITU-R) participate, along with other international organizations, nongovernmental organizations, and individuals. ITU-T maintains a secretariat and the DCAD websites. DCAD aims to ensuring ICT accessibility is included in debates within the IGF. DCAD membership is open for both individuals and institutions willing to contribute in achieving the DCAD's goals.

41 See *http://www.itu.int/ITU-T/jca/ahf/*.

42 See *http://www.itu.int/themes/accessibility/dc/index.html*.

4. Principles of ICT accessibility

The principles that govern ICT accessibility are meant to enable full and effective participation and inclusion of PwD in society. The main principles are:[43]

- *Equal access* so that people with disabilities have the same opportunities and possibilities as the rest of the population to use ICTs, and, hence, there is no discrimination against them.
- *Functional equivalent*, that is, if there is an alternative mean of communication different from the original communication, then this alternative mean must meet the objective and conditions and in similar terms as the original way of communicating (i.e., real time communication).
- *Accessibility* (in *strict sense*) that allows a PwD to use his/her own capabilities to access ICTs in the same manner as the rest of the users. This implies that a PwD does not have to rely in a specific capability or sense (i.e., the hearing sense).
- *Affordability* so that the prices of services, equipment and assistive technology are reasonable, considering the specific circumstances of the region or country.
- *Universal design* or *design for all* requires that when a service, equipment or technology are being developed, these may be used by any person without further adaptation or special design. Therefore, when a service, equipment or technology does not comply with the principle of universal design, then reasonable adaptations must be made to guarantee that PwD may enjoy in equal conditions as the rest of the population.

43 *Cfr.* article 3 of the CRPD, and article 5 of the General Law of Persons with Disabilities (Mexico).

The ITU-T has set forth as basic policy that the developers of ICT equipment or services should incorporate a human-centred approach for accessibility by promoting an active involvement of a broad range of users (i.e., PwD), by making user friendly interfaces, and multidisciplinary design.[44] ITU-T has also created the concept of total conversation that enables a person to communicate through voice, text and/or video. The total conversation service is "An audiovisual conversation service providing bidirectional symmetric real-time transfer of motion video, text and voice between users in two or more locations".[45] Finally, it is worth mentioning that ICT accessibility by PwD can be achieved directly, by standard options, accessories, compatible third party devices, by modifications to the services or equipment.

5. Assistive technologies[46]

Assistive technologies are those aimed to overcome or reduce the gap between standard ICT generally available and those that address the needs of PwD. Assistive technologies enable PwD to access and use ICTs. Assistive technologies face many challenges technological, social and economical challenges.

44 ITU-T, *Recommendation F.790 Telecommunications accessibility guidelines for older persons and persons with disabilities*, approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000, section 7.1.

45 ITU-T, *Recommendation F.703 Multimedia conversational services,* prepared by ITU-T Study Group 16 (2001-2004) and approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on November 17, 2000, section 3.2.7.

46 This Chapter summarizes section of Chapter 10 of the *e-Accessibility Toolkit for Policy Makers*, G3ict Initiative and ITU, *http://www.g3ict.com/resource_center/toolkit*.

A. Challenges for assistive technologies

Among these challenges are:

— Customer base for assistive technology is small compared to mainstream technology, in part because PwD needs varies considerably depending on the type and extent of the disability.[47]
— Due to a limited market of assistive technology, production of assistive technology does not benefit from economies of scale, and there is no competing developers/manufacturers as in a other telecommunication areas. Moreover, if market-driven competition is encouraged then transfer of technology will be costly or non-existing, and collaboration between researchers and the disability communities will be discouraged.
— Assistive technology may be proprietary software solutions, which renders it more costly or prevents further research and development by third parties.
— That when ICTs are updated, upgraded or a new version appears, assistive technology has to be also updated otherwise the "technology gap" would widen. When the updated, upgraded or new version relies on proprietary technology, hardware or software, assistive technology will increase costs with workarounds and these will be borne between the small customer base.
— Lack of generally available or comprehensible (due to language) information of the existing ICT assistive devices (equipment, software, hardware) for access by PwD.

47 *Cfr.* e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, *http://www.g3ict.com/resource_center/toolkit*, Chapter 10. Customer base is currently mainly in North America, Australia, Western Europe and South Asia.

— That certain languages and, specially, native languages are unsupported.[48]
— The socio-economic factors which will render assistive technology unaffordable for most users with disabilities. The cost of certain assistive technology may represent more than the average yearly income of an individual in different countries.
— That assistive technology research and development capacity is null in the majority of countries.
— The cost of assistive technology could be tackled by: (a) adopting the principle of universal design or design for all since the beginning, instead of pretending developing assistive technology afterwards, (b) enacting legislative measures that oblige ICTs being accessible, (c) government subsidizing assistive technology, and (d) encouraging open source software and hardware, and open access for academic research.

