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Matters related to the implementation of the Convention: round-table discussions

Innovation and technology advancing disability rights

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 "Innovation and technology advancing disability rights". 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 fifteenth session.

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I. Introduction

1. There are only eight years left for the world to achieve the Sustainable Development Goals. As Member States, the United Nations and the entire international community continue to address the coronavirus disease (COVID-19) situation and enhance their efforts to "build back better" and implement and deliver the commitments of the 2030 Agenda for Sustainable Development and the Convention on the Rights of Persons with Disabilities, the fifteenth session of the Conference of States Parties to the Convention will engage the States parties and other stakeholders in a round table focusing on the advancement of disability rights in the context of innovation and technology. The round table will be a valuable opportunity to engage in a cross-sectoral dialogue on disability rights and technology, identify key challenges and opportunities, exchange experiences and good practices, and explore strategies on the way forward to further advance disability rights in the sphere of innovation and technology.

2. The present note provides general background information on the topic, with a view to facilitating the round-table discussions. The term "technology" in the present note refers broadly to those innovative and technological solutions, products, equipment, services or systems, both hardware and software, whose primary purpose is to maintain or improve an individual's functioning or capabilities in order to facilitate participation and enhance overall well-being. The discussions will cover assistive technologies,[1] which are used by many individuals with disabilities, as well as mainstream technologies, including emerging technological advances, which can have a significant impact on the advancement of the rights of persons with disabilities.

II. International normative frameworks

3. The commitment of the United Nations to the advancement of the rights of persons with disabilities in society and development is deeply rooted in its Charter and its efforts to promote economic and social progress and human rights for all. The current global normative framework, consisting of international human rights treaties and development instruments, provides comprehensive guidance on addressing issues concerning the advancement of the rights of persons with disabilities in the context of innovation and technology.

4. The Convention on the Rights of Persons with Disabilities, which entered into force in 2008, is a legally binding international instrument that establishes the obligations of States parties to advance the rights of persons with disabilities. Although the Convention does not create any new human rights for persons with disabilities, it clarifies the obligations of States to respect and ensure the equal enjoyment of all human rights – civil, political, cultural, social and economic – and fundamental freedoms by all persons with disabilities. The Convention identifies areas where adaptations have to be made so that persons with disabilities can exercise their rights, and other areas where the protection of those rights must be reinforced by States because those rights have been routinely violated. The Convention applies universal human rights standards to those with disabilities and provides the basis for a coherent framework for action.

5. Many articles of the Convention have important policy implications for the issue to be covered by the round table, namely, the advancement of disability rights in the

[1] There is no universally accepted definition of assistive technologies. The International Organization for Standardization defines assistive products as "any product (including devices, equipment, instruments and software) … especially produced or generally available, used by or for persons with disabilities" (ISO 9999:2016, Assistive products for persons with disability).

context of innovation and technology. For example, article 4 (general obligations) requires States to "take all appropriate measures to eliminate discrimination"; to "undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communications technologies, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost"; and to "provide accessible information to persons with disabilities about mobility aids, devices and assistive technologies, including new technologies, as well as other forms of assistance, support services and facilities". Article 9 (accessibility) requires States to "take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas". States should take measures to "promote access for persons with disabilities to new information and communications technologies and systems, including the Internet" and to "promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost". Article 20 (personal mobility), article 21 (freedom of expression and opinion, and access to information), article 24 (education), article 26 (habilitation and rehabilitation) and article 29 (participation in political and public life) pinpointed some areas where States have specific obligations and responsibilities to take measures to promote, facilitate or provide directly technological products and services as well as information that are accessible to persons with disabilities, and in this way to give effect to the rights enshrined in the Convention. Lastly, article 32 (international cooperation) requires States parties to undertake measures such as "facilitating cooperation in research and access to scientific and technical knowledge" and "providing, as appropriate, technical and economic assistance, including by facilitating access to and sharing of accessible and assistive technologies, and through the transfer of technologies".

6. The Committee on the Rights of Persons with Disabilities, in its general comment No. 2 (2014) on accessibility, addresses the importance of information and communications technology (ICT) and its ability to open up a wide range of services at affordable prices, transform existing services and create greater demand for wider access to information so as to promote social inclusion, particularly for persons with disabilities. Paragraph 9 of the general comment makes reference to the Declaration of Principles adopted by the World Summit on the Information Society, paragraph 25 of which states: "the sharing and strengthening of global knowledge for development can be enhanced by removing barriers to equitable access to information for economic, social, political, health, cultural, educational and scientific activities and by facilitating access to public domain information, including by universal design and the use of assistive technologies".

