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**Matters related to the implementation of the Convention:
round-table discussions: technology, digitalization and
information and communications technology for the
empowerment and inclusion of persons with disabilities**

Technology, digitalization and information and communications technology for the empowerment and inclusion of persons with disabilities

Note by the Secretariat

The present note was prepared by the Secretariat in consultation with United Nations entities, representatives of civil society and other relevant stakeholders to facilitate the round-table discussion on the theme “Technology, digitalization and information and communications technology for the empowerment and inclusion of persons with disabilities”. The Secretariat hereby transmits the note, as approved by the Bureau of the Conference, to the Conference of States Parties to the Convention on the Rights of Persons with Disabilities at its twelfth session.

* [CRPD/CSP/2019/1](#).



Introduction

1. The Convention on the Rights of Persons with Disabilities recognizes the critical role that information and communication technologies (ICTs) and assistive technology play in enabling and empowering persons with disabilities and in ensuring that they fully enjoy human rights and fundamental freedoms. The preamble of the Convention stresses the importance of accessibility to information and communication. Articles 4, 9, 20, 26 and 32 call on all States Parties to provide access to ICTs and to facilitate affordable access to assistive technology. Article 4, on general obligations, urges States Parties to undertake or promote research and development of, and to promote the availability and use of new technologies, including ICTs, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost. Article 9 and 21 call on States Parties to provide equitable access and remove barriers in access to ICTs and to assistive technology. Article 20 on personal mobility asks for effective measures to facilitate access to quality mobility aids, devices, assistive technologies and forms of live assistance and intermediaries, delivered in the manner and at the time of their choice and at an affordable cost. Article 21 urges private entities and the mass media which provide services through the Internet to provide information and services in accessible and usable formats for persons with disabilities. Article 26 calls on States Parties to promote the availability, knowledge and use of assistive technologies, designed for persons with disabilities, as they relate to habilitation and rehabilitation. Article 29 calls on States Parties to facilitate the use assistive and new technologies to guarantee to persons with disabilities political rights and facilitate their political participation. Technology can also play a major role in the inclusion of persons with disabilities in education in line with article 24 and in employment in line with article 27, as well as in accessing health services in line with article 25. Media has a critical role in raising awareness and contributing to the empowerment of persons with disabilities, and article 8 encourages all organs of the media to portray persons with disabilities in a manner consistent with the purpose of the Convention. Moreover, technology can also create accessible means for persons with disabilities to provide information and data and respond to surveys on their own, thus contributing to the implementation of articles 31 and 33. Article 32 of the Convention recognizes the importance of international cooperation for enhanced access to and sharing of accessible and assistive technologies. This is particularly relevant for persons with disabilities for whom state-of-the-art technology can make a decisive difference with regards to their inclusion and independent living.

2. Noting that assistive technology enables and promotes the inclusion, participation and engagement of persons with disabilities; recalling that the majority of those who need assistive technology do not have access to it, and that this has a significant adverse impact on the education, livelihood, health and well-being of individuals, and on families, communities and societies; and to fulfil the aims of the United Nations Convention on the Rights of Persons with Disabilities, the seventy-first World Health Assembly adopted a resolution on improving access to assistive technology for everyone, everywhere.¹ Other major international instruments also

¹ World Health Organization, resolution 71.8 of 26 May 2018, entitled “Improving access to assistive technology”, available at http://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_R8-en.pdf.

call for promoting access to technology and for investing in accessible and affordable technology for persons with disabilities.²

3. The 2030 Agenda for Sustainable Development positioned science, technology and innovation as key means of implementation of the Sustainable Development Goals. Goal 9, target C, commits to significantly increasing access to ICTs and to providing universal and affordable access to the Internet in the least developed countries by 2020. This represents a crucial target in the development of digital inclusion for persons with disabilities.

4. The 2030 Agenda also launched the Technology Facilitation Mechanism to facilitate multi-stakeholder collaboration and partnerships through the sharing of information, experiences, best practices and policy advice among all stakeholders. The Mechanism has three components: an annual multi-stakeholder forum for science, technology and innovation for the Sustainable Development Goals; an interagency task team on science, technology and innovation, which also includes representatives from civil society, the private sector and the scientific community; and an online platform as a gateway for information on existing science, technology and innovation initiatives, mechanisms and programmes.

