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Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels***

Report of the Secretary-General

Summary

This report has been prepared in response to Economic and Social Council resolution 2006/46, in which the Secretary-General was requested to inform the Commission on Science and Technology for Development about implementation of outcomes of the World Summit on the Information Society. The report highlights major activities undertaken by stakeholders during 2018. It was prepared by the secretariat of the United Nations Conference on Trade and Development, based on information provided by United Nations system entities, international organizations and other stakeholders.

* A/74/50.
** E/2019/100.
*** All weblinks in the present document were accessed on 26 February 2019.

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Introduction

1. This report was prepared in response to Economic and Social Council resolution 2006/46.[1] It includes information provided by 33 United Nations entities and other international organizations and stakeholders[2] that responded to a letter from the Secretary-General of UNCTAD inviting contributions on trends, achievements and obstacles in implementation of World Summit on the Information Society (WSIS) outcomes. The report summarizes developments and activities during 2018. Further information on major developments and trends in the implementation of the outcomes is available in document E/CN.16/2019/CRP.2.

I. Key trends

A. Most people now use the Internet

2. At WSIS, and as a part of the 2030 Agenda for Sustainable Development, the international community made a commitment to ensuring universal access to information and communications technologies (ICTs). The large majority of people worldwide now access and use telephone technology, while, in 2018, for the first time, the number of individuals estimated by ITU to use the Internet exceeded half the global population.[3]

3. While this represents a landmark in connectivity, much remains to be done to address gaps in access and usage between countries and communities. Some 80 per cent of individuals in Europe were estimated to be online in 2018, but the comparable figure for sub-Saharan Africa was below 25 per cent and that for least developed countries below 20 per cent.[4] Women are estimated to be some 12 per cent less likely than men to be online, this gender digital divide being particularly marked in least developed countries. Those who live in rural areas and on lower incomes are generally less connected and less able to afford to use connectivity in support of economic and social welfare.

4. ITU and Groupe Speciale Mobile Association (GSMA) report a recent downturn in the rate of growth of connectivity, partly because communications access in developed and some developing countries is approaching saturation, but also because of continued challenges of affordability for many people that are related to underlying structural

[1] https://unctad.org/Sections/un_cstd/docs/ecosoc_res200646_en.pdf.

[2] Association for Progressive Communications(APC); Council of Europe; United Nations Economic Commission for Latin America and the Caribbean (ECLAC); United Nations Department of Economic and Social Affairs (DESA); United Nations Economic and Social Commission for Asia and the Pacific (ESCAP); Economic and Social Commission for Western Asia (ESCWA); United Nations Economic Commission for Africa (ECA); United Nations Economic Commission for Europe (ECE); End Child Prostitution, Child Pornography and Trafficking of Children for Sexual Purposes (ECPAT) International; Food and Agriculture Organization of the United Nations (FAO); International Chamber of Commerce (ICC); International Federation of Library Associations and Institutions (IFLA); International Trade Centre (ITC); Internet Corporation for Assigned Names and Numbers (ICANN); Internet Governance Forum (IGF); Internet Society (ISOC); International Telecommunication Union (ITU); Organization for Economic Cooperation and Development (OECD); United Nations Conference on Trade and Development (UNCTAD); United Nations Development Programme (UNDP); United Nations Educational, Scientific and Cultural Organization (UNESCO); United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women); United Nations Environment Programme (UNEP); United Nations Human Settlements Programme (UN-Habitat); United Nations Industrial Development Organization (UNIDO); United Nations Office on Drugs and Crime (UNODC); United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA); World Bank Group; World Food Programme (WFP); World Health Organization (WHO); World Intellectual Property Organization (WIPO); World Meteorological Organization (WMO); and World Trade Organization (WTO). See http://unctad.org/en/Pages/CSTD/WSIS-UNSG-Report.aspx.

[3] www.itu.int/en/mediacentre/Pages/2018-PR40.aspxm.

[4] www.itu.int/en/ITU-D/Statistics/Documents/statistics/2018/ITU_Key_2005-2018_ICT_data_with%20LDCs_rev27Nov2018.xls.

inequalities in income, literacy and educational attainment. The task of addressing digital divides therefore needs to be integrated into wider international efforts to achieve empowerment, gender equality and sustainable development.

B. Role of new technology in sustainable development

5. ICTs are cross-cutting in nature, affect all aspects of sustainable development and are now central to the work of all United Nations agencies. The digitalization of economic production and commerce is a critical aspect of the emerging information society, reducing transaction costs and expediting trade flows. However, UNCTAD reports that leveraging this phenomenon to achieve developmental gain requires coordinated government, readiness assessment, strategy formulation, investment in infrastructure, payments systems, transport and trade logistics, legal and regulatory frameworks, skills development and access to finance.[5]

6. Increased attention is being paid to the role the rapidly growing volume of data gathered through government and commercial processes can play in targeting resources. At the AI [Artificial Intelligence] for Good Global Summit, participants identified practical applications and strategies for artificial intelligence to enhance human development, for example by mapping poverty, improving traffic flows (and thereby productivity) through "smart city" initiatives, and achieving universal health coverage.[6]

C. Changing world of work

7. The impact of the information society on employment has been prominent in international discourse. The globalization of communications and the growth of online services have led to significant changes in employment patterns, including outsourcing and the emergence of digital platforms. Recent reports concerning these issues have been published by ILO, the World Bank Group, ITU, the World Economic Forum (WEF) and other organizations.[7]

8. Rapid technological innovation will drive further, more extensive changes in employment. Artificial intelligence, automation, robotics and algorithmic decision-making are expected to displace many routine jobs, while also creating new types of work. The results of recent studies estimating the impact of automation on jobs vary widely, depending on the methodologies, coverage and assumptions made.[8] Automation has gender implications; women may hold jobs vulnerable to automation and are less represented in, and therefore may not benefit from increased demand for labour in, science, technology, engineering and mathematics fields.

9. Changing employment patterns will also affect the nature and quality of work and employment relationships, with ramifications for public policy. The relationship between productivity and wages is becoming more complex and less direct. Lifelong occupations are being displaced with the need for lifelong learning to enable workers to shift between occupations during the course of working lives as adaptive skills become more valuable.

10. The pace at which labour market transitions materialize will be rapid. Many agencies are considering changes required in education and employment practice to build the digital and non-digital skills needed for success in an increasingly digital workplace.

[5] https://unctad.org/meetings/en/SessionalDocuments/Africa-eWeek2018_NairobiManifesto_en.pdf.

[6] www.itu.int/en/ITU-T/AI/2018/Pages/default.aspx.

[7] www.ilo.org/global/topics/future-of-work/publications/WCMS_662410/lang--en/index.htm; http://documents.worldbank.org/curated/en/816281518818814423/pdf/2019-WDR-Report.pdf; www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf; www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf.

[8] https://unctad.org/en/PublicationsLibrary/tir2018_en.pdf.

D. Opportunities and challenges of frontier technologies

11. A new wave of innovation in information technology is now underway. This includes machine learning, artificial intelligence, algorithmic decision-making, new types of computing and interfaces between people and ICT services. These ICT innovations interact with other "frontier technologies", including genetics, nanotechnology, advanced materials and space science.