7. The 2030 Agenda and the 17 Sustainable Development Goals, which pledge to leave no one behind, call for a holistic approach to achieving sustainable development for all. The 2030 Agenda emphasizes the responsibilities of States to protect and promote human rights for all, without distinction of any kind, including disability. The 2030 Agenda recognizes persons with disabilities as one of the groups that is more vulnerable than others and calls for their empowerment. The Agenda explicitly references disability in relation to Goal 4 (providing inclusive and equitable quality education at all levels, eliminating gender disparities in education and ensuring equal access to all levels of education and vocational training, and building and upgrading education facilities that are child-, disability- and gender-sensitive and provide safe, non-violent, inclusive and effective learning environments for all), Goal 8 (promoting full employment and decent work for all), Goal 10 (reducing inequality by

empowering and promoting the social, economic and political inclusion of all, irrespective of disability or other status), Goal 11 (providing access to housing, basic services, transportation and public spaces) and Goal 17 (enhancing capacity-building support to developing countries to increase significantly the availability of high-quality, timely and reliable data disaggregated by disability and other characteristics). Although the word "disability" is not cited explicitly in all the Goals, the implementation of the 2030 Agenda holds a promise for all persons with disabilities everywhere, as the Agenda promotes an inclusive approach to development, including with regard to innovation and technology, and pledges to leave no one behind. In relation to innovation and technology, target 9.b of Goal 9 is to support domestic technology development, research and innovation in developing countries, and target 17.6 of Goal 17 is to enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation.

8. In recent years, special emphasis has been placed on rapidly emerging digital technologies and their impact on human rights and the achievement of the Sustainable Development Goals with regard to persons with disabilities, including in the context of the recovery from and response to the COVID-19 pandemic. For example, the General Assembly, the Economic and Social Council and the Human Rights Council have all adopted resolutions urging States to take action to close digital divides and promote digital inclusion, by taking into account national and regional contexts and addressing the challenges associated with access, affordability, digital literacy and digital skills, and by ensuring that the benefits of new technologies are available to all, taking into account the needs of those living in rural areas and those who are vulnerable or in vulnerable situations. In its resolution 75/316, the General Assembly emphasized the quality of that access and acknowledged that speed, stability, affordability, language, local content and accessibility for persons with disabilities are core elements, and urged States and other stakeholders to strengthen the role that rapid technological change can play in mitigating the negative impacts of the pandemic on the achievement of the Goals. The Assembly also called for better coordination and coherence among existing mechanisms, including the Secretary-General's Envoy on Technology, in providing support to Member States in the field of rapid technological change. In its resolution 74/229, the Assembly underscored that rapid technological change brings enormous opportunities to accelerate progress towards the Goals but also poses new challenges, including perpetuating divides within and between countries. In 2021, the Commission for Social Development deliberated on the priority theme "Socially just transition towards sustainable development: the role of digital technologies on social development and well-being of all", resulting in the adoption of a landmark resolution on the issue by the Economic and Social Council, in which special attention is focused on persons with disabilities.[2]

9. The Human Rights Council, in its resolution 47/23, recognized both the great potential of and the risks posed by new and emerging digital technologies for the promotion and protection of human rights and fundamental freedoms. The Council also recognized that assistive technologies can contribute to the full enjoyment of human rights by persons with disabilities and noted that these technologies should be designed in consultation with them and with appropriate safeguards to protect their rights. The Guiding Principles on Business and Human Rights, endorsed by the Council in resolution 17/4, provide practical guidelines for business enterprises, including technology companies, working with Governments for the protection and advancement of the rights of persons with disabilities in the context of new and emerging technologies and human rights diligence processes. For example, guiding principle 12 calls on business enterprises to respect the human rights of persons with

[2] Economic and Social Council resolution 2021/10.

disabilities and makes reference to the internationally recognized human rights instruments concerning the rights of persons with disabilities.

