Commission on Science and Technology for Development
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Item 2 of the provisional agenda
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
Item 3 of the provisional agenda
Science and technology for development

Report on the intersessional panel meeting

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6–8 November 2017

Prepared by the UNCTAD secretariat*

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* This report summarizes the intersessional panel's discussions; it does not necessarily reflect the views of the UNCTAD secretariat or of the member States of the Commission on Science and Technology for Development.

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I. Introduction

1.   At its twentieth session in May 2017, the Commission on Science and Technology for Development selected the following substantive themes for its 2017–2018 intersessional period:

(a)   The role of science, technology and innovation in increasing substantially the share of renewable energy by 2030;

(b)   Building digital competencies to benefit from existing and emerging technologies, with a special focus on gender and youth dimensions;

(c)   Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society (WSIS) at the regional and international levels.

2.   To help address these themes, a panel meeting was organized by the Commission secretariat in Geneva, Switzerland, from 6 to 8 November 2017. The aim of the panel meeting was to closely examine various issues related to the substantive themes, with a view to contributing to considerations by the Commission at its twenty-first session, to be held in Geneva from 14 to 18 May 2018.

II. Organization of work

3.   The intersessional panel was attended by members of the Commission; representatives of international organizations, civil society, and the technical and academic community; business entities and other stakeholders. The documentation for the meeting included papers prepared by the Commission secretariat, presentations and policy papers submitted by participants.[1]

III. Opening

4.   The panel was opened by the Director of the Division on Technology and Logistics of UNCTAD and Head of the Commission secretariat.[2] She reaffirmed the unique position of the Commission as a multi-stakeholder forum for fostering international cooperation and dialogue, sharing experiences and finding common solutions to the most pressing national and international challenges as articulated by the Sustainable Development Goals. In this regard, the role of the Commission would become increasingly critical in addressing policy measures and actions for developing countries, especially the least developed countries, in adopting science, technology and innovation as a tool for achieving the Goals.

5.   The Chair of the Commission[3] noted the importance of the meeting to provide proposals for consideration by the May 2018 annual session of the Commission. He briefed participants on several issues, including the draft resolutions from the annual session in May 2017, meetings of the Working Group on Enhanced Cooperation, and various meetings of the Economic and Social Council that had been held since then, as well as the role played at these meetings by the Chair of the Commission's nineteenth session and other Bureau members.

6.   In her opening remarks, the Deputy Secretary-General of UNCTAD[4] underlined the important role that science, technology and innovation played in enabling and accelerating economic development. It was critical to communicate to audiences the advantages and disadvantages of new technologies to reduce a natural potential tendency towards technophobia, and the Commission played a clear role in this regard. It was important to take an integrated approach to investigating the implications of the development and spread

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[1] For meeting documents, see http://www.unctad.org/cstd (accessed 18 April 2018).
[2] Ms. Shamika N. Sirimanne, UNCTAD.
[3] Mr. Plácido F. Gómez.
[4] Ms. Isabel Durant, UNCTAD.

of traditional and new technologies. For example, artificial intelligence and robotics were creating huge impacts on global labour markets. Such an integrated treatment was explicit in the mandate of UNCTAD as the focal point in the United Nations system "for the integrated treatment of trade and development and interrelated issues in the areas of finance, technology, investment, and sustainable development".[5] Investigating the impacts of technology on sustainable development and the Sustainable Development Goals required an integrated approach. She emphasized the Commission's role in addressing emerging topics in science, technology and innovation.

IV. Theme 1: The role of science, technology and innovation in increasing substantially the share of renewable energy by 2030

7.   The Head of the Commission secretariat[6] presented an issues paper on the first priority theme. The paper highlighted the key issues and challenges in the deployment of different renewable energy technologies, in particular the role of science, technology and innovation in increasing the share of renewables in the global energy mix. There had been a spectacular increase in the deployment of renewable energy technologies, and the costs of these technologies had been falling dramatically. Achieving universal energy access and increasing the share of renewable energy were likely to have large positive impacts on various Sustainable Development Goals.