B. Examples of assistive technologies

There are different types of assistive devices and the following listing does not pretend to be exhaustive, but just to present certain examples of it.

— Low or no-tech options for computer access. These types of assistive technology may go from adjustable chairs to mouthstick or head/chin pointer to type on a keyboard for persons that cannot use their hands/arms, but who can use their neck or upper torso.
— Visual displays. Provide higher contrast or screen colors that generate greater visibility, enlarges icons or

48 *Cfr.* e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, *http://www.g3ict.com/resource_center/toolkit*, Chapter 10. No native language in the American continent is supported, although there are regions where upt to 80% of the population is indigenous.

magnifying portions of the screen, and displays fonts are changed for better visibility.

— Alternative displays. Screen readers that speak text displayed on the screen; voice output synthesizers that read computer information; or Braille displays[49] which translate text to Braille.

— Auditory displays. Alert sounds of the computer are transformed to visual cues, which helps hard of hearing or deaf computer users.

— Captioning. Through captioning content of video or audio files are displayed in text format for persons with hearing disabilities.

— Rate enhancement or literacy support. This is accomplished through software that predicts or completes the word which helps users with slow keyboard input.

— Mouse and pointing devices alternatives/replacements. Examples are joysticks or trackballs, mouse pointers controlled by head movement tracked by infrared or ultrasound technology, switches (e.g., foot pedals) instead of mouse, and touchscreens.

— Eye-aware applications. Certain physical disabilities prevent persons to use a mouse and, hence, the computer. Eye-aware applications enable them to use a computer by allowing them to use their eyes in connection with the software to click and move around the computer screen.

— Switch Inputs. Breath switches are operated with user's mouse and substitute button switches, whereas motion switches consider motion of user instead of contact or pressing buttons.

49 These Braille displays vary on the number of cells displayed (40 or 80), and some are compatible with screen readers. Cfr. e-Accessibility Toolkit for Policy Makers, G3ict Initiative and ITU, *http://www.g3ict.com/resource_center/toolkit*, chapter 10.

— Keyboards. Miniaturized keyboards for persons with limited range of movement/strength, or enlarged keyboards for persons with poor motor control. Also, there are Braille keyboards for typing through a Braille interface.
— Voice recognition. Spoken commands or texts are recognized and executed. It is convenient that each user has a voice model file for optimal voice recognition of the system.
— Braille devices. Examples of Braille devices: Braille printers, PDAs with a Braille interface that can be used for input or output information, or Braille translator (text to a Braille display).

End user equipment in general should: (1) include volume control functionalities for persons that are hard of hearing, (2) have bigger screens for low vision persons, (3) have software that translates text to voice and voice to text, for blind and low vision persons, (4) recognize the verbal commands so that a person with certain physical disability may establish and end a communication without having to press any button, and (5) be compatible with other accessories or assistive technology that avoids interference, degradation or unusability of the devices of PwD. The compatibility between assistive technology and telecommunication equipment is fundamental, otherwise a person that needs a device to hear that is not compatible with the telephone, will be deprived of the use of telephone communication due to the interference between the assistive device and the telephone.

6. Examples of accessible equipments and services

Although accessible equipment and services are evolving along with the ICTs, following is a reference to some

of the current equipment and services for making them accessible for PwD.

A. Telephony

The following services are accessible: (1) the short messaging service (SMS) enables communication with and between persons with hearing disabilities, (2) the video, through telephones, makes possible the communication with sign language, and (3) the relay services that, through an operator, make the communication between and with persons with hearing disability. In these relay services, the operator is the link to perform the call that is a functional equivalent to a call between persons without hearing disabilities. The relay services can be used through text telephones, internet or video. The video relay services allow using sign language by the person with hearing disability.

B. Text telephones

Text telephones are used by persons with hearing disabilities. With the advent of Voice over IP (VoIP) and other Internet services, text telephones are facing another challenge because new technology is erecting a barrier for using text telephones. Unless certain ITU-T and other standards are used,[50] text telephones may not work over Internet platform.

C. Real-time text

Real-time text is a mean of communication through text that is sent and received immediately, character by char-

50 Relevant standards for text telephones interoperability and compatibility are: ITU-T T.140, RFC 4103, RFC 3641, 4566, and RFC 5194. Mobility is covered by The 3GPP IMS defines the features of SDP that ToIP uses in 3GPP TS 26.114 v7.4.0 A5 Al.

acter. The main difference with Instant Messaging (IM) is that in IM the person writes the text and then has to press the bottom to send the message. In Real-time text, there is no need to press any bottom to send the text conversation, but the text that is being written appears in real time on the other person's device. Real-time text is the functional equivalent to telephony, but in text. This means that, for example, two persons communicating through Real-time text are reading what the other person is writing in the same moment as the writing is taking place. Real-time text does not require any special equipment (i.e., text telephone) and can be created over the internet if the standards above are implemented.