5. In July 2018, the Secretary-General established the High-level Panel on Digital Cooperation to help “realize the transformational potential of digital technologies” by accelerating cooperation in the digital space between Governments, the private sector, civil society, international organizations and other relevant stakeholders and gathering their views. The Panel emphasizes the recognition by the United Nations of the significant contribution that digital technologies make to the achievement of the Sustainable Development Goals for all by 2030 and aims to contribute to the broader public debate on how to ensure a safe and inclusive digital future for all.

6. The power of technology (including assistive technology), digitalization and ICTs has grown tremendously in recent decades. In today’s digital age, technology plays a central role in nearly all aspects of life: how people learn, work, play, vote and interact with each other. For persons with disabilities, technology also represents an unprecedented opportunity to improve their quality of life, enhance their inclusion in the community and their social engagement and make independent living possible: online access allows persons with mobility difficulties to access public services, electronic voting grants persons with difficulties moving or standing in line the possibility to vote, e-learning materials adapted to the needs of students with cognitive disabilities remove barriers to learning, text-to-speech devices allow persons with visual disabilities to use a computer in their workplace, digital applications enable persons with psychosocial disabilities to connect with one another virtually for peer support. Technologies of general use, like GPS, can increase accessibility in their physical environment for persons with disabilities. Modern buses use several technological devices such as screens with images to increase accessibility for deaf people, audio to increase accessibility for blind people and automatic ramps of access for wheelchair users. It is important to recall that technology is not only about new technology. Radio, including community-based radio, has an extremely important role in low- and middle-income countries, as well as in developed countries.

7. As technology drives the fourth industrial revolution, the demand for science, technology, engineering and mathematics (STEM) professionals and for STEM skills across all sectors will continue to grow, thus creating vast opportunities in the labour

² See the International Telecommunication Regulations (2012), the World Summit on the Information Society (WSIS)+10 Review and Strategic Directions for Building Inclusive Knowledge Societies for Persons with Disabilities (2013), the New Urban Agenda (2016), the Addis Ababa Action Agenda (2015).

market. Persons with disabilities with such skills will have the opportunity not only to find and create jobs but also to reduce poverty and inequality and promote inclusion. To ensure that persons with disabilities benefit from these emerging trends, the relevant education and training in these fields should be accessible for them, taking in particular into consideration the needs of underrepresented groups, such as persons with intellectual disabilities and people with deafblindness.

8. Assistive technology, such as wheelchairs, hearing aids and screen-readers, has many positive benefits since it promotes an individual's independence and enables persons with disabilities to live healthy, productive, independent and dignified lives, participating in education, the labour market and social life. It can also reduce the need for formal health and support services and long-term care, and burden on carers. Without assistive technology, persons with disabilities are often excluded, isolated and may be locked into poverty. Furthermore, assistive technology can be cost-effective, as it can reduce the need and cost for other services, can enable users to get an education and earn an income, or can reduce the need for support provided by family members, who may then be able to use their time for work or other activities.

9. In the present note, key issues and challenges are identified regarding the use of technology (including assistive technology), digitization and ICTs for the empowerment and inclusion of persons with disabilities, focusing on access and accessibility of ICTs as well as on access to assistive technology. The note also discusses promising opportunities to remove barriers and ensuring equal opportunities for persons with disabilities to access technology, digitalization and ICTs.

Technology, digitalization and information and communications technology for the empowerment and inclusion of persons with disabilities: issues and challenges

10. Existing evidence – available only in a limited number of countries – suggests that persons with disabilities face inequality in accessing ICT and assistive technology.³ In some countries the percentage of persons with disabilities using the Internet is less than half that of persons without disabilities. Persons with disabilities are also less likely to use the radio and television. Part of this inequality comes from lower ownership of ICTs in the households where persons with disabilities live. Households with persons with disabilities are less likely than households without persons with disabilities to have Internet access and are less likely to have a computer or a mobile phone. These inequalities are the result of the many barriers faced by persons with disabilities in accessing technology and in securing sources of income such as jobs.