10. There are also a number of international technical standards, notably those adopted by the International Organization for Standardization (ISO), which provide guidance to industry with regard to accessibility and usability of technologies. ISO 9999:2016 focuses on assistive products, taking into account physical and virtual environments, as well as relevant technologies and services. In addition, the 2013 Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled, which forms part of the international copyright treaties administered by the World Intellectual Property Organization, facilitates the production and international transfer of books specially adapted for people who are blind or partially sighted by establishing a set of limitations and exceptions to traditional copyright.

11. In 2018, the World Health Assembly adopted a resolution on improving access to assistive technology, in which it urged Member States to improve access to such technology within universal health and/or social services coverage; to ensure adequate and trained human resources for the provision and maintenance of assistive products; to develop a national list of priority assistive products that are affordable; to invest in research and development; and to encourage collaboration for the manufacturing, procurement and supply of priority assistive products. The Assembly also requested the Director General of the World Health Organization to prepare a global report on effective access to assistive technology.

12. In response to the challenges brought about by the pandemic, the Secretary-General issued a policy brief highlighting the impact of COVID-19 on persons with disabilities and setting out recommendations for making the response and recovery disability-inclusive and accessible.[3]

III. Overview of the current situation, gaps and challenges

13. Typically, innovative and technological advances, by improving efficiency or efficacy, have the potential to strengthen human capabilities and opportunities and hence change the ways in which people learn, live, work and play. The discussion portion of the present note will focus on the interaction between technology and persons with disabilities and how they experience technology; the challenges and how to overcome them; and what States parties and other stakeholders can do to make the best of technology in order to advance disability rights and build a better society that is more disability-inclusive and participatory.

14. According to a recent report by the World Intellectual Property Organization, over 1 billion people currently need assistive technology, and this figure is expected to double in the next decade as the world's population ages.[4] Historically, persons with disabilities have been a major target user group for the development of assistive technology.

15. There are over 40,000 types of assistive technology products and devices on the market currently, covering a wide range of needs of people with various disabilities and functional limitations. Some of the most common types of assistive technology include: wheelchairs, crutches, prostheses and orthoses for persons with mobility impairments or functional limitations; white canes, magnifiers, talking books and screen readers for persons who are blind or partially sighted; hearing aids,

[3] United Nations, "Policy brief: A disability-inclusive response to COVID-19" (May 2020).

[4] World Intellectual Property Organization, *WIPO Technology Trends 2021: Assistive technology* (Geneva, 2021).

amplification aids and cochlear implants for those who are deaf, hard of hearing or sign language users; speech synthesizers and communication boards for those with speech impairments; video communications technologies for people using sign language; and day calendars with symbol pictures for people with cognitive disabilities.

16. Over the past four decades, the use of assistive technologies has increased greatly. A study conducted in the United States of America showed that the use of assistive technology products since the 1980s has increased at a pace greater than that predicted based on population growth and changes in the demographic composition of the country.[5] The evidence shows that well-designed assistive technology devices and products are powerful tools for increasing the independence of persons with disabilities and their ability to participate fully in society and carry out a wide variety of activities at home, work and school and in their communities. For example, a study conducted in Nigeria showed that people who were deaf, hard of hearing or sign language users improved their hearing functions and participation by using assistive technology devices;[6] another study suggested that in Uganda, people with mobility limitations benefited from using assistive technology, especially for their education and employment.[7] In a 2004 survey conducted in the United States, a third of respondents reported that without assistive technology devices, they would not be able to take care of their daily lives at home, a quarter said that they would not be able to leave home, a sixth said that they would not be able to attend social gatherings, and a sixth said that they would not be able to be involved in hobbies or other interesting activities.[8]

17. Furthermore, studies have found that the use of assistive technology has also contributed greatly to the independence of individuals with disabilities, with clear spillover benefits for their families and associates, who would otherwise need to spend more time providing personal assistance and care services and support. For instance, in a survey conducted in the United Kingdom of Great Britain and Northern Ireland, persons with disabilities resulting from brain injuries reported that assistive technologies, such as personal digital assistants and even simple assistive devices such as wall charts, helped them to live a decent life on a daily basis.[9] According to other studies, the use of assistive technologies may also substitute or supplement support services, possibly reducing care costs,[10] which has socioeconomic implications for public policymakers.

