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[*on the recommendation of the Commission on Science and Technology for Development (E/2018/31)*]

2018/29. Science, technology and innovation for development

The Economic and Social Council,

Recognizing the role of the Commission on Science and Technology for Development as the United Nations torch-bearer for science, technology and innovation for development, and as the United Nations focal point for science, technology and innovation for development, in analysing how science, technology and innovation, including information and communications technologies, serve as enablers of the 2030 Agenda for Sustainable Development[1] by acting as a forum for strategic planning, sharing lessons learned and best practices, providing foresight about critical trends in science, technology and innovation in key sectors of the economy, the environment and society, and drawing attention to new and emerging technologies,

Recognizing also the critical role and contribution of science, technology and innovation in building and maintaining national competitiveness in the global economy, addressing global challenges and realizing sustainable development,

Recognizing further the seminal role that information and communications technologies play in promoting and empowering science, technology and innovation as enablers of development,

Recalling the 2005 World Summit Outcome[2] and General Assembly resolution 70/125 of 16 December 2015, entitled "Outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the outcomes of the World Summit on the Information Society", in which it was recognized that science and technology, including information and communications technologies, are vital for the achievement of the internationally agreed development goals, and reaffirming the commitments contained therein,

[1] General Assembly resolution 70/1.
[2] General Assembly resolution 60/1.

Recalling also the entry into force, on 4 November 2016, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change,[3]

Recalling further that the United Nations Conference on Trade and Development is the secretariat of the Commission,

Recognizing that the General Assembly, in its resolution 72/228 of 20 December 2017 on science, technology and innovation for development, encouraged the United Nations Conference on Trade and Development to continue to undertake science, technology and innovation policy reviews, with a view to assisting developing countries in identifying the measures that are needed to integrate science, technology and innovation policies into their national development strategies and ensuring that such policies and programmes are supportive of national development agendas,

Recalling Economic and Social Council decision 2015/242 of 22 July 2015 providing for the extension, until 2021, of the mandate of the Gender Advisory Board of the Commission, as well as General Assembly resolutions 70/132 of 17 December 2015 and 70/213 and 70/219 of 22 December 2015 addressing, respectively, the barriers to equal access for women and girls to science and technology and the integration of a gender perspective into development policies and programmes,

Recalling also the agreed conclusions of the Commission on the Status of Women on women's economic empowerment in the changing world of work, adopted by the Commission at its sixty-first session,[4] in which it, inter alia, highlighted the need for managing technological and digital change for women's economic empowerment, particularly to strengthen the capacities of developing countries, so as to enable women to leverage science and technology for economic empowerment in the changing world of work,

Taking note of the outcome document of the forum entitled "Equality and parity in science for peace and development", held in New York on 8 and 9 February 2018 to commemorate the International Day of Women and Girls in Science,

Taking note also of the importance for science, technology and innovation development policies and programmes to address various aspects of the digital divides, particularly the digital gender divide, as addressed by the EQUALS global partnership and the #eSkills4Girls initiative of the Group of 20,

Recognizing that capabilities, such as basic education and science, technology, engineering and mathematics, design, management and entrepreneurial skills, are central for effective innovation, but are unevenly distributed across countries, and that the availability, accessibility and affordability of quality education in science, technology and mathematics at the primary, secondary and tertiary levels are essential and should be promoted, prioritized and coordinated, in order to create a social environment conducive to the promotion of science, technology and innovation,

Taking note of General Assembly resolution 70/1 of 25 September 2015, entitled "Transforming our world: the 2030 Agenda for Sustainable Development", in which the Assembly adopted a comprehensive, far-reaching and people-centred set of universal and transformative Sustainable Development Goals and targets,

Recognizing the instrumental role of science, technology and innovation and information and communications technologies in the achievement of a number of Sustainable Development Goals, and highlighting the role of science, technology and innovation, along with information and communications technologies, as an enabler

[3] See FCCC/CP/2015/10/Add.1, decision 1/CP.21, annex.