12. Development is extremely rapid and promises to deliver profound changes to economies and societies, intensifying opportunities to facilitate sustainable development and posing new challenges to Governments, businesses and citizens. Cybersecurity is a major concern for Governments and other stakeholders. Some 90 per cent of new users of the Internet live in developing countries, but half of them lack legislation to protect their privacy. Many people are concerned about the growing decision-making power of devices and algorithms that use machine learning, and that large-scale data analysis will reduce the autonomy they have as individuals or members of society. Low participation of women in science, technology, engineering and mathematics fields can perpetuate gender bias as they are less involved in the development of applications. A recent study showed that less than 20 per cent of faculty in top universities in the United States of America and Europe are women, while only 29 per cent of applicants seeking jobs in artificial intelligence are women.[9]

13. The extent and speed with which new technologies are deployed will vary considerably between countries with different economic structures. Many impacts are difficult to predict, increasing the need for monitoring of outcomes and flexible legal and regulatory frameworks which can adapt over time. For instance, some decision-making algorithms have raised fairness and discrimination concerns.[10] A widening gap exists regarding the capacity of countries to protect their citizens against cyberthreats, necessitating greater international cooperation to develop appropriate regulatory frameworks and processes. The legal, jurisdictional and ethical challenges arising from frontier technologies are also receiving growing attention. The developmental implications of frontier technologies are addressed by the UNCTAD *Technology and Innovation Report 2018: Harnessing Frontier Technologies for Sustainable Development*, in which it is argued that ICT-enabled technologies have significant potential to accelerate the achievement of the Sustainable Development Goals, provided that policy directs change towards inclusive and sustainable outcomes.[11]

II. Implementation and follow-up at the regional level

A. Africa

14. ICTs are less pervasive in Africa than in other regions. Less than 25 per cent of the sub-Saharan population currently use the Internet.[12] The year 2018 saw significant improvements in infrastructure, connectivity and broadband access, including new undersea cables, and increased focus on policy and regulatory frameworks to facilitate ICT deployment and use. The Broadband Commission for Sustainable Development, the World Bank Group, ITU and partners launched a working group on universal broadband described as "a digital infrastructure moonshot for Africa".[13]

[9] http://cdn.aiindex.org/2018/AI%20Index%202018%20Annual%20Report.pdf.
[10] www.nature.com/articles/d41586-018-05469-3.
[11] https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2110.
[12] https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2018/ITU_Key_2005-2018_ICT_data_with%20LDCs_rev27Nov2018.xls.
[13] www.broadbandcommission.org/workinggroups/Pages/WG2-2018.aspx.

15. ECA coordinates regional activities on the information society. It finalized a report on the opportunities and challenges presented by blockchain technology[14] and organized expert group meetings on nanotechnology and artificial intelligence.

16. The African Union adopted a Declaration on Internet Governance and Development of Africa's Digital Economy.[15] The African Internet Governance Forum was held in Sudan, focusing on the digital economy and emerging technologies.[16] The sixth African School on Internet Governance was convened in the United Republic of Tanzania by the African Union, the Association for Progressive Communications and Research ICT Africa.[17]

B. Asia and the Pacific

17. ESCAP conducted a regional review of implementation of WSIS outcomes, which suggested that emerging technologies are presently widening the gap between countries and subregions within the Asia and the Pacific region. ESCAP priorities include: narrowing this gap; financing; infrastructure deployment and broadband connectivity; increasing the use of ICTs in public administration; and facilitating women's economic empowerment.

18. Member States endorsed an updated Master Plan for the Asia-Pacific Information Superhighway, 2019–2022,[18] a regional broadband initiative designed to: improve the connectivity of landlocked developing countries through cable links and Internet exchange points; enhance network management; foster e-resilience by using ICTs in disaster risk identification and management; and promote universal broadband.

19. ESCAP reviewed broadband strategies in China, Japan and the Republic of Korea, identified as global leaders in digital technology,[19] and ICT statistics in Pacific island States.[20] It made proposals to reduce the cost of broadband subscription in Pacific islands,[21] and on enhancing cybersecurity for Industry 4.0.[22]

C. Western Asia

20. ESCWA promotes the integration of WSIS and the Sustainable Development Goals, the development of the digital economy and e-government in the Arab region. At the 30th Ministerial Session of ESCWA, participants agreed on the Beirut Consensus on Technology for Sustainable Development in the Arab Region, emphasizing issues concerning employment and youth.[23] The ESCWA report entitled *Fostering Open Government in the Arab Region* has led to regional activities and national programmes designed to improve e-government and data management.[24]

21. ESCWA prepared the *Arab Digital Agenda on ICT for Sustainable Development* and is working on a study of digital financial inclusion and empowerment in the region. Preparations have begun for the publication of an *Arab Digital Development Report* and a regional study of cybersecurity.

[14] www.uneca.org/sites/default/files/PublicationFiles/eca_policy_brief_promoting_fintech_start-ups_rev1.pdf.
[15] www.afigf.africa/sites/default/files/DeclarationonInternetGovernance_adoptedAUSummit2018.pdf.
[16] www.afigf.africa/.
[17] https://afrisig.org/afrisig-2018/.
[18] www.unescap.org/sites/default/files/ESCAP_CICTSTI_2018_INF1.pdf.
[19] www.unescap.org/sites/default/files/e-Resilience_CJK_final.pdf.
[20] www.unescap.org/sites/default/files/ICT_Statistics_Guideline_FINAL_0.pdf.
[21] www.unescap.org/sites/default/files/PACIFIC_PAPER_Final_Publication_1_3.pdf.
[22] www.unescap.org/sites/default/files/Cybersecurity_WorkingPaper-edit.pdf.
[23] www.unescwa.org/sites/www.unescwa.org/files/ministerial_sessions/resolutions/30th_session_beirut_consensus_on_technology_for_sustainable_development_eng.pdf.
[24] www.unescwa.org/sites/www.unescwa.org/files/page_attachments/brochure-study-fostering-open-government-arab-region-en-ar.pdf.

22. ESCWA and the League of Arab States formulated a new charter and road map for the Arab Internet Governance Forum.[25]

D. Europe

23. ECE coordinates the United Nations Centre for Trade Facilitation and Electronic Business, which develops trade facilitation recommendations and electronic standards for commercial and government business processes.[26] It revised its single window principles and completed a white paper on the use of distributed ledger technologies, including blockchain, to support business and trade facilitation.[27]

24. The European Union introduced the General Data Protection Regulation, a comprehensive new legal framework concerned with data protection and privacy.[28]

25. The Council of Europe addressed issues concerning artificial intelligence, seeking ways of preventing abuse of algorithmic systems and responding to challenges of misinformation and disinformation, media and information literacy and the moderation of online content within the rule of law.[29]

E. Latin America and the Caribbean

26. ECLAC implements WSIS outcomes through the *Digital Agenda for Latin America and the Caribbean*, the latest edition of which (eLAC2020) was agreed on at the sixth Ministerial Conference on the Information Society in Latin America and the Caribbean, held in April.[30] The *Agenda's* priorities include infrastructure, the digital economy, digital government, culture, inclusion, skills, governance and emerging technologies. At the Ministerial Conference, the need to foster cybersecurity, regulatory harmonization and a comprehensive gender perspective in digital policies was emphasized.

27. ECLAC published a report on barriers to expansion of the digital economy. It also published a document entitled *Data, Algorithms and Policies: Redefining the Digital World*, in which consideration is given to ways in which artificial intelligence can contribute to sustainable development.[31]

28. ECLAC supports the Observatory for the Information Society in Latin America and the Caribbean and the Regional Broadband Observatory, as a part of efforts to improve understanding of access to, and the use and impact of, ICTs.[32]

III. Implementation and follow-up at the international level

A. United Nations Group on the Information Society

29. The United Nations Group on the Information Society is an inter-agency mechanism that coordinates implementation of WSIS outcomes throughout the United Nations system, and that meets annually during the WSIS Forum.[33]

[25] www.unescwa.org/sites/www.unescwa.org/files/events/files/arab-roadmap-internet-governance-en.pdf.

[26] www.unece.org/cefact/.

[27] https://un-blockchain.org/2018/06/12/un-cefact-white-paper-on-blockchain/.

[28] https://eugdpr.org/.

[29] www.coe.int/en/web/artificial-intelligence.

[30] www.cepal.org/es/proyectos/elac2020 (in Spanish); www.cepal.org/en/subsidiary-bodies/ministerial-conference-information-society-latin-america-and-caribbean.

[31] www.cepal.org/en/publications/43515-data-algorithms-and-policies-redefining-digital-world.

[32] www.cepal.org/cgi-bin/getprod.asp?xml=/socinfo/noticias/paginas/8/44988/P44988.xml&xsl=/socinfo/tpl-i/p18f-st.xsl&base=/socinfo/tpl-i/top-bottom.xsl; www.cepal.org/es/observatorio-regional-de-banda-ancha.

[33] www.ungis.org/.

B. General Assembly and Economic and Social Council

30. The Economic and Social Council adopted resolution 2018/28 on the assessment of the progress in the implementation of and follow-up to the outcomes of WSIS.

