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Promotion and protection of all human rights, civil political, economic, social and cultural rights, including the right to development

Question of the realization of economic, social and cultural rights in all countries: the role of new technologies for the realization of economic, social and cultural rights

Report of the Secretary-General*

Summary

The present report is submitted pursuant to Human Rights Council resolution 40/12, in which the Council requested the Secretary-General to prepare an annual report on the question of the realization in all countries of economic, social and cultural rights, with a special focus on the role of new technologies for the realization of economic, social and cultural rights.

In the report, the Secretary-General identifies the opportunities and potential held by new technologies for the realization of economic, social and cultural rights and other related human rights, and for the human rights-based implementation of the 2030 Agenda for Sustainable Development. He also identifies risks associated with technological changes in exacerbating gaps and inequalities, and highlights particular challenges that they pose for the realization of economic, social and cultural rights. He considers the value of the normative framework of human rights in terms of providing guidance for States and other stakeholders in harnessing new technologies and mitigating risks in a more effective and inclusive manner. The report concludes with recommendations for related action by Member States, private companies and other stakeholders.

* The document was submitted late to the conference services without the explanation required under paragraph 8 of General Assembly resolution 53/208 B.

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I. Introduction

1. New technologies, including digital technologies, have enormous potential and profound implications for the realization of economic, social and cultural rights, as well as all other human rights, and for the transformative changes envisioned by the world leaders in the 2030 Agenda for Sustainable Development.[1] New technologies can rapidly expand the quality of and access to many essential services and products for the realization of economic, social and cultural rights. At the same time, they involve significant risks in potentially exacerbating existing gaps and inequalities and creating new ones. Furthermore, the benefits of new technologies are not currently distributed equally across and within countries. Some digital technologies often have unanticipated adverse consequences. Digital divides and technology gaps exist between and within countries, between men and women, between generations and across social groups. Many of these gaps correspond to differences in infrastructure, access and capacities, as well as to deeply entrenched discrimination and inequalities.

2. There is a significant risk that new technologies could further exacerbate and entrench existing inequality and patterns of discrimination, leaving those who do not have access to technologies even further behind. The people most heavily affected by these risks are likely to be at the margins of society. As stated by the Secretary-General's independent High-level Panel on Digital Cooperation, in its 2019 report, "[a]s any new technology is developed, we should ask how it might inadvertently create new ways of violating rights – especially of people who are already often marginalized or discriminated against".[2]

3. The focus of the present report, submitted pursuant to Human Rights Council resolution 40/12, is the role of new technologies for the realization of economic, social and cultural rights. In the report, the Secretary-General highlights the value of a human rights-based approach to harnessing the potential of new technologies while addressing potential risks, an approach that views people as individual holders of rights, empowers them and promotes a legal and institutional environment to enforce their rights and to seek redress for any human rights violations and abuses. The report concludes with recommendations to States and other stakeholders to guide them towards ensuring better human rights outcomes when designing, developing and deploying new technologies.

II. Impact of new technologies on key economic, social and cultural rights

4. With its central commitment to leave no one behind, the 2030 Agenda has given important political impetus to the realization of economic, social and cultural rights and efforts to address inequality. If harnessed and distributed equitably, new technologies could greatly facilitate the realization of economic, social and cultural rights, and help ensure that their key elements of availability, affordability, accessibility and quality are achieved.

5. New technologies open opportunities for "leapfrogging" – bypassing intermediate stages of technology through which countries have historically passed during the

[1] There is no universally agreed definition of "new technologies", which are often interchangeably referred to as "frontier technologies" or "emerging technologies". The Organization for Economic Cooperation and Development (OECD) has mapped some of the most commonly identified new technologies into four quadrants that represent broad technological areas: digital technologies (such as artificial intelligence, big data analytics, the Internet of things, robotics and blockchain); biotechnologies (such as stem cell technology and health monitoring technology); advanced materials (such as nanomaterials); and energy and environment (such as drones, microsatellites, electric vehicles and biofuels) (see OECD, *OECD Science, Technology and Innovation Outlook 2016* (Paris, 2016)). Given the multitude of new technologies, the present report focuses on a selective set of digital and other new technologies that have significant relevance to economic, social and cultural rights.

[2] High-level Panel on Digital Cooperation, "The age of digital interdependence: report of the UN Secretary-General's High-level Panel on Digital Cooperation", June 2019, p. 17.

development process – which can accelerate the pace of the progressive realization of economic, social and cultural rights. For example, the availability of cheaper mobile communication technologies has enabled some developing countries, notably in Africa, to skip the development of analogue landline infrastructure and move directly to digital mobile telecommunications, enabling people living in rural areas to access a range of information and services.[3]

6. New technologies can also support States' efforts to promote the right to participation and access to information and to improve the efficiency and effectiveness of public decision-making, with a view to maximizing the use of available resources for the realization of economic, social and cultural rights. For example, during a typhoid outbreak in Uganda in 2015, the Ministry of Health used data visualization and interactive mapping techniques to support the early response to the disease outbreak. By providing the ability to explore real-time data at multiple levels of detail, authorities were able to plan resource allocation effectively, including for medical supplies, medical personnel and training.[4] In short, these technologies hold great potential for advancing the collective good of humanity.