8.   The first panel was moderated by the Chair of the Commission.[7] The first speaker[8] suggested that in order to cultivate appropriate policy responses to support the deployment of renewable energy, a shift in perspective from a linear model of the innovation process to a more systemic approach incorporating a chain-linked model (taking into account contextual factors such as macroeconomic environment and geography) should be encouraged. Policies to support renewable energy, however, needed to coincide with reforms to subsidies for fossil fuel consumption. There was also a vital role for international collaboration, including collaboration in research and development through initiatives such as Mission Innovation and the Global Alliance for Clean Cookstoves. International collaboration could also develop manufacturing capacity and installation, operation and maintenance skills. Moreover, improved grid interconnections across borders could help integrate renewable energy at the regional level. Policy learning, such as energy strategies, policy mixes, policy instruments and their implementation could be shared through international collaboration.

9.   The second speaker[9] outlined some key policies and recent research and development activities in Japan on renewable energy. In Japan, multiple government agencies that worked closely with the Ministry of Science and Technology were mandated not only to support research and development but also to provide subsidies. The National Energy and Environment Strategy for Technological Innovation towards 2050 aimed to deploy energy systems integration technologies, so that various components – energy production, transport and consumption – were networked by information and communications technology (ICT), and the energy system was optimized by artificial intelligence, big data and the Internet of things. This was combined with core technologies for systems, namely, next-generation power electronics, innovative sensors and superconductivity.

10.   The third speaker[10] explained how Brazil had become a leader in clean energy innovation within Latin America. The Government of Brazil allocated substantial financial

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[5] Nairobi Maafikiano, para. 12.

[6] Ms. Shamika N. Sirimanne, UNCTAD.

[7] Mr. Plácido F. Gómez.

[8] Mr. Jim Watson, University of Sussex and United Kingdom [of Great Britain and Northern Ireland] Energy Research Centre.

[9] Mr. Kohei Uosaki, National Institute of Materials Science and Hokkaido University.

[10] Mr. Rubén D. Cruz, Technology Development Centre of the Electricity Sector (CIDET), Colombia.

resources directly to research activities, particularly those of public universities, with bioenergy receiving the largest share of university-based clean energy technology resources. For example, the Government provided funding to the National Bioethanol Science and Technology Laboratory, a network of labs that engaged in bioproduct-related research activities, such as low-impact automation of sugarcane production, biomass utilization evaluation and sustainability of production processes. Various regulations to incentivize private sector innovation in the clean electric power industry were also in place. Most electric power generation, transmission and distribution companies were required to allocate a certain percentage of their net operating revenue to the Brazilian Electric Power Sector Research and Development Programme. Legislation also required electric power research and development projects to establish well-defined goals and results. The private sector's prominent role in the Brazilian clean energy technology sector had resulted in the establishment of research centres led by the private sector and meaningful financial and operational linkages between companies, universities and independent research institutions.

11.   The final speaker[11] highlighted a compelling business model to address the challenges that disproportionately affected the ability of women and girls to access clean and affordable energy in Africa. Solar Sister, a not-for-profit organization that had created a network of women entrepreneurs, could bring products to target markets where there was a strong upstream supply chain in durable and affordable manufactured clean energy solutions, such as portable solar lamps and clean cooking stoves. Women were recruited and trained to support the clean energy enterprise. The initiative supported Sustainable Development Goals related to the promotion of decent jobs, poverty reduction and gender equality, and the provision of access to affordable and sustainable energy.

12.   In the interactive discussion that followed, delegates noted that the development of the green energy industry faced various challenges, including underdeveloped infrastructure and a lack of expertise in certain specialized renewable energy technologies. Localizing the development of renewable energy technologies rather than only importing foreign technologies was a considerable difficulty faced by many developing countries. Raising private sector investment in science, technology and innovation was also a major challenge for developing countries.

13.   The second panel was moderated by the Commission secretariat.[12] The first speaker[13] said that while the Paris Agreement under the United Nations Framework Convention on Climate Change aimed to keep the rise in global temperatures below 2°C, the findings of *The Emissions Gap Report 2017* indicated that under current levels of carbon dioxide emissions, the world was surpassing 3°C. Greater investment in renewable energy technologies could help meet targets, but a systems approach that integrated renewables together with energy efficiency and energy access – from power generation to transport and heating and cooling – was essential. A transition from policy instruments to policy strategies (long-term vision accompanying finance availability and technology) was necessary and should apply across sectors and departments, and the accompanying infrastructure needed to be put in place.