31. The General Assembly adopted resolution 73/218 on information and communications technologies for sustainable development.

C. Commission on Science and Technology for Development

32. The twenty-first session of the Commission on Science and Technology for Development included a high-level round table on the impact of rapid technological change on achievement of the Sustainable Development Goals. Discussions were held on priority themes relating to the building of digital competencies, with a special focus on gender and youth and the role of science, technology and innovation in renewable energy.[34]

D. Facilitation and coordination of multi-stakeholder implementation

33. The WSIS Forum that took place in Geneva, in March, focused on the theme Leveraging ICTs to build information and knowledge societies for achieving the Sustainable Development Goals.[35]

34. Over 2,500 participants from more than 150 countries took part in some 250 workshops and other sessions, while a ministerial round table focused on the role of WSIS action lines in developing information and knowledge societies. A High-level Track addressed the role of ICTs in delivering the Sustainable Development Goals, bridging digital divides, the enabling environment, confidence and security, inclusiveness, gender mainstreaming, the digital economy, e-learning and applications and services. Prizes for excellence were awarded for projects and initiatives in each action line.

35. Governments in the Group of 20 issued a ministerial declaration on the digital economy, which emphasized digital development, infrastructure, e-government, entrepreneurship, employment and consumer protection, alongside efforts to reduce the gender digital divide and to build on opportunities offered by new technologies.[36]

36. The Broadband Commission for Sustainable Development, jointly convened by ITU and UNESCO, draws public and private sector partners together to advocate broadband deployment. In its report entitled *The State of Broadband: Broadband Catalysing Sustainable Development*, the Commission focused on evolving technologies for education, health and the environment, evaluated broadband growth against its established targets, and made recommendations for boosting broadband.[37]

E. Civil society, business and multi-stakeholder partnerships

37. Many activities that support WSIS objectives are implemented by business, civil society, the academic and technical communities and multi-stakeholder partnerships.

38. ITU added some 500 projects to the WSIS Stocktaking Platform, which provides information on more than 11,000 ICT and development activities undertaken by diverse stakeholders.[38] It published a global and regional stocktaking report and a report entitled *WSIS Stocktaking Success Stories 2016*.[39]

[34] https://unctad.org/en/pages/MeetingDetails.aspx?meetingid=1670.
[35] www.itu.int/net4/wsis/forum/2018/.
[36] www.g20.utoronto.ca/2018/2018-08-24-digital_ministerial_declaration_salta.pdf.
[37] www.itu.int/dms_pub/itu-s/opb/pol/S-POL-BROADBAND.19-2018-PDF-E.pdf.
[38] www.itu.int/net4/wsis/stocktaking/.
[39] www.itu.int/dms_pub/itu-s/opb/pol/S-POL-WSIS.REP-2018-PDF-E.pdf; www.itu.int/net4/wsis/forum/2016/Outcomes/#stsuccess.

39. The International Chamber of Commerce coordinates WSIS-related activities through its Business Action to Support the Information Society initiative and contributes to international discussions including the Internet Governance Forum (IGF) and the WSIS Forum.[40] GSMA represents mobile communications businesses and organizes the annual Mobile World Congress.[41] Its 2018 review entitled *The Mobile Economy 2019* focused on mobile contributions to economic growth and was accompanied by eight regional reports.[42] GSMA also reported on global trends in mobile development[43] and the mobile industry's impact on Sustainable Development Goals.[44]

40. Civil society organizations play a prominent part in the WSIS Forum and IGF. IFLA focuses on access to the Internet and online services through libraries and public facilities.[45] APC concentrates on issues relating to communications access, rights and gender. It published a review of civil society perspectives expressed in its annual Global Information Society Watch publications over the past decade.[46]

41. ISOC provides a forum for the Internet technical and professional community and others concerned with the development and maintenance of an open Internet. It provides technical training to Internet professionals and supports the development of community networks in 10 countries.[47] It published policy briefs concerned with licensing models for community networks and cybersecurity in the Internet of things.

42. WEF published reports on digital identity, digital enterprise, potential environmental aspects of blockchain technology and the future of jobs.[48] In a 2018 report, WEF puts forward goals for future "digital stewardship" concerned with inclusion, business effectiveness, security and governance.[49]

F. Facilitation of action lines and selected implementation of activities of United Nations entities

1. Implementation of action lines

43. The implementation of WSIS outcomes is aligned with that of the 2030 Agenda for Sustainable Development through General Assembly resolutions 70/1 and 70/125.

44. At the 2005 WSIS, 11 action lines for multi-stakeholder implementation of outcomes were agreed on. The annual meeting of action line facilitators took place during the WSIS Forum, at which time a report was presented on progress in implementation.[50] Facilitators updated the WSIS-Sustainable Development Goals Matrix, which helps to coordinate implementation of action lines and maps them against Sustainable Development Goals.[51]

[40] https://iccwbo.org/global-issues-trends/digital-growth/internet-governance/business-action-to-support-the-information-society-basis/.
[41] www.gsma.com/mobilefordevelopment/events/mobile-world-congress-2018/.
[42] www.gsma.com/mobileeconomy/.
[43] www.gsmaintelligence.com/research/?file=8535289e1005eb248a54069d82ceb824&download.
[44] www.gsmaintelligence.com/research/?file=ecf0a523bfb1c9841147a335cac9f6a7&download.
[45] www.ifla.org/.
[46] www.apc.org/en/pubs/action-steps-decade-civil-society-advocacy-information-society-baseline-review-global.
[47] www.internetsociety.org/issues/community-networks/.
[48] www.weforum.org/reports.
[49] www3.weforum.org/docs/WEF_Our_Shared_Digital_Future_Report_2018.pdf.
[50] www.itu.int/net4/wsis/forum/2018/Files/documents/outcomes/WSISForum2018_ForumTrackOutcomes.pdf.
[51] www.itu.int/net4/wsis/forum/2018/Files/documents/outcomes/WSISForum2018_WSIS-SDGSMatrix.pdf.

(a) The role of public governance authorities and all stakeholders in the promotion of information and communications technologies for development

45. The contribution of ICTs to development plays an important part in the work of United Nations specialized agencies, multilateral organizations, international financial institutions and many private sector and civil society organizations. The value of multi-stakeholder cooperation in support of sustainable development was emphasized at WSIS and in the General Assembly WSIS+10 review.

46. WSIS Forum sessions focused on use of ICTs to facilitate achievement of the Sustainable Development Goals, including the role of digital government in reducing poverty, improving services and promoting empowerment, particularly for women and vulnerable communities. Emphasis was placed on the alignment of ICT/e-government and national development strategies and investment in digital skills through education and vocational training.

47. The *World Economic and Social Survey 2018: Frontier Technologies for Sustainable Development* addressed the issues of the opportunities offered by and risks of automation, artificial intelligence and other digital and non-digital technologies.[52]

48. A World Bank Group report entitled *2018 Information and Communications for Development: Data-driven Development*[53] explored ways in which Governments can use data generated by digitalization to improve understanding and address developmental challenges more effectively.

49. ITU organized the AI for Good Global Summit in May, focusing on the potential benefits that may be derived from artificial intelligence for implementing the Sustainable Development Goals.[54] ITU also opened a global artificial intelligence repository to map relevant projects and initiatives.[55]

(b) Information and communication infrastructure

50. Private sector businesses play a leading role in ICT infrastructure finance and network deployment. The World Bank Group and other international financial institutions provide support for infrastructure projects in developing regions.