18. The rapid and widespread adoption of digital technologies, in particular ICT and other technological breakthroughs powered by digitalization, computerization and better Internet connection, has significantly changed our world. These technologies and advances, such as faster and more stable broadband Internet connection, have benefited the general population and brought unprecedented opportunities for business and society at large. ICT development is also expanding in low- and middle-income countries. However, this should not disguise the fact that the digital divide is

[5] Institute of Medicine, *The future of disability in America* (Washington, D.C., National Academies Press, 2007).

[6] B.O. Olusanya, “Classification of childhood hearing impairment: implications for rehabilitation in developing countries”. *Disability and Rehabilitation*, vol. 26, issue 20 (2004).

[7] P.C. Hunt and others, “Demographic and socioeconomic factors associated with disparity in wheelchair customizability among people with traumatic spinal cord injury”, *Archives of Physical Medicine and Rehabilitation*, vol. 85, issue 11 (November 2004).

[8] National Organization on Disability, 2004 Harris Survey of American with Disabilities.

[9] J.J. Evans and others, “Who makes good use of memory aids? Results of a survey of people with acquired brain injury”. *Journal of the International Neuropsychological Society*, vol. 9 (September 2003).

[10] J. Persson and others, “Costs and effects of prescribing walkers” (Center for Technology Assessment, 2007).

still very wide, in particular for women and girls with disabilities, persons living in rural areas and those who are vulnerable or in vulnerable situations, who benefit the least from connectivity, ICT innovations and the digital transformation.

19. Persons with disabilities who have access to mainstream technologies benefit in many ways across all ages. Assistive technology for children can help students with disabilities to access education, participate more fully with their peers, and meet their learning goals. Technology has enabled persons who are blind or partially-sighted, deaf, hard of hearing or sign language users, or who have speech and cognitive disabilities to communicate more easily and effectively than before, through computers, mobile devices or platforms; has increased opportunities for better-paying jobs or income generation for many wheelchair users and persons who are blind, who might otherwise be restricted to manual and service jobs in their areas; and has created new potential for remote work and entrepreneurship opportunities. A 2019 study found that 36 per cent of Kenyans who are blind or partially sighted consider that their mobile phone has helped them "a lot" to access education, a figure that rises to 71 per cent for those owning a smartphone, as this device gives them access to many assistive technologies that are essential for studying, such as screen readers.[11] Specialized digital assistive technologies, such as screen readers and voice recognition software, support people who are blind, deafblind or who have manual dexterity issues to read and write more quickly and easily, while remote control devices allow people with mobility difficulties to perform tasks in a more user-friendly manner, both at home and in the workplace.[12] Technologies such as video communication, remote sign language interpretation, subtitling on television, web-streaming and social media streaming can vastly improve the accessibility of information. These examples amply illustrate the potential of technology to enhance personal capacities and improve opportunities for education, employment and income generation, as well as cultural, civic and political participation and full inclusion in societal life.

20. While such technological advances have brought opportunities, there are also challenges. Big gaps exist, mainly in terms of limited access to technologies, connectivity, infrastructure, maintenance and repair, and services by all persons who need them but do not have access to them or cannot afford them, and the lack of accessibility within technologies themselves, embodied in both physical and virtual environments and contexts. This has significant human rights and development implications for affected persons, the majority of whom live in the global South.

21. Despite the demonstrated benefits of technologies, there are huge gaps in access to assistive technology and ICT products and services. According to the World Health Organization, currently only one in ten people in the world have access to assistive technology products and services.[13] Globally, there is a huge unmet assistive technology needs gap, including about 200 million people requiring assistive products for low vision; 75 million in need of a wheelchair; and over 400 million in need of assistive products for hearing, such as hearing aids. Studies have shown that persons with disabilities living in rural areas and those who are vulnerable or in vulnerable situations face greater barriers to accessing technological infrastructure, including electricity, ICT products and high-quality, stable computer, Internet and mobile phone

[11] GSMA, "Understanding the mobile disability gap: Insights on mobile phone access and usage by persons with disabilities in Kenya and Bangladesh" (December 2019).

[12] K. Miesenberger and others, "Computers helping people with special needs", 13th International Conference on Computers Helping People with Special Needs (Linz, July 2012).