11. As with persons without disabilities, younger persons with disabilities are more likely to use the Internet than older persons with disabilities; and persons with disabilities with higher levels of education are more likely to use the Internet than those with lower levels of education.² Gender gaps differ among countries. In some countries, men and women with disabilities use the Internet at similar rates, whereas in other countries there is a marked gender gap.³ Depending on the country, women with disabilities may use the Internet at higher or lower rates than men with disabilities.

³ United Nations Flagship Report on Disability and Development 2018: Realization of the Sustainable Development Goals By, For and With Persons With Disabilities. Available at: <https://www.un.org/development/desa/disabilities/>.

12. On assistive technology, in several developing countries, more than half of the persons with disabilities who need assistive technology are not able to receive it, and in some of those countries this unmet need affects over 80 per cent of persons with disabilities.² Persons with disabilities point to various barriers in accessing technology, including ICT and assistive technology:

(a) Unaffordable cost: for example, although many ICTs are available free of charge, screen readers and text-to-speech applications cost several hundred United States dollars on some mobile platforms;

(b) Inadequacy of available technology: in particular, assistive technology must meet the requirements, preferences and expectations of a user to be effective;

(c) Inaccessibility of technology and communication: for instance, Internet sites with non-accessible features such as non-captioned videos;

(d) Lack of access to providers of technological devices because of lack of transport or inaccessibility of provider facilities;

(e) Inaccessible environments that do not permit an effective use of technology: accessibility of the environment is a precondition for using certain assistive technology, for example, ramps and wide doorways can enable the effective use of a wheelchair;

(f) Lack of accessible information to persons with disabilities about assistive technologies that can be useful and helpful to them.

13. Persons with disabilities have lower employment rates and lower incomes and may have extra costs related to disability, making it more likely that the costs of Internet subscriptions and electronic devices are prohibitive for them. For instance, data available for three sub-Saharan countries indicate that 15 per cent of households without persons with disabilities but only 8 per cent of households with persons with disabilities are able to afford Internet costs. Being unable to afford Internet may mean, for many persons with disabilities, fewer job opportunities, less access to information and education materials and less access to services and social participation. Households with persons with disabilities are also less likely to be able to afford a mobile phone.

14. Without financial assistance, many persons with disabilities are not able to access the assistive technology they need or the technology that could improve their participation. Available data indicates this financial assistance is not often available. In 2005, among 114 countries, 36 per cent did not pay or allocate financial resources for the provision of assistive technology to persons with disabilities.

15. The extent of inaccessibility of general technology is difficult to measure, but a study of government websites suggests that accessibility is still rarely considered. For example, in more than 60 per cent of the 193 United Nations Member States, government websites include features that are inaccessible for persons with disabilities.

16. In many countries, the availability of safe and effective assistive technology is limited in terms of quantity and in terms of the range of types, models and sizes of the products. Similarly, assistive technology services are in short supply or are located far away from the people in need of them. Lack of physical and cognitive accessibility of the transport system and the facilities where assistive technology is provided raises additional barriers. Similar barriers exist for facilities selling ICTs and electronics. Crowd-sourced reports on more than 6,000 electronic shops worldwide, mostly in developed countries, indicated that, in 2017, 43 per cent were not accessible for persons using wheelchairs.

17. Lack of access to or availability of electricity among many persons with disabilities in developing countries, especially in rural and remote areas, hampers access to technology, as most technology is electricity dependent. Available evidence indicates that households of persons with disabilities are less likely to have access to electricity than households without persons with disabilities.² In various developing countries, less than 50 per cent of households with persons with disabilities have access to electricity. Moreover, many schools in developing countries still operate without electricity, which makes it impossible to use electricity-dependent learning technology for students with disabilities.

18. Another barrier in achieving universal assistive technology coverage is the lack of awareness of the potential of assistive technology. In many countries, persons with disabilities, their families and support personnel are not provided with accessible information, or information at all, about assistive technology or where to get it. Moreover, policy- and decision makers are often not aware of assistive technology and the possibilities it provides. Focus has also not yet been key on developing assistive technology that targets some groups of persons with disabilities, such as those with deafblindness, deaf people, persons with autism, blind people, or people with cerebral palsy or psychosocial disabilities, to ensure their full and meaningful participation in society.

19. Other common barriers to assistive technology provisioning is the lack of properly trained personnel who are skilled in manufacturing or adapting products or delivering services; and limited national and local policies promoting accessible and affordable assistive technology.