D. Public phones

The public phones to be accessible for PwD: (1) must be at a height of between 90 to 120 centimeters from the floor to allow persons in wheelchairs use them without any assistance of another person, (2) must have volume control, be compatible with hearing assistive devices, have screens for text and keyboard in order to permit communication with persons with hearing disability, and (3) must have in Braille the keyboard and the notices (i.e., emergency numbers).

E. Television

The television is accessible by: (1) including subtitles, open or close captioning that conveys the text equivalent of what is spoken enabling a person with a hearing disability to receive the information transmitted in a program, (2) the sign language interpreter on the screen during transmission of news or a program[51], (3) audio description on a

51 It is easier to include this functionality in digital TV signals than on analog TV.

separate captioning channel that enables people who are blind or have low vision to hear a description of the action on the screen, and (4) using an emergency alert sound for people with visual and cognitive disabilities in case of emergencies and natural disasters.

F. Websites

Web accessibility is generally achieved when people with disabilities are enabled to use the web as a policy and best practice. Such accessibility allows people with disabilities to perceive, understand, navigate, interact and effectively contribute to the web. A number of people acquire disabilities due to aging and therefore are among the beneficiaries of accessible websites. Web accessibility addresses a wide range of disabilities including visual, auditory, physical, speech, cognitive, and neurological disabilities which create a barrier to effective use of the worldwide web.[52] Currently, more than 26 countries have accessible web design requirements worldwide.[53] Website accessibility is described in the international standards as found in the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines 1.0 posted at *http://www.w3.org/TR/WCAG10/*. A checklist for the standards can be found at *http://www.w3.org/TR/WCAG10/full-checklist.html.*

G. Documentation and support

ICT equipment and services may be accessible to PwD, but sometimes product documentation is not. Therefore, documentation of equipment, services, prices and tariffs should be made available in alternate formats without additional charge. For example, the telephone bill could be

52 See *http://www.w3.org/WAI/intro/accessibility.php#making*.

53 Waddell, Cynthia D. "Worldwide Accessibility Laws and Policies" in *Web Accessibility: Web Standards and Regulatory Compliance*, Apress 2006.

delivered in an audible format or through a Braille invoice, upon request. Also, customer service of manufacturers and service providers should be prepared to provide assistance to PwD.

7. Selected accessibility projects

Colombia. Colombia launched an accessible telephone service that through a relay service a deaf or hard of hearing person may communicate with a hearing person by accessing through any internet center. The access network of this accessible telephone service has computers and text telephones (TTY). Users of these services include deaf, hard of hearing or persons with speech disabilities, their relatives and acquaintances. There are three relay service centers (Bogotá, Medellín and one at a national level). Regarding television, this public service must have closed caption, subtitles or sign language. Additionally, Colombia has installed in public libraries, telecentres and educational institutions, technology for blind or low vision persons, such as screen reading software, Braille printers, digital book readers.

Daisy Consortium. Digital Accessible Information System (DAISY) is an open, nonproprietary, and interoperable standard that meet requirements of persons with print disabilities[54]. No license fees are charged for using this system. DAISY's vision is that all published information be available at the time of release in an accessible format and at no greater cost. Therefore, Daisy books are digital files that contain a human narration of part of the source text, that synchronize the file to related markings in the text file within the audio file, and that provides a navigation control so that users can move seamlessly through files. Currently, Daisy also participates for preparedness in emergency sit-

54 See *www.daisy.org*.

uations so that information for evacuation is in accessible format.[55]

France. Mobile operators (Association Française des Opérateurs Mobiles, AFOM) came to an agreement to facilitate access to mobile services by PwD ("French Mobile Accessibility Agreement") in 2005, while mobile telephone manufacturers also joined this agreement in 2007. The commitments were: (1) to propose equipment adapted for the needs of PwD, evaluate the devices according to each type of disability, elaborate a list of criteria for selecting telephones, offer more models of accessible telephones, and improve the ergonomics, (2) develop specific services that foster autonomy of users, provide special tariffs and free services, make available information in sign language, provide telephones with better functionality for voice recognition, as well as for reading of SMS and text, and (3) share information about products designed for PwD, establish a hotline for accessible products and services, distribute brochures and the French Mobile Accessibility Agreement.[56] For 2008, the projects are to develop new functionalities adapted to each type of disability, to expand their scope to new actors (i.e., elderly), and to open the commitments at European level.

Italy. The University of Trieste in Italy has a Masters degree Programme in Assistive Technology whose goal is to instruct on *design for all* principles, as well as to study the most advance researches in assistive technology. This master degree program responds to the need to train in assistive technology, and to contribute to the competitiveness of the assistive technologies market.

55 *Cfr.* Kawamura, Hiroshi, "The role of ICT policy in promoting access to knowledge for persons with disabilities: Case Study on Tsunami Preparedness of Persons with Disabilities" presented on the Seminar on Sharing Experience on Best Practices and Services for People with Disabilities on September 17, 2007, Geneva, Switzerland.