14.   The second speaker[14] said that there were large variations among member States of the Economic Commission for Europe in terms of installed renewable energy capacity. Energy security concerns pointed in the direction of building local renewable sources. Access to heating in the region could be improved with the support of renewable heating applications. However, several barriers remained, including continued energy subsidies for fossil fuels, which represented a major impediment, since renewable energy economics were not favourable in local situations. Legal, administrative and institutional complexities delayed project implementation. Licensing and permit procedures were bureaucratic, lengthy and lacked transparency in several countries. The region displayed limited regional coordination and integration in global activities for renewable energy promotion, in particular the Sustainable Energy for All initiative. This prevented it from fully leveraging

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[11] Ms. Olasimbo Sojinrin, Solar Sister, Nigeria.
[12] Mr. Angel González-Sanz, UNCTAD.
[13] Mr. Jan Dusik, United Nations Environment Programme.
[14] Mr. Gianluca Sambucini, Economic Commission for Europe.

the available technical know-how. Energy efficiency held large potential in the region but was hampered by slow policy deployment and complexities in enforcement and monitoring of secondary legislation. Lack of, or incomplete, statistical data for final energy uses was detrimental to the implementation of more precise monitoring measures.

15. Delegates provided case examples of current developments in national renewable energy policies. Legal frameworks such as energy reforms that established clear goals and aimed to stimulate greater investment in clean energies had been set up, as had sustainable energy funds to foster enhanced innovation and technology. Various incentives such as a deregulated power sector, feed-in tariffs, mandatory grid connection and power purchases, credit market facilities and carbon credits were available to increase the share of renewable energy in the energy mix. Schemes such as renewable obligations required suppliers to source an ever-increasing amount of electricity from renewable sources and rewarded output over the lifetime of a project. Various funds, for example, Energy Catalyst, funded projects that included renewable energy and energy networks, while the Newton Fund provided support for renewable energy through partnerships with developing countries.

16. The session was divided into three discussion groups on the following sub-themes: good practices and lessons learned for renewable energy deployment, the role of international and interregional collaboration, and the role of public policies for deployment of innovative renewable energy (annex I). Each sub-theme discussion was chaired by an expert speaker, who reported the group's findings to the plenary. The main points raised by participants in the group discussions are highlighted in the following paragraphs.

A. Good practices and lessons learned for renewable energy deployment

17. Participants discussed the challenges of deploying renewable energy, which included funding. Funding often determined the renewable energy agenda, and countries that received funding also wished to develop their own capabilities and technologies, instead of only serving as a market for other countries. Affordability was another issue, as using renewable energy for electricity should not constitute a burden for users. The group also noted the importance of differentiating research and development activities carried out in different countries, as some countries could not compete in highly resource-intensive science fields. Participants discussed the importance of considering the water–food–energy nexus together and the national harmonization of renewable energy standards. They suggested that policies should be flexible to cater for regional differences. They recommended using a quadruple helix approach in renewable energy deployment, where industry, university, government and civil society interacted. Further, renewable energy policies should not be isolated initiatives. It would be advisable to mainstream policies within national policies, such as national development plans, and to ensure policy coherence across sectoral policies. The discussion group noted that funding should not be confined solely to the Government. New financing models, such as peer-to-peer funding, should also be considered.

B. The role of international and interregional collaboration

18. Participants agreed that international cooperation should address the relation between renewable energy and the food system, as well as the environment, especially regarding the use of biomass and biofuels. They recommended using holistic approaches to examine all factors related to renewable energy sources and that joint research-based projects should be supported. The discussion group discussed the role of regional and international multi-stakeholder collaboration, including public–private partnerships, especially partnerships that harnessed the specific expertise and interest of stakeholders. More Commission-type collaboration, involving international organizations that addressed policy issues in a multi-stakeholder manner, should be established. In addition, it was important to improve coordination between countries and both regional and international actors, especially with regard to forecasting future trends, as well as to identify the possibilities of different actors complementing each other. It was also important to involve Government, academia, the private sector and civil society in international and regional

research and development activities, from basic research to implementation. It would be helpful to increase support for these types of initiative, such as giving incentives to academia to work on renewable energy-related patents.

19. International and regional cooperation should consider local capability development. Creating laboratories where local communities could learn and be trained, as well as providing internships to members of local communities were good examples. There was a need for Governments to defend local interests more effectively in international renewable projects to build local capabilities. The discussion group concluded that there was no one-size-fits-all approach; rather, regional and international stakeholders should use a community-based approach in renewable energy project design and involve community stakeholders throughout all stages of the project.