[13] World Health Organization, "Assistive technology", available at www.who.int/health-topics/assistive-technology#tab=tab_2.

services.[14] In 2016, fixed-broadband penetration in developing countries and least developed countries, where 80 per cent of persons with disabilities live, stood at just 8.7 per cent and 0.9 per cent, respectively, compared with 30 per cent in developed countries.[15] A large international survey found that persons with disabilities have lower levels of mobile phone ownership than persons without disabilities in all the countries surveyed.[16] Bangladesh has the widest gap, with persons with disabilities 55 per cent less likely to own a mobile phone than persons without disabilities; the smallest gaps are in Kenya and Pakistan, at 11 per cent.

22. Lack of accessibility within technology, including in related products, systems and services, has been a chronic issue. Many products and systems, ranging from televisions and telephones to the Internet, have been criticized for their shortcomings with respect to accessibility. This is reflected in different aspects. One is their incompatibility with personal assistive devices, such as hearing aids or screen readers, which discourages or even prevents those with sensory disabilities from using and enjoying technology to access information and do things in their work or daily life. The inaccessibility of information, including in ICT technologies, is also embodied in other aspects, such as television programmes without closed captions, audio description or sign language interpretation, which limits access to the information or services by persons who are deaf, hard of hearing, sign language users, blind or partially sighted. An analysis of national government website portals revealed that progress in improving website accessibility has been slow: in 2018, of 193 countries, 61 per cent of government websites were still not accessible, compared with 63 per cent in 2012.[17]

23. The gap in accessing technologies and the lack of accessibility itself, worsened by the barriers created by physical and virtual environments, further impair the rights of persons with disabilities to receive an education, work, access health care and rehabilitation services, and participate in social, cultural, recreational, civic and political life.

24. In recent years, the pace of digital technological advances has accelerated, with many emerging frontier technological breakthroughs in areas such as artificial intelligence, human-computer interfaces, robotics, automation, advances in connectivity and computing, additive manufacturing and new materials. In terms of technology, the potential to embrace innovative ways of living for persons with disabilities seems to be on the increase.

25. During the COVID-19 pandemic, there was a notable shift in how people and communities used technological means. Technological solutions such as e-learning, remote work, telehealth, contactless shopping, e-commerce and e-government services quickly emerged and became default choices for billions of people across the world in ubiquitous lockdowns. Thanks to such technologies, many people continued to engage in educational, social and economic activities, including in businesses, despite sudden disruptions due to the pandemic. Educational technology solutions have certainly become more mainstream due to the pandemic. However, while over 90 per cent of countries offered some form of distance learning during the pandemic,[18] only 18 per cent of parents of children with disabilities said that radio and television learning resources were accessible to children with disabilities, while 29 per cent said

[14] See the report of the Secretary-General on accessibility and the status of the Convention on the Rights of Persons with Disabilities and the Optional Protocol (A/74/146).

[15] Department of Economic and Social Affairs, “Unlocking the potential of knowledge and technology for all” (April 2018).

[16] GSMA, “The Mobile Disability Gap Report 2021” (December 2021).

[17] United Nations e-Government surveys, 2012 and 2018.

[18] United Nation Children’s Fund, “COVID-19: Are children able to continue learning during school closures? A global analysis of the potential reach of remote learning policies” (August 2020).

that computers were accessible and useful.[19] As States start preparing for COVID-19 to shift from pandemic to endemic, it appears that at least some of the above-mentioned changes are here to stay. It also appears likely that the pace of this new wave of digital technological innovations and advances will accelerate. All this could further change people's capabilities and ways to learn, work, socialize and live, which would have an impact on everyone, including the millions of persons with disabilities.

26. A recent study suggested that there is a need to catch up with the rapid pace of mainstream technological development when designing and developing assistive technology products and solutions.[20] Research into new assistive technology-related patents also appears to lie in high-end and, as a result, high-cost solutions, which could exacerbate existing inequalities in accessing assistive technology products.[21] Given that technologies are rapidly changing our world, there are also many emerging opportunities to harness rapid technological changes to advance disability rights and inclusive and sustainable development for all.

27. For example, in the field of employment, there are many digital tools that enable persons with disabilities to gain direct access to employment and other income-generation opportunities through online means, help them to carry out daily tasks at work, and allow them to work remotely from their homes via online platforms. However, if ICT and assistive technology devices are inaccessibly designed or unaffordable, persons with disabilities risk not being able to access and benefit from such opportunities, putting them once again at great risk of being left further behind. Many persons with disabilities also face challenges in terms of reskilling, upskilling and acquiring new technological skills and knowledge in order to find or keep jobs or capitalize on new business opportunities using required technologies that are often undergoing rapid changes. Therefore, it is important for Governments, employers and persons with disabilities to work together to promote digital employment and other emerging opportunities, such as the gig economy and e-commerce, and ensure that they are inclusive of persons with disabilities and that technologies used in workplaces and businesses are universally designed and accessible to persons with disabilities.[22]

28. From the point of view of advancing disability rights, these new developments and trends in emerging digital and other technologies could have important human rights implications and may also have a significant impact on persons with disabilities in terms of their enjoyment of human rights and general well-being.