56 See *www.afrom.fr/v4/STATIC/accesphandicapees/Handicapes.htm#charte*.

Korea. Korea developed a software tool named Kado-Wah that enables designers and programmers to create accessible websites that also allow adequate use with assistive technologies. The Kado-Wah automatically evaluates the accessibility of the website, identifies problems, and adjusts the source code.[57]

Mali. Mali presented a project known as "Cyber Espace" that responds to ICT needs for PwDs which will provide internet access and courses for ICT use at affordable prices. This project could be implemented by choosing pilot countries/regions, and establishing multimedia centers suitable for PwD and educators.

Romania. The Bucharest School for the Blind is a public school that has installed a school laboratory, therefore using ICTs as a mean of empower their students with skills to provide them an independent, self-confident life. The lab has a computer with Internet access, a Braille keyboard, and a software text-to voice that includes Romanian language. The project now includes scanning manuals and books to create a database pursuant to the scholar curricula, which will enable students access all the information in such manuals and books, even if there is no Braille version of them.

South Africa. The National Accessibility Portal in South Africa provides, *inter alia*, services through specific centers which have accessible ICT equipment (screen readers, speech recognition software) and is staffed by personnel trained in ICT and disabilities, and a web portal in the eleven official languages. The National Accessibility Portal has been developed by a partnership between the Meraka Institute, a representative group of the Disabled Persons

57 ITU-D, Document 1/117 from the Republic of Korea to the Second Meeting of ITU-D Study Group 1, Geneva, September 18-21, 2007.

Organizations, and the Office on the Status of Disabled Persons in the Presidency.[58]

Sri Lanka. Sri Lanka implemented several ICT accessibility projects: (1) one that provided telecommunication facilities in centers where PwD live, learn or work, (2) payphones are installed at a height that a person in a wheelchair can easily reach, (3) assistive technology has been provided, (4) payphones with text messages have been encouraged for hearing impaired, (5) bills in Braille are provided upon request, and (6) the *e*NABLE project helps PwD to access ICTs.

Sri Lanka´s *e*NABLE considers the needs of the community, and its capacity to learn to use ICTs. Its objective is to serve at grass root levels, with emphasis in children and women. *e*NABLE centers have computer labs (i.e., computers with Braille facilities). The telecommunication service providers have also contributed to *e*NABLE project and they train for ICT access. Sri Lanka´s success story has been possible thanks to the effort of the telecommunication regulator, that made the operators contribute with the accessibility projects and made the people take advantage of the ICT accessible centers.

Sweden. Sweden has a *Call direct* project that will allow a person to dial a single number through the relay service to the destination number, as an ordinary call is dialled. The *Call direct* project will also permit direct dialling to emergency service which may use relay services when needed.

USA. The National Public Radio Laboratories of the USA have a project of *Accessible Digital Radio Broadcast Service* which will provide: (1) digital radio reading services for the visually impaired and print disabled, and (2) captioned

58 Cfr. G3ict Initiative and ITU-D, *e-Accessibility toolkit for policy makers*, *http://www.g3ict.com/resource_center/toolkit*, chapter 10 (Contributions by J. E. Baker, L. McArthur, J. Silva, J. Treviranus, and Cynthia Waddell).

radio for deaf and hard of hearing.[59] The reading services may be turned on for the reception of eligible users. As per captioned radio, there are several requirements for its success as a fast text channel, and a suitable display screen.

8. e-Accessibility toolkit for policymakers

BDT is participating as partner with G3ict (Global Initiative for Inclusive Information Communication Technologies),[60] in elaborating the ICT Accessibility Toolkit for Policy Makers. BDT has contributed with the chapter relating to "Development policies". This Toolkit's objectives are: (1) facilitate best policies and strategies for implementation of the Convention on the Rights of Persons with disabilities, (2) being a platform for sharing best practices on ICT disability issues, and (3) setting forth action steps for effective policy framework. The Toolkit will consist of an online repository of policies, models and projects that can be replicated. The Toolkit will be freely accessible online at *www.g3ict.com/resource_center/toolkit*, and training for its used will take place.

9. Good accessibility practices

A. Mainstreaming, awareness and legal framework

Mainstreaming accessibility to ICTs by PwD implies that legislation, regulation, policies and programmes should consider at least *the general accessibility principles* set forth in section III above. Consequently, PwD should participate in the decision making processes.

59 See *www.nprlabs.org*.

60 A flagship advocacy initiative of the UN-GAID, the United Nations Global Alliance for ICT and Development, in collaboration with the Secretariat of the Convention on the Rights of Persons with Disabilities.

Raising awareness is also key to the success of ICT accessibility and to generate more active participation of governments, private sector and civil society. Awareness campaigns, workshops, essays and reports can be tools for setting ICT accessibility in the priority topics of each country's agenda.