7. At the same time, new technologies also pose significant risks, including with respect to the protection of human rights, that are often unintended by-products of scientific and technological advancement. Algorithms often reflect and reproduce existing biases. Social media can easily be misused to spread hatred. The collection and processing of a large amount of personal data without due consideration for the right to privacy has significant implications for the enjoyment of rights more generally.

8. Given the cross-cutting benefits and risks of new technologies for all human rights as highlighted above, the focus of the following sections is on the potential impact of new technologies on several key economic, social and cultural rights, as well as the potential of digital identification and financial technology for promoting greater inclusion.

A. Right to education

9. Education is both a human right in itself and an indispensable means of realizing other human rights (E/C.12/1999/10, para. 1). Education is key for lifting people out of poverty, empowering women, safeguarding children and protecting the environment. Education and learning are critical in preparing countries and their people for changes resulting from the accelerated development and spread of technological innovations, in order to maximize their benefits while minimizing the potential risks.

10. New technologies have greatly expanded access to education and learning opportunities, making it easier for teachers to create instructional materials and enabling new ways for people to learn and work together. Online education materials and courses, digitized textbooks and e-learning modules are revolutionizing the provision of education, including for those with disabilities. Open online courses provide an alternative path to higher education. At the same time, this transformation is placing new demands on people in terms of the knowledge and skills that they need to acquire throughout their lives.

11. Advancement in new technologies brings challenges in terms of availability and accessibility of the right to education, particularly for poor and the most marginalized people. Access to educational content and opportunities disseminated by digital means requires physical infrastructure and economic means. People living in urban areas generally enjoy better and cheaper access to electricity, broadband Internet connection and economic means to acquire devices such as computers, tablets and smartphones, while those in remote rural areas are often relegated to using relatively outdated technologies.

[3] *Technology and Innovation Report 2018: Harnessing Frontier Technologies for Sustainable Development* (United Nations publication, Sales No. E.18.II.D.3), pp. 84–85.

[4] United Nations, Global Pulse, "Data visualisation and interactive mapping to support response to disease outbreak", Global Pulse Project Series, No. 20, 2015.

12. New technologies also risk exacerbating gender and other disparities. According to the latest estimates, the digital gender gap is rapidly growing in developing countries, especially in the least developed countries.[5] Gender disparities in access to and use of information and communications technology often reflect the discrimination faced by women in society more broadly, and have the effect of further limiting access to technologies and the opportunities presented by them (A/HRC/35/9, para. 17). Similarly, children with disabilities face several barriers in taking advantage of information and communications technology to better access more educational opportunities, as technologies and contents may need to be adapted for their use (A/HRC/32/37, para. 42).

13. Ensuring the quality of the learning experience in online education is another challenge, as the driver of content dissemination can overwhelm the need for learner engagement and interaction. According to the Special Rapporteur on the right to education, qualifications and certificates obtained through open online courses often do not go through adequate assessment processes. Furthermore, as open online courses are often delivered by or in partnership with the private sector, it is incumbent upon Governments to put in place appropriate policies and regulations to fully ensure the acceptability, adaptability and quality of education in line with their obligations (for example, ibid., sections VI and XII).

14. Technology-based education should preferably supplement, rather than replace, a full learning experience based on proven face-to-face teaching and interaction (ibid., para. 58). There is a need to ensure that the overall education system fully respects the right to education and that education itself is directed to the full development of the human personality and the sense of its dignity.[6]

B. Right to food

15. New technologies are having multiple and complex implications for various dimensions of food security and the right to food. For example, biotechnology and genetic engineering, as well as techniques for improving soil fertility, irrigation technologies and targeted use of agrochemicals, can increase the availability of food. Post-harvest and agroprocessing technologies can address food accessibility, and biofortification can improve the nutritional quality of food. At the same time, the potential safety and ethical implications of these new technologies, including synthetic biology, artificial intelligence and tissue engineering, will require close examination from a human rights perspective.[7]

16. Droughts increasingly threaten access to water for food production and exacerbate hunger. However, new technologies offer the means to predict and mitigate the potential adverse effects of drought on food production. In a joint initiative, the United Nations Children's Fund and the European Union supported the Government of Ethiopia in using satellite remote sensing to identify groundwater sources, with information relayed to communities and pastoralists in drought-affected areas, assisting them in digging more accurate boreholes. This has led to a 92-per-cent success rate in drilling new water sources, reducing cost and improving accessibility.[8]

17. Information and communications technology can play an important role in empowering farmers and rural entrepreneurs with access to information about agricultural innovations, weather conditions, financial services and market prices, and connecting them with buyers. Mobile phones also have great potential for empowering smallholders and

[5] International Telecommunication Union, *Measuring Digital Development: Facts and Figures 2019* (Geneva, 2019), pp. 3–4.

[6] International Covenant on Economic, Social and Cultural Rights, art. 13.

[7] United Nations Conference on Trade and Development, *The Role of Science, Technology and Innovation in Ensuring Food Security by 2030* (Geneva, 2017), pp. 21–22.