29. There is a need to make a strong case for disability rights. First and foremost, it is important to underscore that promotion of accessibility and access to assistive technologies by persons with disabilities is a human right imperative in line with the Convention. In this regard, States parties must uphold the principles established in the Convention, including non-discrimination; accessibility; full and effective participation and inclusion in society, including of those living in rural areas and those who are vulnerable or in vulnerable situations; equality of opportunity; and respect for inherent dignity, individual autonomy and independence of persons. Under the Convention, States parties commit to taking active measures to deliver on their obligations, such as undertaking or promoting research and development of technological products and systems, and promoting the availability and use of new technologies, including ICT, mobility aids, devices and assistive technologies, that

[19] World Bank, "Pivoting to Inclusion: Leveraging Lessons from the COVID-19 Crisis for Learners with Disabilities" (2020).

[20] S. Abdi and others, "Emerging technologies and their potential for generating new assistive technologies", *Assistive Technology*, vol. 33 (2021).

[21] Ibid.

[22] International Labour Organization, *An inclusive digital economy for people with disabilities* (2021).

are suitable for persons with disabilities, giving priority to technologies at an affordable cost (article 4); States parties also commit to undertaking and promoting international cooperation (article 32).

30. There are many things that Governments can do and public policies that can make a difference. For example, policies and measures can be taken to increase the availability of affordable, high-quality assistive technology products and to reduce assistive technology costs, such as facilitating the improvement of economies of scale through centralized large-scale collective purchasing at the regional or local level. The mass production of assistive technologies, if they are properly designed following inclusive and universal design principles and marketed widely, could also help to lower production costs and eventually the retail price.[23] Providing duty-free exemptions and lowering tariffs and taxes for the import of certain technologies, as done by Viet Nam[24] and Nepal,[25] has proved effective in providing affordable assistive technologies to end users with disabilities. Government policies should support the creation of opportunities for innovation of suitable accessible technology capable of addressing specific disability needs.

31. Governments can help persons with disabilities, in particular those facing hardship, to cover the cost of assistive technologies by expanding social protection, implementing universal health insurance or providing direct social assistance to those who need such technologies. For instance, in recent years, Viet Nam has significantly increased social health insurance to cover assistive technology needs for eligible persons with disabilities living in poverty, with coverage rising from 34 per cent in 2001 to 98 per cent in 2016. Increasingly, countries are taking initiatives to help persons with disabilities to meet their assistive technology needs. A number of countries provide automatic or conditional subsidies to persons with disabilities to increase their access to assistive technology, including the Philippines (PhilHealth programme),[26] Georgia (Programme for Social Rehabilitation and Childcare),[27] Kenya (National Development Fund for Persons with Disabilities)[28] and India (Assistance to Disabled Persons for Purchase/Fitting of Aids and Appliances).[29]

32. There is a prime opportunity that must not be missed to promote universal design and ensure accessibility in the development of new technologies. Many emerging technologies are enabled by artificial intelligence and sensors, which means they can be taught and adapted to meet users' needs, which could result in more optimal assistive technology product outcomes and user experiences, which in turn could potentially improve their adoption by end users and market acceptance. This would be a win-win for both business and end users with disabilities. The good news is that many emerging technologies are still in the initial development stages and technology developers need and appreciate the inputs of target users, including persons with disabilities, in the design and development of technological solutions. Accessible and disability-friendly technologies often have spillover effects that

[23] S. Bauer and J. Lane, "Convergence of assistive devices and mainstream products: Keys to university participation in research, development and commercialization", *Technology and Disability*, vol. 18 (July 2006).

[24] Viet Nam, Law on persons with disabilities (2010).

[25] Economic and Social Commission for Asia and the Pacific, *Production and distribution of assistive devices for persons with disabilities* (1997), part 1, chapter 5, and part 2, chapter 9.