51. The challenge of addressing underserved and rural communities received increased attention. The Broadband Commission for Sustainable Development published a report containing recommendations on reducing the broadband gap[56] and a report on broadband for national development in the most vulnerable countries, drawing on experience in Africa and the Asia-Pacific region.[57] OECD published a report on bridging the rural digital divide.[58] Renewed interest in community networks included discussions at regional IGFs and publications from ISOC and from APC, whose Global Information Society Watch report drew together experiences of community network deployment from 43 countries.[59]

52. ITU works with Governments to support infrastructure deployment,[60] including development of national broadband strategies, communications regulation and management of radio spectrum.[61] Its broadband maps facilitate evaluation of connectivity worldwide.[62]

[52] www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/WESS2018_full_web.pdf.
[53] http://documents.worldbank.org/curated/en/987471542742554246/pdf/128301-9781464813252.pdf.
[54] www.itu.int/en/ITU-T/AI/2018/Pages/default.aspx.
[55] www.itu.int/en/ITU-T/AI/Pages/ai-repository.aspx.
[56] https://www.broadbandcommission.org/Documents/reports/ExpertGroupReportFeb2018.pdf
[57] https://broadbandcommission.org/Documents/publications/wgmostvulnerablecountries.pdf.
[58] www.sipotra.it/wp-content/uploads/2018/03/BRIDGING-THE-RURAL-DIGITAL-DIVIDE.pdf.
[59] www.giswatch.org/community-networks.
[60] www.itu.int/en/ITU-D/Projects/Pages/default.aspx.
[61] www.itu.int/en/ITU-D/Technology/Pages/SMS4DCVersion4.0.aspx.
[62] www.itu.int/en/ITU-D/Technology/Pages/InteractiveTransmissionMaps.aspx.

53. ITU also works alongside other agencies, as well as businesses, to develop standards in areas such as broadband access and future networks. It is working to "bridge the standardization gap" between developed and developing countries.[63]

(c) Access to information and knowledge

54. A 2018 ITU report gives an overview of trends in ICT access and use, including detailed assessments of ICT investment, affordability and skills.[64]

55. The Broadband Commission for Sustainable Development agreed on new targets for global broadband, including broadband penetration reaching 75 per cent of the world's population by 2025, with entry-level services costing no more 2 per cent of monthly gross national income per head.[65]

56. Assessments and recommendations concerning gender digital divides were published, among others, by OECD,[66] the Group of 20,[67] the After Access research partnership,[68] GSMA[69] and the Digital Gender Gaps Project.[70] APC published a report entitled *Mapping Research in Gender and Digital Technology*.[71] UN-Women, the World Wide Web Foundation and the Alliance for Affordable Internet published a report on the use of universal access funds to address digital gender inequality.[72] UN-Women published a report entitled Gender Equality and Big Data.[73]

57. The Council of Europe adopted a recommendation concerning children's rights in the digital environment, considering ways of empowering children through education and literacy programmes on rights and safe online activity.[74] UNICEF continued to support children's digital rights and promote online safety alongside new research published by Global Kids Online.[75]

58. The role of public access facilities in Internet access, particularly for vulnerable and marginalized groups, was emphasized by IFLA. The Broadband Commission for Sustainable Development agreed on a statement on connectivity for refugees.[76]

(d) Capacity building

59. Education and capacity building are crucial in enabling developing countries to derive developmental gains from technological innovation. There is growing emphasis on developing skills for the digital economy, including lifelong learning to enable workers to move between jobs as technology evolves.

60. ITU assessed trends in the development of ICT skills in a 2018 report, in which it was found that developing countries are disadvantaged in terms of digital skills while, within countries, inequalities in digital skills reflect historic patterns of inequality.[77]

[63] www.itu.int/en/ITU-T/gap/Pages/default.aspx.
[64] www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf.
[65] https://broadbandcommission.org/Documents/publications/wef2018.pdf.
[66] www.oecd.org/internet/bridging-the-digital-gender-divide.pdf.
[67] www.g20-insights.org/policy_briefs/bridging-the-gender-digital-gap/; www.g20.utoronto.ca/2018/2018-08-24-digital.html#annex2.
[68] https://afteraccess.net/wp-content/uploads/2018-After-Access-Understanding-the-gender-gap-in-the-Global-South.pdf.
[69] www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/06/GSMA_narrative_VF.pdf.
[70] www.digitalgendergaps.org/data/?report=2019-01-24.
[71] www.apc.org/sites/default/files/IDRC_Mapping_0323_0.pdf.
[72] http://webfoundation.org/docs/2018/03/Using-USAFs-to-Close-the-Gender-Digital-Divide-in-Africa.pdf.
[73] www.unwomen.org/-/media/headquarters/attachments/sections/library/publications/2018/gender-equality-and-big-data-en.pdf?la=en&vs=3955.
[74] https://rm.coe.int/guidelines-to-respect-protect-and-fulfil-the-rights-of-the-child-in-th/16808d881a.
[75] http://globalkidsonline.net/results/.
[76] www.broadbandcommission.org/Documents/BroadbandConnectivityOpenStatement_.pdf.
[77] www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR2018-ES-PDF-E.pdf.

61. Gender disparity in science and technology education, employment and leadership received particular attention. The Equals partnership, led by ITU and UN-Women, published a report on gender equality in digital access, skills and leadership,[78] as well as launching a Digital Skills Fund.[79]

62. ITU Centres of Excellence serve as focal points for ICT professional development, research and knowledge sharing, under the umbrella of the ITU Academy. The Academy has been upgraded with additional service offerings, including the Spectrum Management Training Programme.[80]

63. UNODC provides access to online resources and training for judicial service personnel through its Global Judicial Integrity Network.[81] Its Education for Justice initiative supports the development of educational materials to enhance understanding of ethical aspects of the Internet and identify risks to student welfare.[82] The aim of the Secretary-General's Strategy on New Technologies is to define how the United Nations system will support the use of new technologies to accelerate the achievement of the 2030 Agenda for Sustainable Development and to facilitate their alignment with the Charter of the United Nations and Statute of the International Court of Justice, the Universal Declaration of Human Rights and the norms and standards of international law.[83] The Strategy contains five principles to guide United Nations engagement with new technologies and four strategic commitments of United Nations system leaders to upgrade knowledge of and engagement with new technologies and foster a system of learning, innovation and entrepreneurship.

(e) Building confidence and security in the use of information and communications technologies

64. The Global Cybersecurity Agenda, led by ITU, provides a framework for coordinating legal, technical, organizational and training needs regarding cybersecurity.[84] National computer security incident response teams have now been established in many countries. The *Guide to Developing a National Cybersecurity Strategy: Strategic Engagement in Cybersecurity* was launched at ITU Telecom World.[85]

65. The Global Commission on the Stability of Cyberspace issued norms aimed at reducing risks to the stability of the Internet environment.[86] The Paris Call for Trust and Security in Cyberspace, launched by the President of France at the IGF, contained a proposal for the multi-stakeholder development of international cybersecurity standards and practices.[87] It was signed by more than 50 Governments, together with businesses and civil society organizations.

66. ITU has prepared the third edition of the Global Cybersecurity Index.[88] Together with other agencies, it is working with the Oxford Martin School, University of Oxford, to undertake Cybersecurity Capacity Reviews in developing countries.[89]

67. The Online Trust Alliance, led by ISOC, promotes security and privacy principles for Internet of things devices and services.[90] ISOC published a policy brief entitled

[78] https://docs.wixstatic.com/ugd/04bfff_e53606000c594423af291b33e47b7277.pdf.
[79] https://docs.wixstatic.com/ugd/04bfff_8f76b91bb09343e28a12349eb2bf6632.pdf.
[80] www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Pages/CentresofExcellence.aspx; https://academy.itu.int/index.php?lang=en.
[81] www.unodc.org/ji/.
[82] www.unodc.org/e4j/.
[83] www.un.org/en/newtechnologies/.
[84] www.itu.int/en/action/cybersecurity/Pages/gca.aspx.
[85] www.itu.int/dms_pub/itu-d/opb/str/D-STR-CYB_GUIDE.01-2018-PDF-E.pdf.
[86] https://cyberstability.org/wp-content/uploads/2018/11/GCSC-Singapore-Norm-Package-3MB.pdf.
[87] www.diplomatie.gouv.fr/IMG/pdf/paris_call_cyber_cle443433.pdf.
[88] www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx.
[89] www.oxfordmartin.ox.ac.uk/cybersecurity/.
[90] https://otalliance.org/.

"[Internet of things] IoT Security for Policymakers", and is developing recommendations to network operators to improve the security and resilience of Internet routing.[91]

68. The action line facilitation meeting at the WSIS Forum focused on "blockchain as an enabler of security and trust".[92] Opportunities in relation to financial and other applications were identified and challenges of scalability and replicability in blockchain applications, including energy consumption, were highlighted.