[8] *Sustainable Development Outlook 2019: Gathering Storms and Silver Linings* (United Nations publication, Sales No. E.20.II.A.1), p. 94.

promoting inclusiveness in the market, enabling them to sell their perishable produce more effectively and negotiate better prices.[9]

18. At the same time, trends towards digitization, the financialization of the food market and the commodification of food, accelerated by technological advancement, are profoundly reshaping food systems and having a significant impact on the right to food. Technology is at the heart of the industrial food system, which focuses on maximizing efficiency in food production at the lowest possible cost and relies heavily on chemical inputs, affecting nutritional quality and public and environmental health (A/71/282, paras. 22–23). As seeds and other plant genetic materials are being digitized and patented by global corporations, risks emerge that access to traditional knowledge and seeds developed in other ways, including by indigenous peoples, may be undermined. Digitization of land registration and land-related data with blockchain technology can bring significant benefits in enhanced transparency, efficiency and security. However, new technologies need to be introduced with care in order to avoid unintended consequences, including easier transformation of land interests into speculative financial assets and risks of dispossession of, in particular, rural communities from long-held land.[10]

C. Right to health

19. New technologies, including digital technologies, play an important role in the realization of the right to health and universal health coverage for all. Information and communications technology can expand the availability and accessibility of quality health services. For example, in Ghana, mobile phone-based health information technology has helped community health workers in rural areas to receive needed advice online and to track information about patients.[11]

20. Artificial intelligence and big data are being used to develop new medicines, provide personalized treatment plans and improve the efficiency of care delivery. When new technologies are designed and implemented in an accountable manner, they offer the potential to transform health services, expand access to preventive, diagnostic and treatment services, provide health education and expand knowledge and research.

21. Despite the potential benefits, new technologies such as digitization in health care are not always necessary or appropriate in all circumstances or for all people. As technologies affect different people in different ways, the design and application of new technologies will need to take into account the particular conditions and needs of the persons concerned and the context in which technology is to be deployed, so as not to undermine applicable rights and infringe upon the persons' dignity.

22. For example, new technologies, including assistive devices, built-in environmental applications and robotics, are gaining traction as cost-effective and efficient solutions to the increased need for individualized support and long-term care for older persons in many of the countries facing the most advanced population ageing. Effectively designed robots could support care delivery in a safer, more responsible way, relieving pressures from overworked care staff. This could contribute considerably to reducing abuse, violence and maltreatment of older persons in care settings. Interactions with robots, such as social companion robots, could potentially be beneficial for the physical and emotional well-being of older persons (A/HRC/36/48, paras. 73 and 82).

23. At the same time, overreliance on technology entails the risks of dehumanizing care practice. Technologies may undermine the autonomy and independence of older persons,

[9] Food and Agriculture Organization of the United Nations, *The Future of Food and Agriculture: Trends and Challenges* (Rome, 2017), p. 54.

[10] See Global Network for the Right to Food and Nutrition, *Right to Food and Nutrition Watch: When Food Becomes Immaterial: Confronting the Digital Age*, September 2018.

[11] See the conference report of the Integrated National Information and Communications Technology for Health and Development Forum, August 2016. Available at http://1millionhealthworkers.org/files/2016/09/ICT_REPORT.pdf.

and create new forms of segregation and neglect, with older persons abandoned in their private homes or deprived of human interactions. Attention must be paid to ensure that technologies designed to assist older persons do not stigmatize them as frail and needy, which would have a disempowering effect on them and perpetuate dependency and indignity. Electronic surveillance and monitoring technologies could result in unwanted supervision that could even take place without an older person's consent or conscious knowledge (ibid., para. 52).

24. The use of big data and artificial intelligence in the health context poses significant risks to patients' right to privacy regarding sensitive health data and other personal information. With the growth of consumer health technologies such as wearable technology and smartphone applications, the creation, processing, exchange and sale of vast amounts of health data have increased worldwide (A/71/368, para. 13). This trend accompanies the increased risk of inadvertent disclosure of sensitive health-related patient data from health-care institutions, but also of unwarranted sharing with third parties. A further concern is the ability of artificial intelligence to infer and predict health conditions that individuals have not voluntarily disclosed, which may result in the denial of health insurance. Policy frameworks for the right to health need to protect the right to privacy and security in the use of digital health technologies such as biometric identification. Suitable regulation is also needed to ensure the quality and safety of software products, devices and applications that not only are used in primary health care, but also may be directly marketed or otherwise available to individuals.[12]

D. Right to an adequate standard of living

25. Over half of the world's population today lives in urban areas, a number expected to rise to 68 per cent by 2050.[13] Cities are often the centre of innovations and new technologies, as they host universities, research institutions and major technology industries. Increasingly, many cities are harnessing the power of new technologies to address the challenges posed by urbanization, to design and manage the complex interactions of energy, transport, water and waste, and to advance the goals of the New Urban Agenda and of Sustainable Development Goal 11 on making cities inclusive, safe, resilient and sustainable.

26. Effective and accountable use of information and communications technology and digital technologies can help urban planners and residents to enhance equitable access to urban services and opportunities. Conscious and targeted efforts and a broader participatory process are necessary to ensure that new technologies support the better realization of economic, social and cultural rights, such as the rights to housing, water and sanitation, for the most disadvantaged people. Without such efforts, there is a risk that efforts related to smart cities may not necessarily be focused on improving the quality of urban life for all and providing better access to quality services, particularly for poor and the disadvantaged people.

27. The wave of recent technological advances, such as the digitization of land and property data, cloud computing and the emergence of digital platforms, are contributing to a process of financialization of housing that is happening at a much faster pace and is deeper in scope than previously. The social and cultural value of housing may also be undermined by technologies enabling private actors to transform housing and real estate markets into financial instruments and a commodity of choice for investment. Digital platforms facilitating short-term rentals have contributed to driving up rent to a level that is no longer affordable for many residents in some locations.[14] Some governmental authorities have

[12] World Health Organization, "Digital technologies: shaping the future of primary health care", 2018, p. 6.