[26] C. Luci-Atienza, "DSWD allots P11.1 M for assistive devices for PWDs, seniors in 2021 budget", *Manila Bulletin* (September 2020).

[27] Europe Foundation, "Making the most of public resources for full inclusion and participation of people with disabilities in Georgia" (March 2019).

[28] National Development Fund for Persons with Disabilities, "Brief on the Fund's word". Available at nfdk.or.ke/pwds-act/programs/brief/.

[29] Ministry of Statistics and Programme Implementation of India, "Persons with disabilities in India: National Sample Survey 76th round July–December 2018" (2019).

benefit many other population groups, including older persons and persons with specific functional limitations or conditions, such as patients with injuries or women in pregnancy.[30]

33. Effective participation and inclusion of persons with disabilities as a core human right is enshrined in the Convention and must be applied in the new wave of frontier digital technological progress. Learning from lessons from previous decades, we know that one of the keys to the success of accessible assistive technology development is the full and effective participation and inclusion of persons with disabilities as early as possible in the initial phases of technological development. Persons with disabilities have first-hand, lived experience, know how to manage their lives and surrounding environments, and are best placed to know their own needs and aspirations, all of which are valuable contributions to the design and development of new assistive technology products and services.

34. Progress towards disability inclusion and mainstreaming has not been easy in many fields, from human rights to development and peace and security. Existing gaps and challenges in technological advancements can be better addressed by fostering and enhancing an approach with the collaboration and partnership of all stakeholders and with the support of international cooperation, to make assistive technology and other technologies accessible, available and more affordable to persons with disabilities everywhere. Partnerships among research institutions, business, organizations of persons with disabilities and local manufacturers of assistive devices, such as wheelchairs, can not only reduce costs, but also ensure that such products better respond to the needs of end users and are tailored to local requirements, such as terrain or weather.[31]

IV. Way forward: further advancing disability rights in innovation and technology

35. The previous sections reviewed the applicable international normative frameworks and provided an overview of the current situation concerning persons with disabilities in the context of innovation and technology. Available evidence strongly suggests that innovation and technology could have great power and potential to influence and impact people and societies. Technological advances themselves do not necessarily lead to extreme forms of technology divide; rather, policy and institutions play a decisive role in determining the ultimate direction of technological innovation. For persons with disabilities, technologies can be great equalizers and enablers, so long as they are inclusively designed, accessible and available to those who need them.

36. Over the past decades, assistive technology products and services – both high-tech and low-tech – have removed environmental barriers and opened up new opportunities for persons with disabilities to learn, work, play, socialize and pursue a fulfilling life at home and in their communities. The lives of millions of people who have access to such enabling technologies have been transformed.

37. The challenge before the international community is to build on that success and to advance the rights of all persons with disabilities everywhere, by filling in the existing gaps: the lack of accessible and appropriate technologies and services, and the need to make technologies available to all those with disabilities, including in

[30] United Nations, *Disability and Development Report: Realizing the Sustainable Development Goals by, for and with persons with disabilities* (2018).

[31] J. Lane, “Delivering on the D in R&D: Recommendations for increasing transfer outcomes from development projects”. Assistive Technology: Outcomes and Benefits (2008).

low- and medium-income countries. Certain preconditions need to be in place to allow for effective use of ICT and assistive technology, including infrastructure, technological competence, universal design and adequate support services.[32]

38. Throughout history, persons with disabilities have often been left behind in society. Technological divides, such as the digital gap, have been a chronic issue that is embodied in both the lack of accessibility of and access to technologies. The current wave of technological innovations presents potential opportunities as well as challenges that must be tackled carefully. The rapid pace of technological change brings enormous opportunities to accelerate progress towards achieving the Sustainable Development Goals, but also poses new challenges, including perpetuating divides within and between countries.

39. The global experience of COVID-19 is a wake-up call, reminding the world how important and urgent it is to advance the disability rights in innovation and technology, as Member States are speeding up their efforts to win the fight against the pandemic, recover and build back better economies and societies. The core principles enshrined in the Convention must be upheld in innovation and technological development on our way forward to build inclusive and participatory societies. We must make sure that we do not leave persons with disabilities further behind.