C. The role of public policies for deployment of innovative renewable energy

20. The discussion group discussed several policy instruments and related issues such as feed-in-tariffs, standards, public–private research and development and innovation partnerships, demand-side measures (such as public procurement), incentives and funding mechanisms for private sector research and innovation, and the building of local productive capacities. Participants agreed that policy fragmentation was a major challenge that limited the effectiveness of policy support for renewable energy deployment. They recommended improving horizontal and vertical policy coordination, both at the local and international levels, and policy coherence, striving for synergies among various policy areas. There was limited awareness of the role of renewable energy in sustainable development, especially in the framework of the Sustainable Development Goals. They recommended integrating the Goals into applied research and innovation programmes through, for example, explicit mention of them in calls for proposals. Noting the limited scope of innovation collaboration in renewable energy, participants said that it was important to emphasize knowledge rather than transfer of technology alone. This could include, for example, policy learning and work on shared standards.

V. Theme 2: Building digital competencies to benefit from existing and emerging technologies with a special focus on gender and youth dimensions

21. Introducing the issues paper on theme 2, a representative of the UNCTAD secretariat[15] said that the paper built on the Commission's previous work on foresight for digital development, the priority theme of the Commission in 2016. At the time, the Commission had examined some of the latest technological developments that were likely to disrupt and transform existing social, political, and economic norms.

22. The Commission discussed the importance of harnessing the potential of these technologies in order to achieve the Sustainable Development Goals and explored some of the challenges and risks associated with these technologies. The Commission highlighted the role of foresight as a policy-planning tool that allowed to assess the potential impact of these technologies on society. Their impact was already being felt across many areas of social and economic life, including employment opportunities. Today, new technologies were being developed in an environment shaped by the pervasiveness of digital technologies, most prominently mobile phones and the Internet. These new technologies had the potential to support the achievement of the 2030 Agenda for Sustainable Development, particularly in areas such as health, education, agriculture, new enterprise development, gender equality and environmental sustainability. To harness their potential, it was essential to foster the digital competencies that enabled individuals to engage with, and benefit from, these technological advances.

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[15] Ms. Dong Wu, UNCTAD.

23.   Technological changes were not neutral. Today's technological innovations were strongly biased toward capital and skilled labour to the detriment of routine workers, who were easily replaced by automation. New technologies posed a particular challenge to women, given their underrepresentation in science, technology, engineering and mathematics and the persistent gender gap in the use of digital technologies, such as the Internet. Technological innovations potentially offered new opportunities to young people, who were generally more adaptive to new technologies, provided they acquired the cognitive skills that were in demand on the labour market. Given these opportunities and challenges, the crucial question for the Commission was how to build the skills and competencies that were indispensable to allow individuals to participate in and benefit from the latest technological advances.

24.   The first speaker[16] said that technological change was not neutral. It was generally biased, in favour of either capital or labour. In recent years, it had increased the value of capital and skilled workers, for example, those with information technology skills. New technologies had both positive and negative effects on sustainable development and its gender dimensions. They could produce effects in labour markets and jobs. Through the automation of tasks, they could reduce the need for workers who performed repetitive tasks and for those with limited or no digital skills. At the same time, digital platforms such as eBay and Airbnb offered opportunities for e-commerce entrepreneurs and self-employment, many of whom were likely to be women. Updating skills for a digital age was therefore necessary to limit workers' risk of unemployment and income reduction. In addition, there were various levels of digital skills and competencies according to their level of sophistication: those needed for the adoption of new technologies, for their basic use, for creative use and for the creation of new technologies. To build and update digital competencies, it was necessary to consider them in formal education curricula and as part of lifelong learning. To build digital competencies, countries needed to implement additional complementary policies. For example, those aimed at closing the digital divide and creating an enabling environment through investment in infrastructure were becoming increasingly important to ensure the inclusiveness of citizens in the digital economy.