[13] *World Urbanization Prospects: The 2018 Revision* (United Nations publication, Sales No. E.20.II.A.1), p. xix.

[14] Desiree Fields and Dallas Rogers, "Towards a critical housing studies research agenda on platform real estate", *Housing, Theory and Society*, 2019, p. 4.

started to counter these trends by taxing real estate acquisitions by external investors or introducing regulations with stricter controls on short-term rentals, in order to protect access to adequate housing for their residents.[15] However, as technologies and the platform economy evolve at a rapid pace, they have tended to reinforce existing patterns of social and spatial segregation, exclusion and dispossession of housing and land. Regulatory frameworks seeking to counteract such effects remain piecemeal in the absence of a comprehensive approach fully taking human rights into account.

E. Right to work

28. The global wave of technology changes is having a profound impact on the future of jobs, posing both opportunities and challenges for the realization of the right to work, including the right to the enjoyment of just and favourable conditions of work. Automation and new technologies are creating new job opportunities, while eliminating others. Robots and automation can reduce or eliminate hazardous tasks and contribute to the right to safe working conditions. At the same time, many workers who are at risk of losing their jobs to automation and robotization may be forced to accept lower-skilled and lower-paying jobs. The changing nature of jobs requires new skill sets, particularly digital skills: digital technologies are used in all types of jobs, including in sectors previously less associated with such technologies, such as agriculture, health and construction.[16] When it comes to the impact of such technological changes on different age groups, an emerging challenge is the need for adaptation and the retraining and relocation of adults, particularly older persons, affected by technological shifts. Women are also at the risk of losing out in the workplace because of the digital gender gap, in terms of skills, participation in digitization processes and representation in the workforce and corporate leadership (A/HRC/35/9, para. 25).

29. New technologies are also creating a growing diversity of employment forms, including work done outside of an employer's premises, often at home, which may widen access to employment and bring additional benefits in, for example, social and environmental spheres. However, while digital service platforms may create new work opportunities and help stabilize informal work arrangements, many workers in the gig economy face greater precarity in their work situation. Employment arrangements of this sort are often temporary in nature and involve multiple employers, impeding or restricting employees' practical ability to exercise their right to freedom of association, including the right to form and join trade unions, as most workers on online platforms do not know each other and their working patterns and conditions vary greatly.[17]

F. Inclusion through digital technology

30. Many new technological solutions have the potential to enhance the inclusion of marginalized people in development processes, positively affecting various human rights. For example, providing the means for identification is an important way to empower people to participate in social, economic, political and public life. Conversely, not being able to prove one's identity can severely inhibit, and even effectively block, access to essential services, including housing, social security, banking, health care and telecommunications. Lack of proof of identity can lead to people being wrongly deemed not to have any citizenship, thus leading to statelessness. From the perspective of governmental functions, identity systems can be an important tool for Governments to avoid duplication and fraud and facilitate planning and accurate targeting of resources.

[15] For example, in British Colombia, Canada, the Miscellaneous Statutes (Housing Priority Initiatives) Amendment Act (2016) imposed 20-per-cent tax for foreign buyers of residential properties in selected geographic areas.

[16] See European Commission, *ICT for Work: Digital Skills in the Workplace* (Brussels, 2016).

[17] European Agency for Safety and Health at Work, *Protecting Workers in Online Platform Economy: An Overview of Regulatory and Policy Developments in the EU* (Luxembourg, 2017), pp. 15–16.

31. In recent years, many States and international organizations have moved towards adopting comprehensive digital identity systems. Often, new digitized identity systems are accompanied by legal obligations to enrol; in other cases, enrolment is made a requirement for accessing services, including public services, social security and food aid. The World Bank, with its Identification for Development campaign, and other organizations have launched broad programmes to promote access to identity documents, with a strong focus on digital technologies. Such initiatives are often designed as a response to the target 16.9 of the Sustainable Development Goals, under which States have committed to providing legal identity for all, including birth registration.

32. While implementing such systems may help tackle many challenges, it is important to carefully consider their potential and actual impact on the enjoyment of human rights, both positive and negative.

33. One major concern linked to comprehensive digital identification systems is that these systems can themselves be sources of exclusion, contrary to their purpose. Costly or difficult registration requirements, for example, may prevent poor and disadvantaged populations from fully participating in an identity system. Women in some regions face legal or customary barriers to obtaining official identification. A lack of Internet connectivity, needed for online authentication, also can contribute to exclusion. Older persons and members of some occupational groups performing mostly manual labour may have difficulties providing fingerprints that are clear enough for the purposes of the identify systems. Services that require authentication at the point of delivery create problems for older persons or persons with disabilities who may not be able to travel. Difficulties also arise when the name and gender in identity documentation are not properly reflected in the identity system, exposing people with non-binary gender identity to particular risks. Lastly, exclusion can also result from a particular group being given identity documents that are different from those of others.[18]

34. Comprehensive identity systems can also have a significant impact on the right to privacy, which in turn may lead to adverse impacts on a broad range of human rights and sustainable development. Digitized identity systems face great challenges regarding the security of the personal data collected, stored, shared and otherwise processed. Databases with information on millions of people are highly sensitive and attractive targets for attacks by criminal actors. Data breaches of any kind can facilitate identity theft, the consequences of which can be dire for the individuals concerned (A/HRC/39/29, para. 14). If the data collected contains biometric information, which is inseparably linked to a particular person and that person's life, the harms of data breaches can be irreparable.