69. UNODC provides technical assistance and online training resources to address cybercrime and reduce the risk of terrorism online. Its Commission on Crime Prevention and Criminal Justice aims to develop frameworks for tackling cybercrime.[93]

70. The European Union General Data Protection Regulation came into effect in May, enhancing privacy protections for citizens of European Union countries throughout the world, leading to changes in business practice and policy development in ICANN and other Internet governance bodies.[94] The African Union Commission issued privacy and personal data protection guidelines for Africa, developed in partnership with ISOC.[95]

71. The ITU Child Online Protection Initiative and the WeProtect Global Alliance draw together stakeholders concerned with child protection.[96] ECPAT International and the International Criminal Police Organization published a joint report on trends in online child abuse material.[97] The Broadband Commission for Sustainable Development established a working group on child safety online.[98]

(f) The enabling environment

72. ITU assists Member States and businesses in developing policy and regulatory frameworks for telecommunications through information sharing, capacity building and the provision of regulatory resources. Its *Global ICT Regulatory Outlook 2018* report charted the evolution of ICT policy and regulation and assessed current trends.[99] Regulatory information resources developed by ITU include the ICT-Eye and the ICT Regulatory Tracker, which observes trends in over 180 countries.[100]

73. The ITU Global Symposium for Regulators was attended by more than 600 delegates and focused on new regulatory frontiers, emphasizing the need for innovative policy and regulatory approaches to opportunities and challenges of new technologies.[101] A meeting of private sector chief regulatory officers was held during the Symposium, together with the first meeting of the Industry Advisory Group for Development Issues.[102]

74. The action line facilitation meeting at the WSIS Forum focused on sharing collaborative regulatory approaches for digital transformation, highlighting the value of open exchange of practices and texts, particularly for innovative services in the digital economy where the regulatory environment needs to respond rapidly to changing technology, markets and security.[103]

[91] www.internetsociety.org/wp-content/uploads/2018/04/IoT-Security-for-Policymakers_20180419-EN.pdf; www.internetsociety.org/tag/routing-resilience/.
[92] www.itu.int/net4/wsis/forum/2018/Pages/Agenda/Session/291.
[93] www.unodc.org/unodc/en/commissions/CCPCJ/index.html.
[94] https://eugdpr.org/.
[95] www.internetsociety.org/wp-content/uploads/2018/05/AUCPrivacyGuidelines_2018508_EN.pdf.
[96] www.itu.int/en/cop/Pages/default.aspx; www.weprotect.org/our-mission-and-strategy/.
[97] www.ecpat.org/wp-content/uploads/2018/07/ECPAT-International-Report-Trends-in-Online-Child-Sexual-Abuse-Material-2018.pdf.
[98] www.broadbandcommission.org/workinggroups/Pages/WG1-2018.aspx.
[99] www.itu.int/en/ITU-D/Regulatory-Market/Pages/Outlook/2018.aspx.
[100] www.itu.int/net4/itu-d/icteye/; www.itu.int/net4/itu-d/irt/.
[101] www.itu.int/net4/ITU-D/CDS/GSR/2018/documents/Guidelines/BPG-GSR-18-E.pdf.
[102] www.itu.int/net4/ITU-D/CDS/GSR/2018/default.asp.
[103] www.itu.int/net4/wsis/forum/2018/Files/documents/outcomes/WSISForum2018_ForumTrackOutcomes.pdf.

75. ITU published a report entitled *Regulatory Challenges and Opportunities in the New ICT Ecosystem*, [104] as well as studies and discussion papers concerning artificial intelligence,[105] the opportunities and challenges of 5G networks[106] and the economic impact of broadband.[107]

76. There has been growing interest in the relationship between national jurisdictions and international governance. The Internet and Jurisdiction Policy Network is preparing a global status report on jurisdiction in support of its Ottawa Road Map to formulate multi-stakeholder approaches.[108]

(g) ICT applications

E-government

77. DESA launched the 2018 editions of the *United Nations E-Government Survey* and *E-Government Development Index*, which showed continued progress towards higher levels of e-government.[109] The Survey considered the potential impact of new transformative technologies on the future of e-government.

78. The number of countries with open government data portals rose from 46 in 2014 to 139 in 2018. All Governments now have some online presence. However, in the Survey, it was suggested that there is a need for e-inclusion policies to address factors inhibiting access and use in order to avoid the risk of a new digital divide, especially in developing countries.

79. DESA developed an Open Government Data Readiness Assessment Template to assist Governments in adopting open government.[110] The Council of Europe is preparing a toolkit on electronic democracy.[111]

80. In the wake of the IGF, UNESCO, ISOC and the Mozilla Foundation organized a discussion forum on harnessing artificial intelligence to advance knowledge societies and achieve good governance.[112]

E-business

81. The WTO *World Trade Report*, which reviewed the relationship between digital technologies and global commerce, predicted that the Internet of things, artificial intelligence, three-dimensional printing and blockchain networks are likely to lower trade costs and increase volumes, with potentially greater benefits for developing countries.[113]

82. The International Monetary Fund published a staff report entitled *Measuring the Digital Economy*.[114] WTO is working with Eurostat, OECD and others to develop a data set on international trade in services, including digitally enabled services. An Expert Group established by the Inter-Agency Task Force on International Trade Statistics is developing a handbook on measuring digital trade for publication in 2019.[115]

[104] www.itu.int/pub/D-PREF-BB.REG_OUT03-2018/en.
[105] www.itu.int/en/ITU-D/Conferences/GSR/Pages/GSR2018/GSR-18-reports-papers-and-series.aspx.
[106] www.itu.int/en/ITU-D/Documents/ITU_5G_REPORT-2018.pdf.
[107] www.itu.int/en/ITU-D/Regulatory-Market/Documents/FINAL_1d_18-00513_Broadband-and-Digital-Transformation-E.pdf.
[108] www.internetjurisdiction.net/uploads/pdfs/Secretariat-Summary-and-Ottawa-Roadmap-second-Global-Conference-of-the-Internet-Jurisdiction-Policy-Network.pdf.
[109] https://publicadministration.un.org/egovkb/portals/egovkb/documents/un/2018-survey/e-government%20survey%202018_final%20for%20web.pdf; https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2018.
[110] http://workspace.unpan.org/sites/Internet/Documents/UNPAN97795.pdf.
[111] https://rm.coe.int/gt-ed-2018-2e-preparation-of-e-democracy-guidelines-2-/16808eeec4.
[112] https://en.unesco.org/events/harnessing-artificial-intelligence-advance-knowledge-societies-and-good-governance-open.
[113] www.wto.org/english/res_e/publications_e/world_trade_report18_e.pdf.
[114] www.imf.org/~/media/Files/Publications/PP/2018/022818MeasuringDigitalEconomy.ashx.
[115] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3f_Digital_Trade_OECD.pdf.

83. The African Union and the European Union launched a Digital Economy Task Force in December.[116] OECD published a document entitled *Tax Challenges Arising from Digitalization – Interim Report 2018*.[117]

84. UNCTAD has supported 11 countries in conducting rapid e-Trade readiness assessments[118] and drafting national electronic commerce (e-commerce) strategies. Its e-Trade for all initiative brings together 29 international organizations to reduce knowledge gaps, facilitate interactions to identify requirements and constraints to e-commerce development, and propose appropriate solutions.[119] Its annual E-commerce Week in Geneva addressed "development dimensions of digital platforms",[120] while its Intergovernmental Group of Experts on E-commerce and the Digital Economy focused on fostering development gains from domestic and cross-border e-commerce.[121]

85. Participants in the UNCTAD Dialogue on Trade and the Digital Economy in Africa noted problems caused by persistent weaknesses in infrastructure, regulation and institutional frameworks, as well as the limited skills of both producers and consumers of digital products.[122] The Nairobi Manifesto on the Digital Economy and Inclusive Development in Africa issued at the UNCTAD Africa E-commerce Week emphasized the need to address the gender gap in e-commerce entrepreneurship.[123]