25.   The second speaker[17] described recent trends in innovation performance and digital skills in Latin America and the national strategies of Chile in these areas. She also introduced the Engineering 2030 strategy, which aimed to provide the skills required for future generations of engineers to contribute to the economic transformation of the country. Based on experience, countries that had successfully linked the development of competencies with growing productivity, employment and development had designed policies with three objectives: meeting the current demand for competencies by adjusting the offer of the labour market, helping workers and enterprises adapt to change, and creating and supporting competencies for the future demands of job markets. In the case of Chile, for example, findings indicated that educational programmes in engineering were not responding to the needs of industry. There was a lack of internationalization in academia in developing countries. The speaker suggested that a diagnostic check and international benchmarking could enable the assessment of the requirements to design and execute programmes to address shortfalls.

26.   The third speaker[18] introduced the Study Webs of Active Learning for Young Aspiring Minds initiative of India, a massive open online course platform that enabled online and free-of-cost learning in India. Such courses could complement in-person education, as well as the information available in open libraries. The initiative provided training at all educational levels, including lifelong learning. Currently, it offered over 700 courses as open education resources.

27.   He also described trends related to digital competencies and ICT adoption in India. It was important to change mindsets so that people valued the provision of digital services, especially in rural areas, and consequently valued acquiring digital competencies. It was equally important to use technological devices for educational purposes and provide

[16] Ms. Xiaolan Fu, Oxford University.
[17] Ms. Marcia Varela, Production Promotion Corporation.
[18] Mr. Manpreet S. Manna, Ministry of Human Resource Development of India.

training in local languages. Further, students using the platform could take advantage of incubation and entrepreneurship programmes recently created alongside the initiative.

28.   The final speaker[19] underlined the importance of digital competencies in primary education and introduced the Bebras International Challenge on Informatics and Computational Thinking initiative. Students needed to learn both the basics of informatics (concepts) and building programmes (coding), so as to cultivate computational thinking – the thought process of formulating problems and solutions in a form such that the solutions could be addressed by someone processing the information. This involved a set of problem-solving skills and techniques used by software engineers to write programmes and applications. Bebras was an initiative that promoted computer science skills among school students of all ages, including the ability to break down complex tasks into simpler components, algorithm design, pattern recognition, pattern generalization and abstraction. In 2016, more than 50 per cent of girls participated in the challenge in Germany, Iceland, Ireland and Japan. This initiative influenced the teaching of informatics – introducing concepts to students in a playful manner – as well as challenging teachers to deal with new concepts and building a deeper understanding of informatics. It also influenced the curriculum, as it established an international standardization process.

29.   During the ensuing discussion, delegates discussed how developing countries could become producers of digital technologies rather than just consumers of the digital technologies created elsewhere. They also discussed how to overcome the digital divide between developed and developing countries, referring to the potential roles of international collaboration, public–private sector cooperation, technology transfer and capacity-building activities. The means of implementation section of the 2030 Agenda was a pertinent example. Experts argued that to create advanced technologies, developing countries had to progressively build their technological capabilities. In addition, there was a need for better access to finance and information, and improved infrastructure (for example, infrastructure for ICTs, bandwidth, electricity and water). Several speakers said that international collaboration must play an important role and was currently underutilized. Policy measures could incentivize improved collaborative linkages across universities, and between them and industry. One speaker suggested that countries should build channels for technology transfer, for example, through online platforms, such as that being developed by the United Nations. Further, countries should pursue more actively technology transfer through international negotiations, ensuring that international trade agreements allowed for measures such as local content requirements. Countries could also make efforts to target appropriate types of foreign direct investment. Another speaker suggested that consortiums for knowledge transfer should be built. Also, measures to promote talent mobility between universities and firms could help circulate technology and skills.

30.   The second panel was moderated by the Commission secretariat.[20] The first speaker[21] introduced the main findings of a report on digital skills for life and work prepared in the context of the Broadband Commission. The report showed that in developed economies 90 per cent of jobs required some level of digital skills. Yet more than one third of the labour force in countries of the Organization for Economic Cooperation and Development had a low capacity to use digital technologies productively, and 56 per cent had no ICT skills. Women were more likely than men to lack digital skills. This showed that digital skills were a policy concern, even in developed countries. There was a need to identify and assess digital skills globally, as well as to reduce digital gaps. The United Nations Educational, Scientific and Cultural Organization and other bodies, such as the Group of 20, were taking steps to do so.