Legislation and regulation should address both positive obligations towards accessibility, and positive discrimination for accessing products, services and information for PwD.

B. ICT technical standards

Development of accessibility technical standards that allow interoperability, usability of ICT services/equipment with assistive technology, and quality of service is of essence. Design of services/equipment must take into account PwD accessibility needs under the principle of *universal design or design for all*. Guidance on what universal design is and how to achieve it is strongly recommended to harmonize accessibility standards implementation.

C. Government procurement

Public procurement should demand ICT equipment and services that are accessible for PwD for government employees or persons from the public with disabilities. ICT equipment and services include web technologies (information services, websites, online applications), public access terminals (ATMs, information kiosks, vending machines, information displays, point of sale payment systems, door en-

try systems), application software, telecommunication devices and services, smart cards.[61] Providing an *ICT public procurement toolkit* is recommended.

D. Universal service

Universal service considered as the availability of telecommunication services to all, must necessarily take into account ICT accessibility by PwD. Consequently, universal service programmes should *design specific projects making ICT accessibility for PwD a reality*. New projects must consider that even if there is newer technology, legacy accessible equipment will continue to be used (i.e., TTY).

E. Accessible websites

The information and knowledge society heavily rely on information in websites. Therefore, *websites must incorporate accessibility criteria*. Governments and public interest websites must be accessible, otherwise PwD are deprived of the fundamental right to information, and several fundamental rights would not be realized (i.e., right to education). Private websites should be encouraged to be fully accessible.

F. Assistive technology and equipment

Assistive technology and accessible equipments should be *available and affordable*. Otherwise, funding, tax incentives (duty exemption on assistive technology import) or other financial schemes should be designed to allow PwD

61 *Cfr.* ITU, Meeting Information and Communications Technology Access and Service Needs for People with Disabilities (prepared by Cynthia D. Waddell), Document SIS-07/005-E presented at the *Seminar on Sharing Experience on Best Practices and Services for People with Disabilities*, Geneva, September 17, 2007, p. 28.

acquire the appropriate assistive technology and equipment to effectively access ICTs.

G. Emergency information and services

Emergency information must be provided in several formats to be accessible to a wide range of types and degrees of disabilities. Moreover, emergency services must have relay service supports for persons with hearing disabilities.

H. Enforcement and class actions

Effective mechanisms and procedures should be in place to assure compliance of ICT accessibility laws and regulations. Legal standing or the right to file complaints to enforce legal provisions should be granted to individuals, disabilities organizations or other relevant groups. Class action should also be considered insofar as these types of actions tend to be more effective than individual complaints.

I. Gathering information

Due to lack of information, laws and regulation generally do not address the needs of PwD and their access to ICTs at affordable prices. Hence, *countries should gather information and data regarding disabilities and ICT usage for generating statistics.* Statistics should be comparable in order to *create indicators* that support enactment of legislation/regulation, implementing policies and programmes.

J. ICT accessibility education

Education and *courses on ICT accessibility of equipment, services and assistive technology should be incorporated to universities syllabus* (i.e., engineering, public

policy, computer science careers). Additionally, specialization on ICT accessibility by PwD should be encouraged.

K. Certification

Certification schemes of compliance with ICT accessibility for PwD should be encouraged for: (1) promoting a *competitive environment* when there is no binding legislation, then accessibility certification could be a competitive advantage, and (2) assuring ICT services/equipment *comply with the relevant legal framework* when there are mandatory accessibility provisions.

L. Self-regulation

Self-regulation, codes of practice and sector agreements or commitments should be fostered. These may also contribute as a guide to establishing what should be understood by ICT accessible in a given product or service.

10. Guidelines for ICT accessibility policies

ICT accessibility policies will not emerge from night-to-day. Consistent and persistent steps should be taken to properly design policies and to implement them for an effective ICT accessible environment in a given country. Following is a proposal of the steps that can serve as guidelines for establishing ICT accessibility policies:

A. Mapping existing laws and regulations

Many countries have laws and/or regulations that address non-discrimination of PwD provisions and general accessibility provisions (e.g., access to buildings or public transportation), and some others have specific provisions for ICT accessibility. States that have signed the CRPD

have additional obligations on accessibility issues which include ICTs. However, seldom such laws or regulations do not address all concerns for giving equal access to ICTs to PwD. Therefore, mapping existing laws and regulations is of the essence. This will enable, first, to know the then current legal framework of the given country, and then, it will be the base for an appropriate design of ICT accessibility policies which will take into account the State's obligations and the gaps which need to be solved pursuant to the principles of ICT accessibility (see section III above).