86. UNIDO published a report on e-commerce development regarding small and medium-sized enterprises (SMEs) in Brazil, the Russian Federation, India, China and South Africa (BRICS),[124] and provided support through its e-commerce training programme. It organized global and regional events on opportunities and challenges associated with the rapidly changing technological environment for business.[125] ITC is helping countries to strengthen national ICT sectors and e-commerce entrepreneurship. Its SME Trade Academy grew by 40 per cent in 2018, reaching over 23,000 course participants from 180 countries.[126]

87. The Universal Postal Union is supporting the expansion of access to digital e-commerce through postal networks. GSMA launched a mobile money certification initiative to improve the transparency, security and resilience of digital financial services.[127]

E-learning

88. Many international agencies are concerned with the need for skills development to meet changing employment requirements in the information society.[128] The ITU *Measuring the Information Society Report* paid special attention to ICT skills.[129]

89. UNESCO maintains the Global ICT in Education Policy Platform, which facilitates policy debate on e-learning and inclusive education. Its Mobile Learning Week for 2018 focused on skills for a connected world.[130]

[116] https://ec.europa.eu/digital-single-market/en/news/european-union-and-african-union-launch-digital-economy-task-force.
[117] www.oecd.org/ctp/tax-challenges-arising-from-digitalisation-interim-report-9789264293083-en.htm.
[118] https://unctad.org/en/Pages/Publications/E-Trade-Readiness-Assessment.aspx.
[119] https://unctad.org/en/Pages/DTL/STI_and_ICTs/eTrade-for-All/eTrade-for-All-Organization.aspx.
[120] https://unctad.org/en/conferences/e-week2018/Pages/default.aspx.
[121] https://unctad.org/en/pages/MeetingDetails.aspx?meetingid=1666.
[122] https://unctad.org/en/Pages/DTL/STI_and_ICTs/Dialogue-on-the-Digital-Economy.aspx.
[123] https://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=498.
[124] www.unido.org/sites/default/files/files/2018-07/E-commerce%20Development%20Report%20%28SASS%29_09072018.pdf.
[125] www.unido.org/news/global-forum-naturally-based-and-convergent-technologies-underway-sochi.
[126] https://learning.intracen.org/#/Default.
[127] www.gsma.com/mobilefordevelopment/programme/mobile-money/a-quick-guide-to-the-gsma-mobile-money-certification/.
[128] www.ilo.org/global/topics/future-of-work/publications/WCMS_662410/lang--en/index.htm.
[129] www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf.
[130] https://en.unesco.org/events/mobile-learning-week-2018-skills-connected-world.

90. UNESCO is finalizing guidelines on the development of open educational resources policies and assists over 20 countries in supporting the development of such policies and teacher training.[131]

E-health

91. The number of countries reporting that they have ICT strategies for health continues to grow,[132] with increased adoption of mobile and wireless technologies apparent in health promotion, clinical care and emergency response. The WHO Global Observatory for eHealth provides online access to many strategies.[133]

92. The World Health Assembly adopted a resolution on digital health, urging Member States to prioritize development and use of digital technologies to promote universal health coverage and advance the Sustainable Development Goals.[134] WHO also adopted the Astana Declaration on Primary Health Care[135] and launched a partnership with non-profit organization Programme for Appropriate Technology in Health to develop holistic primary health strategies.[136]

93. The Global Digital Health Partnership was established by Governments and multilateral organizations, including WHO, to share experience on policy, interoperability, cybersecurity and clinical engagement.[137]

94. The Working Group on Digital Health of the Broadband Commission for Sustainable Development published a report on digital health and the issue of addressing non-communicable diseases through ICTs.[138]

E-employment

95. There was extensive discussion about the potential impact of new technologies, including artificial intelligence and robotics, on the nature and volume of employment, with many contributions from international organizations, research centres, employers and trades unions.

96. WEF published a report entitled *The Future of Jobs 2018* concerned with likely future employment patterns and skill requirements.[139] The World Bank Group *World Development Report 2019* focused on the changing nature of work, including opportunities for employment creation and improved productivity, as well as issues concerned with employment law and regulation.[140]

97. The ILO Global Commission on the Future of Work, led by the President of South Africa and the Prime Minister of Sweden, published its final report in January 2019, emphasizing investment in capabilities and the need to develop employment regulations, collective representation and social protections in the digital age.[141] ILO also published a report on digital labour platforms and the future of work, identifying criteria to ensure better quality work and employment rights on such platforms.[142]

131 https://en.unesco.org/themes/ict-education/oer.
132 https://www.who.int/ehealth/en/.
133 https://www.who.int/goe/policies/countries/en/.
134 http://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_R7-en.pdf?ua=1
135 https://www.who.int/primary-health/conference-phc/DRAFT_Declaration_on_Primary_Health_Care_28_June_2018.pdf
136 www.who.int/ehealth/events/WHO-PATH-partnership/en/.
137 www.gdhp.org/.
138 www.broadbandcommission.org/Documents/publications/DigitalHealthReport2018.pdf.
139 www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf.
140 www.worldbank.org/en/publication/wdr2019.
141 www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_650666/lang--en/index.htm.
142 www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_645337.pdf.

E-environment

98. The ministerial declaration of the high-level political forum on sustainable development emphasized the potential for ICTs to improve the management of cities, transport systems, energy consumption and waste management.[143]

99. ITU, UN-Habitat and ECE coordinate the United for Smart Sustainable Cities initiative, through which 16 agencies collaborate to facilitate smart city development.[144] UN-Habitat, as lead agency for the New Urban Agenda,[145] is working on the impact of frontier technologies, and working with ITU on standardization requirements for smart cities.

100. WEF published a report entitled *Harnessing the Fourth Industrial Revolution for Water*.[146] The eighth Green Standards Week addressed the role of ICTs in environmental protection.[147]

101. Only 20 per cent of e-waste is currently collected for appropriate disposal.[148] ITU published a handbook on policies and legislative frameworks for e-waste management.[149] UNEP, ITU, ILO, UNIDO, the United Nations Institute for Training and Research (UNITAR) and the secretariats of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the Stockholm Convention on Persistent Organic Pollutants signed a letter of intent to establish an e-waste coalition for United Nations system-wide collaboration and private sector engagement.[150] WHO, UN-Habitat and ITC will join the coalition in 2019.

102. ECE promotes information-sharing on environmental issues through the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, the Protocol on Pollutant Release and Transfer Registers and support for the European Environment Agency Shared Environmental Information System.[151]

103. WFP leads the Emergency Telecommunications Cluster, which works with the United Nations and other stakeholders to provide services, including connectivity, to disaster-affected communities.[152]

104. The WMO Information System enables information sharing on climate and environmental issues, while its Severe Weather Forecasting Demonstration Project helps develop environmental mitigation strategies.[153] The ITU/WMO/UNESCO [Intergovernmental Oceanographic Commission] IOC Joint Task Force is working to enhance cable network capabilities to provide earthquake and tsunami warnings.[154]

E-agriculture

105. FAO coordinates e-agriculture within the United Nations system, working with ITU to facilitate the development of e-agriculture policies and innovation on the basis of their

[143] E/HELS/2018/1.
[144] www.itu.int/en/ITU-T/ssc/united/Pages/default.aspx.
[145] http://habitat3.org/wp-content/uploads/NUA-English.pdf.
[146] www.weforum.org/reports/harnessing-the-fourth-industrial-revolution-for-water.
[147] www.itu.int/en/ITU-T/Workshops-and-Seminars/gsw/201804/Pages/default.aspx.
[148] https://eandt.theiet.org/content/articles/2017/12/only-20-per-cent-of-world-s-e-waste-is-recycled-un-report-finds/.
[149] www.itu.int/en/ITU-D/Climate-Change/Documents/2018/Handbook_Policy_framework_on_ICT_Ewaste.pdf.
[150] https://unemg.org/images/emgdocs/SOMMeetings/2018/EMGSOM24%20INF%20-%202.%20Letter%20of%20Intent_E-waste%20Coalition.pdf.
[151] www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf; https://www.unece.org/env/pp/prtr.html; https://www.eea.europa.eu/about-us/what/shared-environmental-information-system-1/shared-environmental-information-system.
[152] www.etcluster.org/.
[153] www.wmo.int/pages/prog/www/WIS/; www.wmo.int/pages/prog/www/swfdp/.
[154] www.itu.int/en/ITU-T/climatechange/task-force-sc/Pages/default.aspx.

joint e-agriculture strategy framework.[155] GSMA published a toolkit for assessment of mobile agriculture value chains.[156]

106. The FAO Digital Innovation Team, which provides web-based information and advisory services, implemented hackathons on the future of sustainable agriculture and youth employment through digital innovation.