31.   He said that it was necessary to provide people with the skills that empowered them to use digital technologies in an effective and safe manner, noting that digital literacy should include a broad spectrum of skills. Some of the recommendations of the report were as follows: to ensure the effective support of Governments; promote multi-stakeholder

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[19] Ms. Valentina Dagiene, Vilnius University.
[20] Mr. Angel González-Sanz, UNCTAD.
[21] Mr. David Atchoarena, United Nations Educational, Scientific and Cultural Organization.

cooperation; focus on inclusion, equity and gender equality; and undertake measurement and assessment of policies at both the national and international levels.

32.   The second speaker[22] outlined the main trends regarding digital competencies and ICT access for women. She said that 250 million fewer women than men had access to the Internet and that the widening gender gap in global Internet access was largest in the least developed countries. Its roots lay in a complex set of social, economic, and cultural barriers. It was important to understand the specific barriers that prevented women and girls from accessing the Internet and how emerging technologies, such as artificial intelligence, could eliminate rather that increase the divide. The International Labour Organization and the International Telecommunication Union had launched the Digital Skills for Decent Jobs for Youth campaign, which was part of the Global Initiative on Decent Jobs for Youth that aimed to foster decent and inclusive employment and entrepreneurship opportunities. Both in and out of school training of digital skills were important to create job opportunities for young people in the digital economy. Other efforts of the International Telecommunication Union in this regard were the Global Partnership for Gender Equality in the Digital Age, or EQUALS, of which UNCTAD was a member, and the Girls in ICT Day initiative. Further, data collection and availability were crucial to inform analysis and contribute to sound policymaking.

33.   During the presentations of country case studies, one delegate outlined the importance of incorporating informatics at all levels – and all activities – within the education system, such as using paint software for painting or using bibliographic managers such as EndNote or Zotero. Another delegate gave some examples of useful national initiatives, including teaching young users to deal with online hate speech and bullying, as well as coding, robotics, and website design. One delegate outlined a national initiative for digital competencies to 2030, which targeted vulnerable groups in society for digital inclusion, promoted digital skills acquisition through education, created employability and stimulated professional specialization, as well as research and development in emerging technologies. Another speaker outlined the challenge of ensuring that all teachers of computing had the knowledge, skills and confidence needed to teach a newly adopted curriculum effectively, which was being addressed through initiatives such as a network of master teachers who could provide bespoke support to other teachers nationwide, as well as free online resources and workshops for teachers.

34.   The final speaker introduced the main features of his country's social and economic development strategy, which included the strengthening of human capital; the improvement of the competitiveness and productivity of firms, particularly micro, small and medium-sized enterprises; and the reduction of institutional constraints to facilitate the growth of firms. Measures to provide digital skills and entrepreneurial opportunities in his country included the provision of broadband Internet for all and the establishment of several agreements with international partners aimed at providing an environment that enabled the creation of products for global markets.

35.   The session was divided into three discussion groups on the following sub-themes: digital capabilities for the labour market, digital capabilities and an enabling environment for ICT development, and the role of education policies and lifelong learning in building digital competencies (annex II). Each sub-theme discussion was chaired by an expert speaker, who reported the group's findings to the plenary. The main points raised by participants in the group discussions are highlighted below.

A.   Digital capabilities for the labour market

36.   Participants stressed the need for more apprenticeship programmes. In this regard, makerspaces and living laboratories in Africa were good practices. In addition, the design of education and lifelong learning policies on digital competencies should take into account present and future trends and changes in labour markets and jobs. There was a need for lifelong learning training for trainers, particularly in entrepreneurship and soft skills.

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[22] Ms. Carla Licciardello, International Telecommunication Union.

Soft skills, in particular problem-solving skills, were fundamental at all levels of education. So, too, were lifelong learning strategies to consider computational thinking in combination with other general knowledge. This enabled learners to use the skills in a broad range of disciplines and increased the lifespan of the skills acquired.

37.   The discussion group explored the importance of providing training to policymakers in interdisciplinary topics, which would enable policymakers to deepen their understanding of technological developments and their social and economic impacts. Importantly, the Commission was a place to share good practices and connect policymakers and scientists, thus strengthening the science–policy interface. Further, participants stressed the importance of inclusion in the provision of digital competencies and suggested that that the Commission should increase its efforts towards that goal, particularly the inclusion of people with special needs and the illiterate. ICTs could contribute significantly to building skills.