[4] *Official Records of the Economic and Social Council, 2017, Supplement No. 7* (E/2017/27), chap. I, sect. A.

of the 2030 Agenda for Sustainable Development to continue to address global challenges,

Taking note of General Assembly resolution 69/313 of 27 July 2015 on the Addis Ababa Action Agenda of the Third International Conference on Financing for Development, and noting the establishment of the Technology Facilitation Mechanism,

Highlighting the contribution that the Commission on Science and Technology for Development can make to the Technology Facilitation Mechanism, bearing in mind its mandate to foster multi-stakeholder collaboration and partnerships through the sharing of information, experiences, best practices and policy advice among Member States, civil society, the private sector, the scientific community, United Nations entities and other relevant stakeholders for achieving Sustainable Development Goals supported by science, technology and innovation,

Recalling that in its resolution 72/228, the General Assembly encouraged the Commission to promote, in the spirit of the 2030 Agenda and the Addis Ababa Action Agenda, international cooperation in the field of science and technology for development,

Recalling also that in the same resolution, the General Assembly encouraged the Commission to discuss and explore innovative financing models as a means of attracting new stakeholders, innovators and sources of investment capital for science, technology, engineering and innovation-based solutions, in collaboration with other organizations, where appropriate,

Noting that new technologies create new jobs and development opportunities, thus increasing the demand for digital skills and competencies, and underlining the importance of building digital skills and competencies, so that societies can adapt to and benefit from technological changes,

Taking note of General Assembly resolution 72/242 of 22 December 2017, in which the Assembly requested the Technology Facilitation Mechanism and the Commission, through the Economic and Social Council, to give due consideration to the impact of key rapid technological changes on the achievement of the Sustainable Development Goals within their respective mandates and existing resources,

Welcoming the work of the Commission on its two current priority themes, “The role of science, technology and innovation in increasing substantially the share of renewable energy by 2030” and “Building digital competencies to benefit from existing and emerging technologies, with a special focus on gender and youth dimensions”,

Recognizing the need for innovation approaches that respond to the needs of poor, grass-roots and marginalized communities in developing and developed countries and involve them in innovation processes and that embed capacity-building in the areas of science, technology and innovation as a crucial component of national development plans, inter alia, through collaboration between the relevant ministries and regulatory bodies,

Recognizing also the importance of data protection and privacy in the context of science and technology for development,

Recognizing further that technology foresight and assessment exercises, including gender-sensitive and environmentally sensitive technologies, could help policymakers and stakeholders in the implementation of the 2030 Agenda through the identification of challenges and opportunities that can be addressed strategically, and that technology trends should be analysed, keeping in view the wider socioeconomic context,

Recognizing that well-developed innovation and digital ecosystems [5] play a fundamental role in the effective digital development and facilitation of science, technology and innovation,

Recognizing also the increased regional integration efforts across the world and the associated regional dimension of science, technology and innovation issues,

Recalling the outcome document of the United Nations Conference on Sustainable Development, held in Rio de Janeiro, Brazil, from 20 to 22 June 2012, entitled "The future we want",[6] including the principles referred to therein,

Recognizing the need to mobilize and scale up financing for innovation, especially in developing countries, in support of the Sustainable Development Goals,

Noting with concern that 1.1 billion people in the world today have no access to electricity and that 2.8 billion people cook and heat their homes using open fires and simple stoves that burn traditional biomass and coal, with health, social and environmental consequences,

Recognizing that the achievement of the Sustainable Development Goals is highly dependent on increasing access to clean energy services and that increasing the deployment of renewable energy has substantial implications for income generation and other development outcomes such as gender equality, health, environmental protection and poverty eradication,

Recognizing also that renewable energy policies should be incorporated into national development strategies and that policy mixes and a systematic approach to innovation are necessary, considering the potential role of international cooperation in increasing the share of renewables, as well as a mix of supporting policies to stimulate research and development, build skills locally, ensure affordability and create a supporting regulatory environment,