40. In this regard, Governments have an obligation to advance disability rights, in line with the Convention, by taking all appropriate measures to promote research and development of universally designed goods, services, equipment and facilities, and to promote the availability and use of new technologies, including ICT, mobility aids, devices and assistive technologies. Public policies matter and they can make a difference. Policy interventions need to be directed to address the lack of accessibility, affordability and availability of technological products, devices and services, as well as capacity gaps of technology stakeholders, including persons with disabilities and policymakers in line ministries.

41. Actions in the following areas, accompanied by a government-wide approach and partnerships with relevant stakeholders, could promote and facilitate disability-inclusive and accessible technological development and advance the rights of persons with disabilities with respect to innovation and technology in society and development:

- Technology and innovation policies, as an integral part of national innovation strategies or systems, to direct technological changes towards socially inclusive and sustainable outcomes (including through increased support to solutions that adopt systems interoperability and rely on the concepts of open access, open source software and open standards)
- National accessibility standards to guide technological innovation and development in industry sectors
- Accessibility laws and policies and robust enforcement to regulate and encourage sector players to promote universal design and accessible technological innovation
- Financing, including through strengthening relevant funding mechanisms and financial and taxation policy measures, to promote and support accessible technology-related research and development, innovation and entrepreneurship
- Development of a list of priority assistive technology products may be considered in the national context

[32] World Bank, “A landscape review of ICT for disability-inclusive education” (2022).

- Public procurement policies and measures to incentivize universally designed and accessible digital and other technological innovations and help them to be more competitive on the markets
- Universal social protection, including social protection floors, or similar programmes such as health insurance, with expanded coverage to cover either partially or fully the cost of certain items contained in the national list of assistive technology products, since disability-related extra costs can be a heavy economic burden on individuals with disabilities and their households, including in developed countries
- Capacity-building and skills upgrading, including specific technology, know-how, expertise and trained personnel[33] needed to develop, produce and supply well-designed and appropriate technologies, including assistive technology products and services, that are more responsive to the needs of end users, local environments and markets in different parts of the world[34]
- Awareness-raising about assistive technology requirements for persons with disabilities among developers, producers, users and other market players, including funders, as well as government officials

42. There is an increased need for multi-stakeholder collaboration and partnership among Governments and technology stakeholders, including researchers, funding bodies and the wider private sector, as well as persons with disabilities, their families, and professionals working with and supporting persons with disabilities as technology users. Such a collaborative approach will help to make assistive technology products and services not only more accessible, but also more available to all those persons with disabilities who need and can benefit from them.

43. Lastly, international cooperation needs to be explored further in support of national efforts for the advancement of the rights of all persons with disabilities. Under article 32 of the Convention, States parties commit to taking measures to promote international cooperation, including facilitating cooperation in research and access to scientific and technical knowledge, and providing technical and economic assistance, including facilitating access to and sharing of accessible and assistive technologies, and technology transfer. As the international community enters a critical moment in the fight against COVID-19, global cooperation is needed more urgently than ever. As noted by the Secretary-General, the pandemic can be defeated in 2022, but only if vaccines, tests and treatments are made available to all people.

V. Questions for consideration

44. The following guiding questions may be used for the round-table discussion:

(a) What are the obstacles that impede the removal of major barriers that prevent persons with disabilities, including those living in rural areas and those who are vulnerable or in vulnerable situations, from enjoying their human rights in the context of innovation and technology?

(b) What are some examples of public policy tools that have proved effective in promoting and supporting technological innovations that are accessible and cost-effective for persons with disabilities? How can such policies be further strengthened?

[33] World Health Organization, “WHO global disability action plan 2014–2021” (2015).

[34] L. de Witte and others, “Assistive technology provision: towards an international framework for assuring availability and accessibility of affordable high-quality assistive technology”, *Disability and Rehabilitation*, vol. 13 (2018).

(c) What are some examples of good practices with respect to the inclusion and participation of persons with disabilities in the development of innovative design and technologies?

(d) How can States parties fulfil their obligation to ensure that assistive technologies are available to all persons with disabilities who require them, including through their partnerships with the technology sector, business and persons with disabilities?

(e) What can be done to ensure that persons with disabilities, including those living in rural areas and those who are vulnerable or in vulnerable situations, have access to information about available assistive technology?

(f) Article 32 of the Convention calls for international cooperation; can more progress be made in this area to better support the capacities of States Parties and stakeholders in order to fully harness the potential of innovation and technology to advance the rights of all persons with disabilities everywhere?