35. When not properly designed, implemented and run, digitized identity systems tend to collect, analyse, share, merge and otherwise process more data than may be strictly necessary for legitimate system purposes. The accessibility of personal data to a range of government entities (and possibly other actors) may pose certain risks. Integrated identity management systems can facilitate access to personal information across the Government and enable the linking of individual records across disparate data registers, potentially facilitating tracking and monitoring of individuals without sufficient legal justification in violation of the rights to privacy and to freedom of association.

36. The Human Rights Council has called upon States to take appropriate measures to ensure that digital or biometric identity programmes are designed, implemented and operated with appropriate legal and technical safeguards in place and in full compliance with international human rights law (Council resolution 42/15, para. 6 (m)). The World Bank has provided guidance for designing digital identity systems and implementing the required technical, legal and institutional framework, the key principles of which include universal coverage and accessibility, robust and secure design that protects privacy, and

[18] See, for example, Alan Gelb and Anna Diofasi Metz, *Identification Revolution: Can Digital ID Be Harnessed for Development?*, (Washington, D.C., Center for Global Development, 2018, pp. 127–134.

strong governance, including a legal and regulatory framework, clear institutional mandates and accountability and independent oversight.[19]

37. Financial inclusion is another area in which new technological solutions, such as financial technology or fintech, hold great promise for the greater socioeconomic participation of people. The significant reduction in transaction costs and expanded access precipitated by new technologies, including mobile networks, has made financial services affordable and accessible for many that were previously priced out or considered not creditworthy. As highlighted by the High-level Panel on Digital Cooperation in its report, "many more people [have] the ability to save and transact securely without needing cash, insure against risks, borrow to grow their businesses and reach new markets".[20]

38. Upon closer scrutiny, however, new opportunities for digital financial inclusion are also a source of considerable human rights risks. Mobile money has been widely lauded as bringing financial services to marginalized people and remote regions, and lending platforms are credited with bringing instant digital loans to similarly remote users. At the same time, many of the claimed benefits of these technologies have been disputed, as concerns have arisen that highlight the need for consumer protection and oversight, including overindebtedness and abusive contract enforcement.[21]

39. Across the world, new business models enable people with no credit history or physical collateral to demonstrate their creditworthiness, by, for example, allowing lenders to access and model social media profile and phone location data, as well as online transaction and payment histories. These are innovative approaches to modelling credit risk, but as with digital identification, there are important questions to be addressed concerning data privacy, user consent and knowledge regarding the collection and use of data, and the absence of legal and other safeguards.

III. Human rights-based responses to new technologies

40. In order to fully reap the benefits of the technological progress under way while minimizing the potential for harm, the development and deployment of new technologies needs to be rooted in strong human rights foundations.[22] As agreed by States and monitored by national, regional and international mechanisms, international human rights law provides a key guiding framework for societies in shaping their responses to the challenges of an ever-changing technological environment. Human rights law sets out substantive and procedural rights, which, if violated, constitute harms that need to be prevented, mitigated or remedied. It imposes corresponding duties on States to respect, promote and protect human rights, and provides a framework for businesses to fulfil their responsibilities to do likewise.[23]

41. Both Governments and technology companies should ensure that the development and application of new technologies does not pose risks to the enjoyment of human rights. A human rights-based approach entails the application of a number of core principles, including equality and non-discrimination, participation, and accountability, which are also at the heart of the Sustainable Development Goals. In addition, new technologies raise the

[19] World Bank, "Principles on identification for sustainable development: towards the digital age", February 2018.

[20] High-level Panel on Digital Cooperation, "The age of digital interdependence", p. 9.

[21] See, for example, Center for Financial Inclusion, "Making digital credit truly responsible", 25 September 2019.

[22] See Human Rights Council resolution 42/15, in which the Council recognized the need to apply international human rights law in the design, development, deployment, evaluation and regulation of individual profiling, automated decision-making and machine learning technologies, and acknowledged that international human rights law should be taken into account in the design, development and deployment of new and emerging technologies, such as artificial intelligence.

[23] Lorna McGregor, Daragh Murray and Vivian Ng, "International human rights law as a framework for algorithmic accountability", *International & Comparative Law Quarterly*, vol. 68, No. 2 (April 2019), pp. 309–343.

importance of fully considering relevant rules concerning the legality, legitimacy, necessity and proportionality of restrictions on human rights. The following sections highlight examples in the application of these key principles.

A. Reinforcing equality and non-discrimination in new technologies

Bridging the digital divide

42. The need to bridge the digital divide, which hampers access to technologies and its benefits, is recognized in the 2030 Agenda (General Assembly resolution 70/1, para. 15) and in several resolutions of the Human Rights Council. In its resolution 38/7, for example, the Human Rights Council called upon all States to bridge the digital divides, including the gender digital divide, and to enhance the use of information and communications technology, in order to promote the full enjoyment of human rights for all.