Noting the significant achievements and continuing potential contribution of science, technology and innovation and information and communications technologies, to human welfare, economic prosperity and employment,

Noting also that science, technology and innovation policies must be aligned to address the three dimensions of sustainable development, specifically, economic development, social progress and environmental protection,

Taking into consideration that traditional knowledge can be a basis for technological development and the sustainable management and use of natural resources,

Encouraging the design and implementation of public policies that address the impact of rapid technological change on the achievement of the Sustainable Development Goals,

Noting that the success of using technology and innovation policies at the national level is facilitated by, among other things, creating policy environments that enable education and research institutions, businesses and industry to innovate, invest and transform science, technology and innovation into employment and economic growth incorporating all interrelated elements, including knowledge transfer,

[5] The digital ecosystem involves components such as technological infrastructure, data infrastructure, financial infrastructure, institutional infrastructure and human infrastructure.

[6] General Assembly resolution 66/288, annex.

Noting also various ongoing and future initiatives related to science, technology and innovation to explore important issues associated with the Sustainable Development Goals,

Recommends the following for consideration by national Governments, the Commission on Science and Technology for Development and the United Nations Conference on Trade and Development:

(a) Governments, individually and collectively, are encouraged to take into account the findings of the Commission and to consider taking the following actions:

(i) To closely link science, technology, innovation and strategies of sustainable development by prominently featuring capacity-building in information and communications technologies and science, technology and innovation in national development planning;

(ii) To promote local innovation capabilities for inclusive and sustainable economic development by bringing together local scientific, vocational and engineering knowledge, mobilizing resources from multiple channels, improving core information and communications technology and supporting smart infrastructure, including through collaboration with and among national programmes;

(iii) To encourage and support the science, technology and innovation efforts leading to the development of infrastructure and policies that support the global expansion of information and communications technology infrastructure, products and services, including broadband Internet access, to all people, particularly women, girls and youth, and persons with special needs and from remote and rural communities, catalysing multi-stakeholder efforts to bring 1.5 billion new Internet users online by 2020 and endeavouring to improve the affordability of such products and services;

(iv) To undertake systemic research, including gender, sensitive aspects, for foresight exercises, on new trends in science, technology and innovation, and information and communications technologies and their impact on development, particularly in the context of the 2030 Agenda for Sustainable Development;[1]

(v) To work, with input from a variety of stakeholders, including appropriate United Nations agencies and all relevant entities and forums, such as the Commission and the multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals, to formulate, adopt and implement science, technology and innovation policies aimed at contributing to the implementation of the Sustainable Development Goals;

(vi) To continue giving due consideration to the impact of key rapid technological changes on the achievement of the Sustainable Development Goals within their respective mandates and existent resources, in accordance with General Assembly resolution 72/242;

(vii) To use strategic foresight exercises to identify potential gaps in education for the medium and long terms and address such gaps with a policy mix, including the promotion of gender-responsive science, technology, engineering and mathematics education, vocational training and digital and data literacy;

(viii) To use strategic foresight as a process to encourage structured debate among all stakeholders, including representatives of government, science, industry and civil society and the private sector, particularly small and medium-sized enterprises, towards creating a shared understanding of long-term issues, such as the changing nature of work and building consensus on future policies,

and to help to meet current and emerging demands for competence and adaptation to change;

(ix) To incorporate the provision of digital competencies, including, but not limited to, entrepreneurship and complementary soft skills, in formal education curricula and lifelong learning initiatives, while taking into consideration best practices, local contexts and needs, and ensuring that education is technology-neutral;

(x) To address the implications of fundamental changes in the digital economy for labour markets;

(xi) To undertake strategic foresight initiatives on global and regional challenges at regular intervals and cooperate towards the establishment of a mapping system to review and share technology foresight outcomes, including pilot projects, with other Member States, making use of existing regional mechanisms, and in collaboration with relevant stakeholders;