20. One major example of the exclusion of persons with psychosocial disabilities from the use of technology and ICT (and who are disempowered by their exclusion from it) is when they are deprived of liberty and in detention for an indefinite term that can last from days to years. In such cases, access to communication technologies and devices can be severely restricted or altogether eliminated. Unlawful or arbitrary deprivation of liberty based on the existence of a disability is against the principles and violates the norms of the Convention, and upholding the rights of persons with disabilities should also include ensuring continuing access to technology and communication.

Overcoming challenges and building on opportunities: scaling up good practices

21. Despite the various barriers encountered by persons with disabilities in accessing and using technology, accessible technology has become more common in recent years. A growing number of mainstream everyday ICTs, such as mobile devices, desktop computers and Internet websites, increasingly offer functionalities that facilitate access for persons with disabilities and are built according to principles of universal design. Features such as text-to-speech and voice recognition, the ability to change contrast and colour schemes, touch and gesture input, and screen magnification, which in the past required specialized, stand-alone software and hardware, are now embedded in off-the-shelf ICT devices. The inclusion of accessibility features in mainstream technologies reduces the need for costlier specialized assistive technologies.

22. The benefits of creating products that are accessible to all extend not only to persons with disabilities, but also to companies, by opening a new market opportunity for vendors among persons with disabilities, who are estimated to represent 15 per cent of the population. Moreover, accessibility can create new markets by pushing

innovation for all. For instance, the vibration mode in cell phones was originally developed for persons with hearing disabilities.

23. However, enhanced accessibility of ICTs still remains a relatively underdeveloped segment of the ICT market. Innovative approaches that make technology accessible to persons with disabilities must be scaled up. Often, a product ends up not being accessible because of lack of awareness. To address this, it is crucial to increase research, design and production by ICT designers, raise awareness and involve persons with disabilities in the design and production of new technology in order to properly understand the variety of needs that technology can address as well as the necessary accessibility requirements.

24. Technology industries can make use of guidelines and standards on accessibility. For example, an International Organization for Standardization (ISO) classification of a wide range of assistive technologies, known as ISO 9999, has been developed. The Web Content Accessibility Guidelines 2.0 provides guidance on making web content more accessible to persons with disabilities. Some countries have established their own ICT accessibility policies and regulations. Similar international and national norms can be expanded to other areas of technology, digitalization and ICTs, such as computers and smartphones. Setting national standards, regulations and monitoring mechanisms to facilitate the implementation of accessibility guides actors involved in the design and production of technology to produce adequate, affordable, accessible and quality goods and services. Standards also have the potential to bring the cost of production down, as markets are enlarged when all designers and producers follow the same standard.

25. National systems for the provision of assistive technology can struggle with limited resources and lack of reliable evidence for sound planning. In countries with established systems for the provision of assistive technology, the focus should be on improving adequacy, efficiency and effectiveness, by expanding the coverage and improving the relevance, quality and affordability of assistive technologies, while other countries may focus on introducing and gradually expanding such systems, prioritizing cost-effective approaches. Whatever the system used, it should be monitored and based on quantitative evidence to ensure that those who can benefit from assistive technology receive it, in an adequate, affordable, accessible and quality manner. This requires estimating needs for assistive technology and mapping available human and financial resources. It is important that the specific requirements of all groups of persons with disabilities are considered.

26. In some countries, there are public spaces with free Internet available to the community. This access is accessible to persons with disabilities and promotes a culture of living together and of public and free Internet use.

27. The first priority assistive products list, which includes 50 items, was released by the World Health Organization in 2016 to assist countries with limited resources to prioritize the allocation of resources for assistive technology on the basis of widespread need and impact on a person's life. Priority lists could also be developed in other areas of technology such as ICTs, on the basis of the positive impact on the well-being and independent living of persons with disabilities. The International Telecommunication Union has also conducted extensive work on persons with disabilities, in particular in building the capacity of developing countries to provide access to ICT for persons with disabilities.