In mapping existing laws and regulations, there are certain questions that should be responded: (1) are there specific laws addressing disabilities related to ICTs?, (2) are there specific regulations addressing disabilities related to ICTs?, (3) what are the obligations for the government or public authorities to provide ICT accessibility?, (4) are there obligations for telecommunications operators/licensees? If yes, are those obligations only for the incumbent/dominant or for all operators?, (5) what type of accessible ICT´s are mandated by law, regulation or licenses?, (6) who is in charge of verifying that such legal or regulatory provisions are enforced?, and (7) is ICT accessibility considered within universal service programs? If yes, what type of ICT services or equipment are considered. It is important to note that an honest mapping is done. It is far better acknowledging that a country has no laws/regulations for ICT accessibility than pretending to have them.

B. Information and statistics

Countries should gather information and data specifically addressing: (1) number of PwD, disaggregated by type of disability (e.g., visual, hearing, mental) and if with multiple disabilities (e.g., persons with hearing and visual disabilities), (2) number of PwD with effective access to ICTs, disaggregated by ICT (e.g., television programs with

captioning, computer usage with screen readers), (3) number of public centers that provide ICT accessible services (e.g., Internet center with screen readers and Braille printers), (4) the status or the number of government websites that comply with accessibility standards, and (5) the status or the number of government procedures through Internet and electronic means that are fully accessible (e.g., annual income presentation through electronic means). These data should be periodically updated to reflect the changes on the country's ICT accessible services and equipment, as well as effective ICT accessibility for PwD.

C. Mapping best practices and cases

Laws and regulations generally contain mandatory provisions; however, self-regulation and projects from the private sector or civil society tend to provide excellent case studies and best practices of how to make ICT accessibility a reality. Consequently, mapping best practices and success cases will prove to be an excellent input for policy design.

D. Status of e-Accessibility

Information and statistics gathered should help to depict the status of e-Accessibility in a State and its different regions. This picture of e-Accessibility will certainly evidence the gaps and deficits in several services and equipments, as well as the differences between urban/rural and high/low income zones. However, the status of e-Accessibility will serve to focus attention on relegated areas. For example, in a given country it is possible that public websites are generally accessible, but television programming lacks captioning. Another example could be that public policy has emphasized on providing accessible ICT on cities, but has delayed or forgotten PwD in rural

areas that perhaps are less in number but in equal need. Finally, emergency telecommunication services may be widely available for the population, but have not considered PwD which excludes them of timely receiving alerts in the event of emergency situations.

E. Active participation of PwD and consultations

The best resource for adequate and effective policy design is to perform consultations with PwD and organizations dealing with PwD, achieving their active participation. Nobody will be in a better position to comment or provide feedback to proposed legislation or public policy measures, than directly PwD. “Nothing about us, without us” must be considered in ICT accessibility for PwD. In countries where civil society is less active, and additional effort should be made to encourage participation by PwD. In any case, consultations must consider accessibility issues and features (meetings with wheelchair access, captioning of speeches or sign language), surveys must also be accessible (if in printed format, then a Braille version available; if only, then should allow screen readers use). In summary, policy makers should be sensitive to special considerations for achieving successful participation of PwD, as individuals or as organized groups.

F. Mainstreaming

A next step should be to mainstream ICT accessibility for PwD. Mainstreaming will involve taking into consideration accessibility principles in a cross-cutting manner. This implies that ICT accessibility issues must be considered not only when focusing specifically on PwD or in certain consultation stage, but in any law, regulation, policies and programmes design that is linked with ICTs, and in all stages of the design and implementation process.

G. All stakeholders

All stakeholders must be involved or in some manner participate in ICT accessibility policy designing and reviewing its effective implementation.

Legislators and regulators will have to review existing laws and regulations, so as to ensure that they comply with ICT accessibility policy. The CRPD may not be as detailed as to refer to different ways of assuring equal ICT access for all, including PwD. Therefore, legislators and regulators, both from local and national governments, will have to amend the legal and regulatory framework in order to fully comply with the CRPD mandate.

Generally, several Ministries hold responsibilities on their respective sector for ICT accessibility as the Ministries of Communications, Education, Health, and Labor. It is important that these Ministries are also considered relevant stakeholders in ICT accessibility policy.

Besides the periodic report that countries to the CRPD have to present, it is important that in country audits are performed to realize effective implementation of ICT accessibility measures at local and national governments.

Civil society and non governmental organizations on disabilities or accessibility are a good source for information, can be a channel between individuals with disabilities and government policy makers, and can also serve as watchdogs of effective implementation of accessibility policies and the CRPD, if the country has ratified it. The CRPD mandates that civil society, PwD and the organizations that represent them, must fully participate in all stages of the process of reviewing the CRPD application.[62]

Cooperation between the private sector and the government is of the essence. Legal or regulatory obligations to

[62] Article 33 of the CRPD.

render ICT accessible will prove not to be enough, especially considering the private sector probable challenges in court that may take several years. Therefore, laws, regulations and policy design must pursue the maximum effectiveness for ICT accessibility implementation. There are several alternatives that can be taken into account as public procurement of ICT equipment and services have to be accessible, preferential tax treatment to production or importation of ICT accessible equipment, benefits for research and development in ICT accessibility which could include funding for it, for example.

