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Science and technology for development**

**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.

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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 stakeholders² 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.aspx.

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 technology¹⁴ 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/p18fst.xml&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 development⁴³ 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

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