43. Assessing and addressing the digital divide requires attention not only to physical access to technologies and devices, but also to the different types of technology, the quality of access and the distributional equity of access. For example, while developing countries are gaining cheaper access to mobile technologies and the use of mobile phones has spread rapidly in most parts of the world, technology gaps are widening with regard to more advanced areas of technology, such as bandwidth availability.[24] The gender digital divide also persists, reflecting existing patterns of gender inequality and discrimination. Disaggregated data is needed to analyse and monitor the differentiated impacts of technologies in order to ensure equality and non-discrimination.

Addressing bias in algorithms

44. While many dimensions of economic, social and cultural rights are to be realized progressively, States have an immediate obligation to ensure equality and non-discrimination in law and practice. There is an urgent need to address the causes and impact of unintended bias and discrimination resulting from certain algorithmic and automated decision-making based on artificial intelligence and other technologies. Many algorithms tend to reinforce existing biases and prejudices, thereby exacerbating discrimination and social exclusion. Data-driven tools often encode human prejudice and biases, with a disproportionate impact on women and minority and vulnerable groups that are the subjects of those prejudices and biases.[25]

B. Legality, legitimacy, necessity and proportionality

45. Unless carefully regulated, the use of new technologies, in particular digital technologies, can easily lead to inappropriate restrictions on human rights. For example, big data and artificial intelligence, as well as digital identity systems, frequently depend on the collection and processing of data, often including massive amounts of personal data. This may amount to violations and abuses of the right to privacy when undertaken without the informed free consent of affected persons. Other rights often affected by the deployment of new technologies relating to economic, social and cultural rights include the right to freedom of opinion and expression, the rights to freedom of association and of peaceful assembly, and the right to an effective remedy. Restrictions on these and other rights must conform to the principles of legality, legitimacy, necessity and proportionality. [26] Limitations on a right, where permissible, must be necessary for reaching a legitimate aim

[24] *Human Development Report 2019 – Beyond Income, Beyond Averages, Beyond Today: Inequalities in Human Development in the 21st Century* (United Nations publication, Sales No. E.20.III.B.1), p. 201.

[25] High-level Panel on Digital Cooperation, "The age of digital interdependence", pp. 17–18; World Economic Forum, Global Future Council on Human Rights, "How to prevent discriminatory outcomes in machine learning", white paper, March 2018.

[26] The Special Rapporteur on extreme poverty and human rights has pointed out that too many digital welfare state initiatives are characterized by a lack of attention to the importance of ensuring legality (A/74/493, para. 42).

and must be in proportion to that aim. According to the Human Rights Committee, restrictions must be the least intrusive option available,[27] and must not be applied or invoked in a manner that would impair the essence of a right.[28] They need to be prescribed by publicly available law that clearly specifies the circumstances under which a restriction may occur.[29]

46. In the light of the foregoing, an assessment of the necessity and proportionality of the implementation of a biometric identity system would consider the intrusiveness of taking biometric information, the heightened safety risks linked to biometric databases and the risks of abuse of such databases, such as for monitoring of political opponents or for other purposes beyond the scope and purposes of the original implementation. Based on this, the assessment would investigate whether the purposes of the biometric system justified the means sought to achieve them, and whether less intrusive ways for verifying people's identity could achieve those ends. Where biometric systems are deployed, less intrusive approaches should be made available to those who choose to opt out of such systems whenever feasible.

C. Empowering rights holders

47. The development, diffusion and adoption of new technologies consistent with international obligations can be enhanced by effective and meaningful participation of rights holders. Towards that end, States should create opportunities for rights holders, particularly those most affected or likely to suffer adverse consequences, to effectively participate and contribute to the development process, and facilitate targeted adoption of new technologies. Through participation and inclusive consultation, States can determine what technologies would be most appropriate and effective as they pursue balanced and integrated sustainable development with economic efficiency, environmental sustainability, inclusion and equity.

48. Access to new technologies needs to be accompanied by measures to promote and protect economic, social and cultural rights, with a specific emphasis on poor and marginalized people to empower them and build their capacity to take full advantage of those technologies. Enhanced opportunities for jobs, access to education, health and other public services, infrastructure, and social protection systems are critical for such empowerment, as are adjustments to laws, policies and social norms that discriminate against poor people and other social groups. Investing in physical infrastructure such as computers, broadband networks and markets, strengthening endogenous capacities for innovation and adaptation of relevant technologies, and developing institutional and regulatory frameworks are essential to maximizing the sustainable development impact of new technologies (E/2018/50, p. 8).

49. Investing in the right to social protection in particular will be critical to ensuring that people can harness the benefits of economic and technological change, and mitigate the risks and uncertainties arising from it, in order to protect and fulfil their human rights. As noted, the absence of formal, standard employment relationships in the gig economy and elsewhere has contributed to considerable gaps in social protection coverage and adequacy. States need to protect the rights of workers in all forms of employment, particularly those engaged in digital labour platforms, to ensure their rights to equal pay and to freedom of association and collective bargaining.

[27] General comment No. 27 (1999) on freedom of movement, para. 14.

[28] General comment No. 31 (2004) on the nature of the general legal obligation imposed on States parties to the Covenant, para. 6.

[29] General comments No. 27, paras. 11–13, and No. 16 (1988) on the right to privacy, paras. 3 and 8; A/HRC/39/29, para. 10; A/HRC/29/32, para. 33.