107. FAO manages the e-Agriculture Community of Practice, which facilitates online knowledge sharing on agriculture and rural development.[157] It collaborates through the United Nations Innovation Network[158] to leverage geospatial and other data to improve resource management and crop productivity. It also developed pilot projects concerned with the use of big data to support agriculture.[159]

E-science

108. At the third multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals, it was recognized that there was a need for better understanding of rapid technological change, including detailed assessment of the impact on different Sustainable Development Goals.[160]

109. UNESCO launched the Global Observatory of Science, Technology and Innovation Policy Instruments to disseminate information on science, technology and innovation (STI) initiatives,[161] and initiated work towards a recommendation on open science. The European Commission published final recommendations from its Open Science Policy Platform.[162]

110. The Commission on Science and Technology for Development considered the role of STI in supporting sustainable and resilient societies, with particular reference to citizen science.[163] It organized a workshop on applying a gender lens to STI at its intersessional panel in January 2019.[164]

111. FAO, UNEP, WHO and WIPO collaborate in the Research for Life programme, which offers developing countries access to scientific journals.[165] The WIPO Access to Research for Development and Innovation programme offers journal access to researchers in 120 developing countries.[166]

(h) Cultural diversity and identity, linguistic diversity and local content

112. UNESCO promotes implementation of WSIS outcomes concerned with cultural and linguistic diversity, digital heritage and creative industries. It elaborated a road map for implementing the Convention on the Protection and Promotion of the Diversity of Cultural Expressions in the digital environment. Its Intergovernmental Committee for the Protection and Promotion of the Diversity of Cultural Expressions focused attention on digital creativity and artificial intelligence.[167]

113. UNESCO facilitated adoption of the Paris Call: Software Source Code as Heritage for Sustainable Development, aimed at preserving documentary heritage in the digital age,[168] and developed resources concerned with intangible heritage. It is working with the

[155] www.fao.org/3/a-i6909e.pdf.
[156] www.gsma.com/mobilefordevelopment/programme/magri/magri_value_chain_tool/.
[157] http://aims.fao.org/activity/blog/e-agriculture-community-practice.
[158] www.uninnovation.network/.
[159] www.fao.org/3/CA1158EN/ca1158en.pdf.
[160] www.un.org/ga/search/view_doc.asp?symbol=E/HLPF/2018/6&Lang=E.
[161] https://en.unesco.org/go-spin.
[162] www.go-fair.org/2018/07/02/2351/; www.openaire.eu/recommendation-to-the-ms.
[163] https://unctad.org/en/pages/MeetingDetails.aspx?meetingid=2026.
[164] https://unctad.org/en/pages/MeetingDetails.aspx?meetingid=2057.
[165] www.research4life.org/.
[166] www.wipo.int/ardi/en/.
[167] https://en.unesco.org/news/diversity-cultural-expression-committee-focus-digital-creativity-and-artificial-intelligence.
[168] https://en.unesco.org/news/experts-call-greater-recognition-software-source-code-heritage-sustainable-development.

UNITAR Operational Satellite Applications Programme to monitor conflict damage to historic monuments using satellite technology.[169]

(i) Media

114. Discussion continued on the changing media environment resulting from the spread of new media platforms and financial and other pressures facing traditional media.

115. World Press Freedom Day was celebrated in May with 80 national events around the world, focused on media, justice and the rule of law. The UNESCO *World Trends in Freedom of Expression and Media Development: Global Report 2017/2018* focused on pluralism and restrictions on media freedom.[170]

116. The UNESCO International Programme for the Development of Communication supports media development projects in 35 countries. Nine national assessments using its media development indicators were active during the year.[171]

117. There has been continued concern about the online dissemination of misinformation and disinformation. UNESCO published a handbook for journalism education and training on this theme.[172]

118. The Council of Europe approved an implementation strategy concerning the safety of journalists and other media actors.[173] UNESCO organized meetings of United Nations agencies to enhance collaboration on journalists' safety.[174]

(j) Ethical dimensions of the information society

119. The General Assembly adopted resolution 73/179 on the right to privacy in the digital age. The Human Rights Council adopted resolution 38/7 on the promotion, protection and enjoyment of human rights on the Internet. The Special Rapporteur on violence against women presented a report on online violence against women and girls, while the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression reported on content moderation.[175]

120. UNESCO elaborated its Internet universality concept by adopting a framework of Internet Universality Indicators.[176] The Council of Europe prepared a draft recommendation on the human rights impact of algorithmic systems and a draft study on the concept of responsibility within a human rights framework.[177]

(k) International and regional cooperation

121. The Secretary-General established a High-level Panel on Digital Cooperation, co-chaired by leaders of the Bill and Melinda Gates Foundation and Alibaba Group, to develop proposals for strengthening cooperation in the digital space among Governments, the private sector, civil society, international organizations, academia, the technical community and other relevant stakeholders.[178]

[169] https://en.unesco.org/news/unesco-and-unitar-unosat-team-protect-cultural-heritage-geo-spatial-technologies.
[170] https://unesdoc.unesco.org/ark:/48223/pf0000261065.
[171] www.unesco.org/new/en/communication-and-information/resources/publications-and-communication-materials/publications/full-list/media-development-indicators-a-framework-for-assessing-media-development/.
[172] https://en.unesco.org/fightfakenews.
[173] www.coe.int/en/web/freedom-expression/safety-of-journalists.
[174] https://en.unesco.org/commemorations/endimpunity/2018/beirut.
[175] A/HRC/38/47; A/HRC/38/35.
[176] https://en.unesco.org/internetuniversality.
[177] https://rm.coe.int/draft-recommendation-on-human-rights-impacts-of-algorithmic-systems/16808ef256; https://rm.coe.int/draft-study-of-the-implications-of-advanced-digital-technologies-inclu/16808ef255.
[178] www.un.org/en/digital-cooperation-panel/.

122. The ministerial declaration of the 2018 high-level political forum on sustainable development on the theme of transformation towards sustainable and resilient societies highlighted the need to address digital divides between and within countries, and opportunities to use ICTs to improve the quality of life.[179]

123. DESA organized the first meeting of a group appointed by the Secretary-General to advise on implementation of the Technology Facilitation Mechanism launched under the 2030 Agenda for Sustainable Development.[180]

124. ITU adopted the Connect 2030 Agenda for Global Telecommunication/ICT Development at its Plenipotentiary Conference[181] and held its Telecom World 2018 event in Durban, South Africa, in September.[182] The second United Nations World Data Forum, on the theme of harnessing the power of data for sustainable development, was held in October.[183]

2. Implementation of themes

(a) Financing mechanisms

125. Private investment is the main source of ICT sector finance. Several ICT businesses are now among the largest global corporations, investing in new technologies, including artificial intelligence, and in new approaches to enabling connectivity. ITU reports that growth in ICT capital expenditure is increasingly led by data demand in developing countries, while financial pressures and intensifying competition are leading service providers to explore new revenue streams.[184]

126. The World Bank Group Digital Development Partnership provides a platform for public and private sector cooperation on infrastructure. The Group approved infrastructure finance programmes for seven countries during the year, with nine more programmes under development.