H. Priorities, timeframe and budget

Recommending minimum desirable ICT accessible services could prove to be counterproductive. Each country must make its own assessment of what are its ICT accessibility priorities depending on its local conditions and population with disabilities. Budget restraint and cost should not override the need of having ICT accessibility policies, programs and projects in a given country. Therefore, each country must consider that to finish a 10,000 kilometer journey, it has to start with the first step. The schedule for implementing policies and strategies will then depend on specific local conditions, and should be seen as a different stage process towards full ICT accessibility for PwD.

I. Training, education and research

No amount of availability of ICT accessible equipment, services and software can replace the need of training and education to PwD, school teachers of PwD and community centers, among others. The best approach to training and education is that considers the needs of the community and empowers people of the same community to be the trainers under the strategy of teach the teachers.

One of the challenges of the vast majority of countries is being only importers of ICT technology in general. However, this should not discourage fostering projects that involve research and further development of ICT accessible equipment, services, and software. For example, public universities with an appropriate back-up and funding of national or international entities, public or private, may research and develop software for specific ICT accessibility functions.

J. Periodic reviews

ICT accessibility for PwD is (overall) in its infancy. In ICT accessiblity for PwD there is no final goal or target that when achieved, the work and effort is over. It is important to monitor progress, detect delays or drawbacks, focus on new challenges imposed by technology's continued evolution. Consequently, periodic reviews on ICT accessibility must be performed in order to adapt the legal framework, policies and programmes to solve the then present and future needs for rendering ICTs' fully accessible to PwD.

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Annex "A" – Summary of Guidelines for ICT accessibility policies and best practices

ICT accessibility policies will not emerge from night-to-day. Consistent and persistent steps should be taken to properly design policies and to implement them for an effective ICT accessible environment in a given country. Following is a summary of guidelines for establishing ICT accessibility policies:

1. Mapping existing laws and regulations that address non-discrimination of PwD provisions and general accessibility provisions (e.g., access to buildings or public transportation), and some others have specific provisions for ICT accessibility.
2. Information and statistics should be gathered by countries addressing: (1) number of PwD, disaggregated by type of disability and if with multiple disabilities, (2) number of PwD with effective access to ICTs, disaggregated by ICT, (3) number of public centers that provide ICT accessible services, (4) the status or the number of government websites that comply with accessibility standards, and (5) the status or the num-

ber of government procedures through Internet and electronic means that are fully accessible. These data should be periodically updated to reflect the changes on the country's ICT accessible services and equipment, as well as effective ICT accessibility for PwD.

3. Mapping best practices and cases that can be self-regulation and projects from the private sector or civil society.
4. Status of e-Accessibility in a country and its different regions to depict the gaps and deficits in several services and equipments, as well as the differences between urban/rural and high/low income zones. This status will enable a country to adopt appropriate policies to progress in e-Accessibility.
5. Active participation of PwD and consultations, to receive feedback on proposed legislation and public policy measures. These consultations must consider accessibility issues and features, surveys must also be accessible.
6. Mainstreaming ICT accessibility for PwD which implies considering accessibility principles in a cross-cutting manner.
7. All stakeholders must be involved or in some manner participate in ICT accessibility policy designing and reviewing its effective implementation.
8. Establish priorities considering the local conditions and population with disabilities in a given country. These priorities should be established within a timeframe and will seek to be progressive measures to implement wide accessibility taking into account budget.
9. Training, education and research are paramount, and should consider the needs of the community seeking to empower people of the same community to be the trainers.

10. Periodic reviews should be performed to monitor progress, detect delays or drawbacks, focus on new challenges imposed by technology's continued evolution.
11. Fostering the development of accessibility technical standards to allow interoperability, usability of ICT services/equipment with assistive technology, and quality of service is of essence.
12. Design of services/equipment must follow the principle of universal design or design for all.
13. Public procurement should demand ICT equipment and services that are accessible for PwD for government employees or persons from the public with disabilities.
14. Universal service programmes should design specific projects making ICT accessibility for PwD a reality.
15. Governments and public interest websites must be accessible, and private websites should be encouraged to be fully accessible.
16. Assistive technology and accessible equipments should be available and affordable. Otherwise, funding, tax incentives) or other financial schemes should be designed to allow PwD acquire the appropriate assistive technology and equipment to effectively access ICTs.
17. Emergency information must be provided in several formats to be accessible to a wide range of types and degrees of disabilities. Moreover, emergency services must have relay services support for persons with hearing disabilities.
18. Enforcement and class actions, as well as other effective mechanisms and procedures should be in place to assure compliance of ICT accessibility laws and regulations.

19. Certification schemes of compliance with ICT accessibility for PwD could be another mean to realize e-Accessibility. Self-regulation, codes of practice and sector agreements or commitments should also be fostered.