D. Ensuring accountability

50. Accountability for human rights violations is central to the framework of international human rights obligations. This framework defines who is responsible for what and towards whom, and expresses the obligations assumed by States to take steps, individually and through international assistance and cooperation, especially economic and technical, to the maximum of available resources, with a view to achieving progressively the full realization of economic, social and cultural rights. It makes clear that certain obligations are of an immediate nature, notably to remove discriminatory laws, policies and other measures and to assure minimum essential levels of each right for all, with particular attention to those left furthest behind. The framework enables duty bearers to be held accountable to rights holders for their decisions or omissions, and provides mechanisms for claiming rights, monitoring progress transparently, sanctioning poor performance and seeking redress for human rights violations.

51. While new, data-driven technologies bring about new challenges in terms of ensuring human rights accountability, a variety of tools and safeguarding methodologies exist to identify and address risks and harms. Appropriate due diligence processes, taking into account the full range of rights under international human rights law throughout the life cycle of a technological system, can help avoid unduly narrow analysis of potential risks. Such processes can be helpful in identifying and preventing possible human rights harm, including by determining necessary safeguards, and in developing effective remedies when harm does occur. Meaningful consultations with external stakeholders and, where possible, with representatives of potentially impacted individuals and groups, in order to avoid project-driven bias, can strengthen such processes and significantly enhance their effectiveness (A/73/348, para. 54). On this basis, it would, for example, be recommended to integrate ongoing human rights diligence and broad consultations into the process of developing and deploying comprehensive nationwide digital identification systems, in order to enable the identification and mitigation of human rights risks associated with the systems.

52. Often, there may be significant gaps in public knowledge and understanding concerning the technological means being used by Governments and private actors in many public services, such as social security, pensions, health care, taxation, education or recruitment. This is a particular problem in the context of the automated decision-making processes that rely on artificial intelligence. Comprehensive, publicly available information is important to enable informed decision-making and the relevant consent of affected parties. It is advisable to require administrative services to systematically inform the addressees of rights-affecting decisions if those decisions have been made automatically or with the help of automation tools. For human rights-critical applications, the introduction of registers containing key information about those tools and their use can be considered. Regulations requiring companies to disclose when artificial intelligence systems are used in ways that affect the exercise of human rights and share the results of related human rights impact assessments may also be a helpful tool.

53. An associated dimension in the use of artificial intelligence technologies is “explainability”, concerned with the tendency towards opacity of complex algorithmic tools, also known as the “black box” problem. Such systems, in particular those with self-learning capabilities, can often behave in a fashion that is not entirely explainable or predictable. On occasion, intellectual property protections may, in this context, prevent necessary scrutiny of the algorithms and data used to train them. Even access to the underlying source code and training data, however, may often be insufficient to offer adequate understanding of how a particular artificial intelligence system operates in practice. Additional efforts are necessary to create tools and methods that provide a sufficient level of explanation of how decisions have been reached, in particular when artificial intelligence is determining critical issues within judicial processes or regarding access to, eligibility for and use of critical social services that are essential for the realization of economic, social and cultural rights.

54. In addition, regular audits by internal and external reviewers throughout the life cycle of artificial intelligence systems can provide a critical guarantee of rigour and independence

in transparency and, eventually, accountability (A/73/348, para. 55).[30] According to the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, States should consider avoiding using systems that can have material adverse human rights impacts that cannot be subject to meaningful auditing (ibid.).[31]

55. While new technologies are largely driven by the private sector, States have legal obligations under human rights law to protect affected human rights, including through the adoption of necessary legislative measures. New technologies may require traditional approaches to regulation to be refined, in order to reflect the specificities of emerging technologies. Enhancing the capacity of sectoral oversight bodies to address relevant issues raised by the use of new technologies, such as sectoral regulation and oversight, could also help ensure on-target interventions in human rights-critical areas affected by the use of artificial intelligence (A/73/348, para. 42).[32]

E. Protecting the right to privacy in the context of personal data

56. Many new technologies that hold promise in terms of promoting human well-being rely heavily on the processing of large amounts of personal data. In such an environment, ensuring an adequate level of data privacy is essential in order to prevent human rights violations and abuses, including economic, social and cultural rights.[33] Uninhibited access to health or genetic information, for example, could enable insurers to exclude from coverage those that need health care most urgently. The Human Rights Council has called upon States to develop or maintain and implement adequate legislation, with effective sanctions and remedies, that protects individuals against violations and abuses of the right to privacy, namely through the unlawful or arbitrary collection, processing, retention or use of personal data by individuals, Governments, business enterprises and private organizations (Council resolution 42/15, para. 6 (f)). According to the General Assembly, the adoption and implementation of data protection legislation, regulation and policies could include the establishment of national independent authorities with powers and resources to monitor data privacy practices and investigate violations and abuses, and to provide appropriate remedies (Assembly resolution 73/179, para. 6 (g)).

57. Many States, intergovernmental organizations and other institutions have developed standards for the protection of personal data that can guide the design of personal data governance frameworks and mechanisms.[34] Within the United Nations system, the guidelines for the regulation of computerized personal data files (E/CN.4/1990/72) adopted by the General Assembly in its resolution 45/95, and the personal data protection and privacy principles adopted in 2018 by the High-level Committee on Management, provide a benchmark for rights-respecting processing within the United Nations system. These guidelines and principles underscore a number of important principles, including that the processing of personal data requires an adequate level of transparency, requiring data subjects to be informed about the processing of their personal data and about how to request appropriate access, rectification and/or erasures of those personal data in the case of unlawful, unnecessary or inaccurate entries. Moreover, the processing of personal data should be based on the free and informed consent of the individuals concerned, or another legal basis. It should be relevant, limited and adequate to what is necessary in relation to a specified purpose. Appropriate security measures should be taken to protect personal information against unauthorized disclosure, modification or deletion.