(xii) To encourage the review of progress on integrating science, technology and innovation in the achievement of the Sustainable Development Goals;

(xiii) To conduct assessments, including of gender-sensitive aspects, of national innovation systems, including digital ecosystems, drawing from foresight exercises, at regular intervals, to identify weaknesses in the systems and make effective policy interventions to strengthen their weaker components, and share outcomes with other Member States;

(xiv) To recognize the need to promote the functional dynamics of innovation systems and other relevant methodologies based on diversified policy instruments to support science, technology and innovation development priorities, in order to strengthen the coherence of such systems for sustainable development;

(xv) To encourage digital natives to play a key role in a community-based approach, including gender-responsive approaches, to science, technology and innovation capacity-building, and facilitate the use of information and communications technologies in the context of the 2030 Agenda;

(xvi) To put in place policies that support the development of digital ecosystems, bearing in mind the potential of emerging digital technologies to leapfrog existing technologies for development, that are inclusive and take into account the socioeconomic and political context of countries and attract and support private investment and innovation, particularly encouraging the development of local content and entrepreneurship;

(xvii) To implement initiatives and programmes that encourage and facilitate investment and participation in the digital economy;

(xviii) To collaborate with all relevant stakeholders, promote the application of information and communications technologies in all sectors, improve environmental sustainability, encourage the creation of suitable facilities to recycle and dispose of e-waste and promote sustainable consumption and production patterns;

(xix) To promote science, technology, engineering and mathematics education, particularly among female students, while also recognizing the importance of complementary soft skills, such as entrepreneurship, by encouraging mentoring and supporting other efforts to attract and retain women and girls in those fields, as well as applying a gender lens when developing and implementing policies that harness science, technology and innovation;

(xx) To support the policies and activities of developing countries in the fields of science and technology through North-South as well as South-South cooperation, as complementary to but not substituting for each other, by encouraging financial and technical assistance, capacity-building, technology transfer on mutually agreed terms and conditions and technical training programmes or courses;

(xxi) To encourage countries to progressively increase the rate of generation of high-quality skilled human resources at all levels by providing an environment for building a critical mass of human resource capacity, harnessing and effectively participating in the application of science, technology and innovation for value addition activities, solving problems and enhancing human welfare;

(xxii) To increase support for research and development activities in renewable energy technologies and improve policy coordination and policy coherence with sectoral policies such as science, technology and innovation policies;

(xxiii) To support policies that increase financial inclusion and deepen the sources of financing and direct investments towards innovations that address the Sustainable Development Goals;

(xxiv) To ensure the inclusiveness of innovation, especially with regard to local communities, women and youth, to ensure that the scaling and diffusion of new technologies are inclusive and do not create further divides;

(b) The Commission is encouraged:

(i) To continue its role as a torch-bearer for science, technology and innovation and to provide high-level advice to the Economic and Social Council and the General Assembly on relevant science, technology, engineering and innovation issues;

(ii) To help to articulate the important role of information and communications technologies and science, technology and innovation as enablers in the 2030 Agenda by acting as a forum for strategic planning, providing foresight about critical trends in science, technology and innovation in key sectors of the economy and drawing attention to new and emerging technologies;

(iii) To consider how its work aligns with, feeds into and complements other international forums on science, technology and innovation and efforts supporting the implementation of the 2030 Agenda;

(iv) To raise awareness and facilitate networking and partnerships among various technology foresight organizations and networks, in collaboration with other stakeholders;

(v) To promote, in the spirit of the 2030 Agenda and the Addis Ababa Action Agenda of the Third International Conference on Financing for Development,[7] international cooperation in the field of science and technology for development, including capacity-building and technology transfer on mutually agreed terms and conditions;

(vi) To raise awareness among policymakers about the process of innovation and to identify particular opportunities for developing countries to benefit from such innovation, with special attention being placed on new trends in innovation that can offer novel possibilities for developing countries;

[7] General Assembly resolution 69/313, annex.