Annex "B" – Summary of available technological solutions and economic cost evaluation

— The ***e-Accessibility toolkit for policy makers***[63] in Chapter 10 provides links to charts and data base useful as it refers to available technological solutions for ICT accessibility and a comparison of cost related issues between countries.

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Annex "C" – Summary of identified challenges

— Provisions for ICT accessibility for PwD may not be explicit, and in many cases are a result of interpreting anti-discrimination laws, disabilities law or telecommunications laws.
— Legal provisions enacted considering disability issues from a medical standpoint (disability as a "defect" rather than addressing disability with emphasis on ability and integration).
— Effectiveness of legal and regulatory provisions, that is, turning good accessibility provisions into reality.
— Having an unorganized or passive civil society, specially in connection with civil society organizations of or for PwD.
— Lack of knowledge by policy makers of how to effectively communicate with PwD individuals or groups.

63 G3ict Initiative and ITU-D, *e-Accessibility toolkit for policy makers*, *http://www.g3ict.com/resource_center/toolkit*.

— Lack of interest of congresspersons and governments to make consultations with PwD before implementing policies or enacting legal provisions.
— Holding consultations, seminars, meetings or forums that are not accessible for PwD.
— Customer base for assistive technology is small compared to mainstream technology, in part because PwD needs varies considerably depending on the type and extent of the disability.
— Due to a limited market of assistive technology, production of assistive technology does not benefit from economies of scale, and there is no competing developers/manufacturers as in a other telecommunication areas. Moreover, if market-driven competition is encouraged then transfer of technology will be costly or non-existing, and collaboration between researchers and the disability communities will be discouraged.
— Assistive technology may be proprietary software solutions, which renders it more costly or prevents further research and development by third parties.
— When ICTs are updated, upgraded or a new version appears, assistive technology has to be also updated otherwise the "technology gap" would widen. When the updated, upgraded or new version relies on proprietary technology, hardware or software, assistive technology will increase costs with workarounds and these will be borne between the small customer base.
— Lack of generally available or comprehensible (e.g., due to language) information of the existing ICT assistive devices (e.g., equipment, software, hardware) for access by PwD.
— In assistive technologies, certain languages and, specially, native languages are unsupported
— The socio-economic factors which will render assistive technology unaffordable for most users with dis-

abilities. The cost of certain assistive technology may represent more than the average yearly income of an individual in different countries.

— Assistive technology research and development capacity is null in the vast majority of countries.

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Annex "D"- Index of country examples

— Brazil, Colombia, Democratic Republic of Congo, European Union, France, Italy, Korea, Mali, Mexico, Romania, South Africa, Sri Lanka, Sweden, USA, and Venezuela

Annex "E" – Links to relevant sources of information

— International organizations.
— Dynamic Coalition on Accessibility and Disability (DCAD), *http://www.itu.int/themes/accessibility/dc/index.html.*
— Global Initiative for Inclusive ICT (G3ict), *http://www.g3ict.com/*.
— Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF), *http://www.itu.int/ITU-T/jca/ahf/*.
— Assistive technology.
— For information about assistive technology products, *http://www.abledata.com/.*
— For research, development and education on inclusively designed emerging information and communication technology and practices, see *http://atrc.utoronto.ca/index.php>http://atrc.utoronto.ca/* of the Adaptative Technology Resource Center from the Faculty of Information of the University of Toronto.
— Accessible websites
— For website accessibility, see *http://www.w3.org/WAI/.*

— Planning accessible meetings
— Following is a list of online resources proposed by the DCAD that will help for planning an accessible meeting:
— ITU tutorial on accessibility, website at *http://www.itu.int/ITU-T/worksem/accessibility/tutorial/index.html*. Online webcast of the tutorial "Making ITU Accessible: Web Design, Web Conferencing and Real Time Web Captioning" at *http://www.itu.int/ibs/ITU-T/200804tutorial/index.html*
— Guide to Planning Inclusive Meetings and Conferences, Treasury Board of Canada Secretariat at *http://www.tbs-sct.gc.ca/pubs_pol/hrpubs/tb_852/gpimc-gprci_e.asp* (french and english).
— Plan an Accessible Meeting, posted at Ontario Province, Canada, website at *http://www.mcss.gov.on.ca/mcss/english/how/howto_meeting.htm* (french and english).
— Access Checklist, Disabled Women's Network in Ontario, it provides an helpful guide, website at: h*ttp://dawn.thot.net/access_checklist_full.html* (french and english).
— Planning Accessible Conferences and Meetings, State of Michigan, website at: *http://www.michigan.gov/documents/Planning_Accessible_Conferences_and_Meetings_59735_7.doc.*
— Meeting information and communications technology access and service needs for people with disabilities, background paper, online at: *http://www.itu.int/ITU-D/study_groups/SGP_2006-2010/events/2007/Workshops/documents/05-successpolicies.pdf.*