127. The Inter-Agency Task Force on Financing for Development emphasized the need for international collaboration and financial support for new technology, including new platforms and payment systems.[185] The Secretary-General's Task Force on Digital Financing of the Sustainable Development Goals, launched in November, draws together experts from Government, business and civil society to recommend ways in which the digitalization of financial services can support achievement of the Sustainable Development Goals.[186]

(b) Internet governance

Enhanced cooperation

128. The Tunis Agenda for the Information Society called for enhanced cooperation to enable Governments to carry out, on an equal footing, their roles and responsibilities regarding international public policy issues pertaining to the Internet.[187]

129. In 2015, the General Assembly requested the Chair of the Commission on Science and Technology for Development, through the Economic and Social Council, to establish a working group to develop recommendations on how to further implement enhanced cooperation, with full involvement of all relevant stakeholders. The Working Group on Enhanced Cooperation held its final meeting in January 2018, noting that, while consensus seemed to emerge on some issues, significant divergence of views also persisted on a

179 E/HLS/2018/1.
180 https://sustainabledevelopment.un.org/?menu=2059&nr=1465&page=view&type=230.
181 www.itu.int/en/connect2020/pages/default.aspx.
182 https://telecomworld.itu.int/2018-event/.
183 https://undataforum.org/.
184 www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR2018-ES-PDF-E.pdf.
185 https://developmentfinance.un.org/sites/developmentfinance.un.org/files/Report_IATF_2018.pdf.
186 https://digitalfinancingtaskforce.org/.
187 www.itu.int/net/wsis/docs2/tunis/off/6rev1.html.

number of issues.[188] The General Assembly welcomed the progress made by the Working Group, while regretting that it had been unable to find agreement on recommendations, and called for continued dialogue.[189]

Internet Governance Forum

130. The thirteenth annual IGF was hosted by UNESCO in Paris with the theme The Internet of Trust. It was convened as a part of Paris Digital Week, which also included the inaugural segment of the Paris Peace Forum and the Govtech Summit,[190] and was opened by the Secretary-General and the President of France.[191]

131. More than 3,000 people from 143 countries participated in 171 sessions, either directly or online. Sessions were thematically organized following a public call for priorities, with the aim of reducing duplication and fostering more focused discussions. The main themes were: cybersecurity, trust and privacy; development, innovation and economic issues; digital inclusion and accessibility; human rights, gender and youth; emerging technologies; the evolution of Internet governance; media and content; and technical and operational issues. The outcomes of the Forum were summarized in IGF Messages.[192]

132. The Multi-stakeholder Advisory Group of the Forum published a review of initiatives to improve the functioning of the IGF and reported on progress towards developing a multi-year strategic programme. Intersessional activities included work on policy options for connecting the next billion users and best practice forums on the Internet of things, big data and artificial intelligence, cybersecurity, gender and access, and local content. IGF Dynamic Coalitions have adopted common work standards and addressed issues concerned with Sustainable Development Goals for IGF community review.

133. The number of national, regional and youth IGFs reached 111 in 2017, and linkages between these have intensified. The 2017 edition of the APC Global Information Society Watch contained case studies of national and regional IGF initiatives.[193]

(c) Measuring ICT for development

134. The Partnership on Measuring Information and Communication Technology for Development is a collaboration between 14 United Nations and other agencies concerned with data collection and analysis of WSIS outcomes. It has established a task group that is preparing a thematic list of indicators to measure ICT availability, use and impact in relation to different Sustainable Development Goals.[194] A working document on definitions, benchmarks and methodologies was developed and a first draft of thematic indicators was considered at the WSIS Forum.

135. ITU maintains the World Telecommunication/ICT Indicators Database, which includes more than 180 indicators from over 200 economies.[195] The 2018 edition of the ITU *Measuring the Information Society Report*, published at the World Telecommunication/ICT Indicators Symposium, contains an overview of trends in access and use, and chapters on ICT skills and trends in ICT prices, revenue and investment.[196]

136. Further detailed research on access and use in developing countries, derived from household surveys, was published by Research ICT Africa, Learning Initiatives for

188 E/CN.16/2018/CRP.3.
189 E/RES/2018/28; A/RES/2018/28.
190 https://parispeaceforum.org/; https://govtechsummit.eu/.
191 www.un.org/sg/en/content/sg/speeches/2018-11-12/address-internet-governance-forum; www.intgovforum.org/multilingual/content/igf-2018-speech-by-french-president-emmanuel-macron.
192 www.intgovforum.org/multilingual/content/igf-2018-0; www.intgovforum.org/multilingual/content/igf-2018-key-messages.
193 www.giswatch.org/sites/default/files/giswatch17_web.pdf.
194 www.itu.int/en/ITU-D/Statistics/Pages/intlcoop/partnership/post2015.aspx.
195 www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx.
196 www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR2018-ES-PDF-E.pdf.

Network Economies in Asia and the Regional Dialogue on the Information Society Network.[197]

137. The GSMA Mobile Connectivity Index measures mobile infrastructure, affordability, consumer readiness, content and services in 163 countries.[198] GSMA also published a report on the mobile gender gap, and, in partnership with APC, the World Wide Web Foundation and the Alliance for Affordable Internet, a toolkit for measuring women's Internet access and use.[199]

138. UNESCO adopted a new framework of Internet Universality Indicators for measuring national Internet environments, including quantitative and qualitative indicators concerned with rights, openness, accessibility for all, multi-stakeholder participation and cross-cutting aspects of the information society, including gender, children, sustainable development, trust and security, and legal and ethical dimensions.[200]

IV. Findings and suggestions

139. The nature of the information society has changed profoundly since WSIS. Digital innovations are transforming lives and offering new opportunities to strengthen and invigorate efforts to achieve the Sustainable Development Goals. Alongside the tremendous benefits that the information society can bring, however, new issues have emerged for the international community, including cybersecurity, data and artificial intelligence.

140. This poses complex challenges for all stakeholders seeking to secure the "people-centred, inclusive and development-oriented information society" envisaged in the Geneva Declaration of Principles.[201] This report shows that there has been continued progress regarding the access, use and application of ICTs, but that much more needs to be done to achieve internationally agreed goals of connectivity for all and to maximize the value of ICTs in sustainable development. Effective policy development and programme design are required to realize the potential of information technology to enhance development, inclusion and empowerment, and to address potential harms.

141. The rapid pace of change in ICTs is transforming expectations about future economic, social and cultural development. Innovations in communications and computing, artificial intelligence, machine learning, robotics and algorithmic decision-making are expected to have even more profound impacts on the development of human society than those experienced since WSIS. Meeting the opportunities and challenges arising in this regard will require greater understanding of present and future developments, innovation in governance and business management, and greater cooperation concerning governance, technology and services.

142. Improved efforts to measure the information society and the impacts of digital change will be crucial. Work is under way within the United Nations system to establish ICT indicators for the Sustainable Development Goals, while new approaches to measurement are being developed, such as the UNESCO Internet Universality Indicators and the work of UNCTAD to measure the digital economy. More must be done, however, to: build an authoritative, timely evidence base, including the disaggregation of data to enable greater understanding of impacts on different population groups, particularly women; and anticipate future technological developments and consider appropriate policy approaches.

143. The involvement of diverse stakeholders in policymaking and programme development has been a hallmark of WSIS implementation and has helped enhance the

[197] https://afteraccess.net/reports.

[198] www.mobileconnectivityindex.com/.

[199] www.gsma.com/mobilefordevelopment/connected-women/the-mobile-gender-gap-report-2018/; www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/05/GSMA-Women-and-Internet-Research-Toolkit_WEB.pdf.

[200] https://en.unesco.org/internetuniversality.

[201] www.itu.int/net/wsis/docs/geneva/official/dop.html.

developmental value of the information society and facilitate inclusion. The increasing complexity of the information society, and its growth across human development, indicate the value of building on this multi-stakeholder experience. Digital growth affects everyone; marginalized communities should be visibly involved and heard if effective policies and programmes are to be developed and deployed.

144. Cooperation amongst actors in the digital space should kept pace with new technologies, reflecting diversity within stakeholder communities and drawing on multidisciplinary expertise, experience and ideas to strike the right policy balances, for example between privacy and security, and between innovation and sustainability. Non-traditional, multilateral and multi-stakeholder cooperation will be crucial, including between Governments, private sector, research centres and civil society. These issues have been considered by the High-level Panel on Digital Cooperation.

145. In 2020, it will be 17 years since the adoption of the Geneva Declaration of Principles and 15 years since the adoption of the Tunis Agenda for the Information Society. The nature of the information society, and the prospects that unfold from it, have changed enormously and will continue to do so. Assessment of progress towards the information society needs to look forward towards achieving the WSIS vision of a people-centred, inclusive and development-oriented information society within the dual context of rapid technological change and the 2030 Agenda for Sustainable Development.