(vii) To support efforts to build capacity to develop, use and deploy new and existing technologies in developing countries, particularly the least developed countries, small island developing States and landlocked developing countries;

(viii) To identify mechanisms for improving capabilities in developing countries for renewable energy, including capabilities to develop policies, flexible plans and regulations, and measures to improve capabilities to absorb, maintain and adapt renewable energy technologies to the local context;

(ix) To proactively strengthen and revitalize global science, technology and innovation partnerships for sustainable development, which would entail the engagement of the Commission in (a) translating technology foresight into elaborating the scope of specific international projects for targeted research, technology development and deployment and initiatives for building human resource capacity for science, technology and innovation; and (b) exploring innovative financing models and other resources contributing to enhancing the capacities of developing countries in collaborative projects and initiatives in science, technology and innovation;

(x) To explore ways and means of conducting international technology assessment and foresight exercises on existing, new and emerging technologies and their implications for renewable energy and digital competency, including discussions about models of governance for new areas of scientific and technological development;

(xi) To support countries in their efforts to identify future trends in terms of capacity-building needs, including through foresight exercises;

(xii) To discuss and explore innovative financing models, such as impact investment, as a means to attract new stakeholders, innovators and sources of investment capital for science, technology, engineering and innovation-based solutions, in collaboration with other organizations, where appropriate;

(xiii) To promote capacity-building and cooperation in research and development, in collaboration with relevant institutions, including appropriate United Nations agencies, working to facilitate the strengthening of innovation systems that support innovators, particularly in developing countries, to boost their efforts to contribute to the achievement of sustainable development;

(xiv) To provide a forum for sharing not only success stories and best practices but also failures and key challenges and learning from the results of foresight exercises, successful local innovation models, case studies and experience on the use of science, technology and engineering for innovation, including the application of new emerging technologies, in symbiotic relationship with information and communications technologies, for inclusive and sustainable development, and to share findings with all relevant United Nations entities, including through the Technology Facilitation Mechanism and its multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals;

(xv) To continue to play an active role in creating awareness of the potential contribution of science, technology and innovation to the 2030 Agenda through substantive inputs, as appropriate, to relevant processes and bodies of the United Nations, and to share findings and good practices on science, technology and innovation among Member States and beyond;

(xvi) To highlight the importance of the work of the Commission related to the implementation of and follow-up to the areas of information and communications technologies and science, technology and innovation related to

the Sustainable Development Goals, with the Chair of the Commission to report at appropriate reviews and meetings of the Economic and Social Council, the high-level political forum on sustainable development and other relevant forums;

(xvii) To strengthen and deepen collaboration between the Commission on Science and Technology for Development and the Commission on the Status of Women, including sharing good practices and lessons learned in integrating a gender perspective into science, technology and innovation policymaking and implementation;

(c) The United Nations Conference on Trade and Development is encouraged:

(i) To seek funding proactively for the expansion of science, technology and innovation policy reviews, with an emphasis on the critical role of information and communications technologies in empowering science, technology and innovation and engineering capacity-building and utilization, and the implementation of the recommendations on those reviews, as appropriate, in close cooperation with United Nations agencies and international organizations;

(ii) To look into the feasibility of including elements of strategic foresight and digital ecosystem assessment in policy reviews of science, technology and innovation and information and communications technologies, possibly by including a chapter dedicated to these themes;

(iii) To broaden the framework for national science, technology and innovation policy reviews in order to integrate the Sustainable Development Goals, including a specific focus on bottom-of-the-pyramid approaches to innovation, and social inclusion;

(iv) To plan for periodic updates on progress made in countries for which science, technology and innovation policy reviews have been performed and to invite those countries to report to the Commission on Science and Technology for Development on progress made, lessons learned and challenges encountered in implementing recommendations;

(v) To encourage the Gender Advisory Board of the Commission to provide inputs to the policy deliberations and documentation of the Commission, to report on progress at the annual sessions of the Commission and to better integrate gender perspectives into science, technology and innovation policy reviews.

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