28. To make access to technology a reality, key stakeholders must be involved, including governments, researchers, relevant industries in the public and private sectors as well as persons with disabilities and their representative organizations. The Global Cooperation on Assistive Technology – a partnership among United Nations agencies, organizations of and for persons with disabilities, donor agencies,

professional organizations, academia and industry – has been working since 2014 to assist Member States in improving access to high-quality and affordable assistive technology. More partnerships, focusing on ICT and technology accessible for persons with disabilities, can provide benefits in crucial areas. Research institutes have also contributed to creating technological solutions to improve access by persons with disabilities to technology. The Federal University of Rio de Janeiro, for instance, produced a voice-based system for personal computers to communicate with users, thus creating an environment in which persons with visual impairments can use computers and ultimately obtain a higher degree of independence in their study and work. Persons with disabilities also play a major role in the development of technology, as they have been employed and lead major programmes in high-tech industries.^{4,5}

29. While many initiatives, projects and organizations worldwide have been carrying out innovative practices in enhancing the potential of technology for persons with disabilities, the majority of such initiatives are based in developed countries. Many developing countries lack the required ICT and technological infrastructure.

30. Considering the vast potential of technology to improve the lives of persons with disabilities and to contribute to the implementation of the Convention, as well as the role of persons with disabilities in designing, developing and producing ICTs, wider access to technology among persons with disabilities should be considered a priority. It is crucial to reduce the gaps in access to technology, digitalization and ICTs between persons with and without disabilities and to invest in assistive technology, focusing on the following priority areas:

(a) Raising awareness and enhancing knowledge of ICT accessibility and its potential to improve the quality of life of persons with disabilities among key stakeholders such as governments and ICT industries in the public and private sectors;

(b) Involving persons with disabilities, including through organizations of persons with disabilities, at every stage of ICT development and in the design of assistive technology;

(c) Formulating policies and financial incentives to support universal design in technology as well as research, development, production, distribution and servicing of assistive technology, including through the direct involvement of researchers and users with disabilities;

(d) Building countries' capacities and facilitating the transfer of technologies, especially assistive technology;

(e) Adopting national policies and regulations on ICT accessibility;

(f) Making assistive technology and ICT available and affordable for persons with disabilities through, for instance, the provision of grants or other compensation schemes for those in lower income brackets;

(g) Ensuring that persons with disabilities obtain knowledge, in accessible format, on available assistive technology and schemes from which they can benefit and enabling their families to contribute towards the full enjoyment of that technology and those schemes;

⁴ IBM, "Q&A with an accessibility research pioneer, Chieko Asakawa: 'AI is going to allow blind people to see the world'", available at: <https://www.ibm.com/watson/advantage-reports/future-of-artificial-intelligence/chieko-asakawa.html>.

⁵ Paolo Gaudiano, "Accenture, EY, Google, Microsoft and other leaders find great value in employees with disabilities", *Forbes*, 6 November 2017.

- (h) Training service providers on the specific requirements and adequacy of assistive technology to deliver high-quality services for persons with disabilities;
- (i) Investing in a barrier-free and universal design environment to ensure an effective use of assistive technology and optimize the benefits of assistive technology;
- (j) Collecting, analysing and publishing internationally comparable data on access to and use of ICTs disaggregated by disability, sex and age as well as on accessibility of ICTs;
- (k) Collecting data on the need for assistive technology to inform responsible planning of systems for the provision of this technology;
- (l) Including the disability perspective of people with disabilities in all relevant intergovernmental mechanisms, processes and institutions promoting technology as a tool for the implementation of the Sustainable Development Goals.

Guiding questions for discussion by the round-table panel

31. The following questions are presented for consideration at the round-table discussion:

- (a) What are the barriers that may negatively affect access by persons with disabilities to technology, digitalization and ICT? What good examples are there of initiatives to promote this access?
- (b) What can be done by governments, United Nations agencies and private actors to promote access by persons with disabilities to technology, digitalization and ICT, and how can they work together to this end?
- (c) What measures must States Parties take to increase the availability and use of assistive technology for those who need it? What initiatives have been taken to address the unmet need for assistive technology?
- (d) Are there specific measures that have encouraged the producers of technology, in both the public and private sectors, to create products sensitive to the needs of persons with disabilities, including universal design?
- (e) What examples of good practices are there in terms of raising awareness among governments and decision makers, ICT industries, educators and employers of the benefits of technology for the inclusion and empowerment of persons with disabilities?
- (f) How can the active and leadership role of persons with disabilities as producers and users of technology be promoted and awareness raised on this issue?