[30] See also Human Rights Council resolution 42/15, para. 5.

[31] See also AI Now Institute, New York University, *AI Now Report 2018* (New York, 2018), recommendation 4.

[32] See also AI Now Institute, *AI Now Report 2018*, recommendation 1.

[33] See Human Rights Council resolution 42/15, in which the Council notes with concern that automatic processing of personal data for individual profiling may affect the enjoyment of human rights, including economic, social and cultural rights.

[34] For a list of relevant international instruments and guidelines, see A/HRC/39/29, para. 28.

IV. Responsibilities of the private sector

58. The High-level Panel on Digital Cooperation points out in its report that "[t]here is now a critical need for clearer guidance about what should be expected on human rights from private companies as they develop and deploy digital technologies".[35] The Guiding Principles on Business and Human Rights (A/HRC/17/31, annex), endorsed by the Human Rights Council in 2011, provide a comprehensive framework intended to guide efforts by a range of actors, including Governments and companies, to identify, prevent, mitigate and remedy human rights harm related to the activities of companies, including in relation to new technologies.

59. A central premise of the Guiding Principles is that companies should avoid infringing on the human rights of others and should address adverse human rights impacts with which they are involved. In the context of new technologies and their impact on economic, social and cultural rights, it can be particularly valuable to assess and address the risks of business models that involve, for example: (a) collecting large volumes of personal health data and using and sharing such data without consent; (b) using new technologies for public service delivery, in partnership with or on behalf of Governments, that could disproportionately put vulnerable populations at risks; (c) providing and using technologies and technology-driven processes such as algorithms that may result in harm to people and direct and indirect discrimination.

60. According to the Guiding Principles (ibid., principle 17), companies should carry out human rights due diligence across their activities and business relationships to identify, prevent, mitigate and account for how they address the actual and potential adverse human rights impacts, and particular efforts should be made to address risks of further marginalizing and discriminating vulnerable populations and groups. The human rights due diligence requirement extends across a company's operations, products and services, and applies to those related to the delivery of public services and goods, including in the areas critical for the realization of economic, social and cultural rights such as smart cities, health and education services. Furthermore, human rights due diligence should be embedded in company operations as an ongoing process, also integrating rights holder perspectives and experiences. If new digital technologies are to fulfil their potential while mitigating accompanying risks, companies should meaningfully engage civil society, rights holders and vulnerable populations in their due diligence.

61. In cases of business-related human rights harms, the Guiding Principles recall the duties of States and the responsibilities of business enterprises to ensure access to effective remedy (ibid., chap. III). In the context of new technologies, as highlighted above, unique and complex issues will need to be addressed, such as guaranteeing remedy when abuses result from decisions made by machines and algorithms rather than humans; providing effective operational-level grievance mechanisms when there may be millions of adversely-affected rights holders; and safeguarding access to remedy when dozens of companies, rather than a single corporate actor, are linked to a human rights abuse through the interaction of different technology products and services.

V. Conclusions and recommendations

62. **In the present report, a number of actions are identified that Member States and other stakeholders can take to harness the opportunities of new technologies for the realization of economic, social and cultural rights, while addressing potential risks. Among them, the following deserve particular attention of States and, as applicable, private companies and other stakeholders:**

(a) **Fully recognize the need to protect and reinforce all human rights in the development, use and governance of new technologies as their central objective, and ensure equal respect for and enforcement of all human rights online and offline;**

[35] High-level Panel on Digital Cooperation, "The age of digital interdependence", p. 17.

(b) **Reaffirm and fulfil the obligations of States to adopt legislative measures, including measures concerning private sector activities, so that new technologies contribute to the full enjoyment of human rights by all, including economic, social and cultural rights, and adverse impacts on human rights are prevented;**

(c) **Accelerate efforts to bridge digital divides and technological gaps between and within countries, and promote an inclusive approach to improving accessibility, availability, affordability, adaptability and quality of new technologies;**

(d) **Invest in the right to social protection to build resilience for changes and instability, including those caused by technological change, and protect labour rights in all forms of employment;**

(e) **Significantly enhance efforts to disseminate information to the public about the use of new technologies, in particular of artificial intelligence, in the public sector;**

(f) **Ensure participation of all relevant stakeholders in decisions on the development and deployment of new technologies, and require adequate explainability of artificial intelligence-supported decisions, in particular in the public sector;**

(g) **Systematically carry out human rights due diligence during the entire life cycle of systems based on new technologies, in particular artificial intelligence systems, that can have a significant impact on the enjoyment of human rights;**

(h) **Create adequate legal frameworks and mechanisms to ensure full accountability in the context of the use of new technologies, including by reviewing and assessing the gaps in national legal systems, creating oversight mechanisms, where necessary, and making available avenues for remedies for harm caused by new technologies;**

(i) **Address discrimination and bias in the development and use of new technologies, particularly in terms of access to products and services that are essential for the enjoyment of economic, social and cultural rights;**

(j) **Pay particular attention to the impact of new technologies on economic, social and cultural rights in reporting and review under the universal periodic review and the human rights treaty bodies**.