B.   Digital capabilities and an enabling environment for the development of information and communications technology

38.   The group suggested that the focus on gender and youth described in the relevant issues paper could be further strengthened. Access and inclusiveness – within and between countries – were considerable challenges, with the gender gap a major obstacle. Digital technologies could be used to build skills among young people and women. It would make a deeper analysis of why women, in particular, were severely marginalized in the adoption of digital technology, and hence digital competencies, and how youth and women could be effectively targeted for digital skills training at the local, national, regional and international levels. In terms of best practices for this sub-theme, the National Coalitions for Digital Skills and Jobs among States of the European Union was a good example of international cooperation enhancing digital capabilities and providing an enabling environment for ICT development. The discussion group recommended that focus should not only be on accelerating training opportunities for citizens, but also on increasing the adaptability of education systems to constantly changing technologies. Further, it was necessary to embed the concept of lifelong learning in vocational strategies. With regard to policy measures, bypassing stages in digital learning, also known as leapfrogging, might be ideal for contexts in which there were resource limitations, especially in developing countries. For example, the older generation that had little to no knowledge of the use of computers was learning to use smartphones.

C.   The role of education policies and lifelong learning in building digital competencies

39.   The discussion group agreed that education policies should find a balance between pedagogy and technology and avoid a technology bias. A good example was a system-wide improvement of training on informatics in Cuba. The group recommended that curricula should be developed based on empirical evidence. It discussed how to give value to the teaching profession in the context of increasing competition from the information technology sector for high-skilled professionals. Good examples were private sector involvement and civil engineering organizations contributing to teaching digital competencies in classrooms. Policymakers should make use of the private sector in building skills, but at the same time, ensure technology neutrality. In addition, gender bias and teachers' awareness of possible gender bias should be considered when implementing initiatives focused on building digital competencies, and gender bias training should be a compulsory part of the curriculum for teachers. It was important for education policies to emphasize the education of mathematics, and science, technology, engineering and mathematics in general. The discussion group suggested that countries such as Finland or Israel should be asked to share their good practices on enhancing the education of those fields, particularly mathematics.

40.   With regard to infrastructure, the discussion group recommended that some international organizations might identify infrastructure requirements to achieve

meaningful education. Acknowledging the need for lifelong learning, participants agreed that open courses and massive open online courses were useful tools. Further, more courses should be brought into the public domain, and policymakers should support retraining programmes. As a universal recommendation, the discussion group suggested that education programmes aiming to build digital competencies should be contextualized for local conditions.

VI. 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

41.   This session was moderated by the Vice-Chair of the Commission.[23] Participants considered the linkages between the WSIS process and the 2030 Agenda for Sustainable Development, particularly in terms of the gaps between and within countries, under the imperative of "leaving no one behind". Advances in addressing ICT gaps would be considered at the high-level political forum on sustainable development to be held in July 2018.

42.   The first speaker[24] highlighted the current state of play in implementing WSIS outcomes. Almost 20 years had passed since the initial resolution to hold such an event and many new technologies had emerged. WSIS issues were now central to shaping societies in people's interest. It was important to understand the impact that ICTs had on structural inequalities, and there was a risk that the least developed countries would be left behind. The benefits of ICTs were unevenly distributed, with more going to those who had adequate resources. Foresight studies would need to play an important role in helping to foresee and prepare for the future by using technologies to achieve desirable changes. Since commercial interests were currently driving the Internet, responsible businesses would have to pay attention to various impacts, including ethical and legal factors. As before, international organizations such as UNCTAD, the United Nations Educational, Scientific and Cultural Organization and the International Telecommunication Union had a key role to play in the WSIS process, and the Commission was important to bring various key stakeholders together.

43.   With regard to the implementation of WSIS outcomes carried out by the International Telecommunication Union, the speaker[25] recalled the linkages between the WSIS action lines and the Sustainable Development Goals, and the importance of providing relevant inputs on best and emerging practices at the global, regional and national levels to the 2018 high-level political forum on sustainable development. She highlighted the activities of the EQUALS Partnership in addressing the digital gender gap.

44.   UNCTAD[26] presented the highlights of the recently launched *Information Economy Report 2017: Digitalization, Trade and Development*. The new digital economy was taking shape through ICTs, with significant impacts on the workforce. Recent estimates showed that electronic commerce (e-commerce) was growing quickly, but that there was a considerable divide between developed and developing countries. It was important that multi-stakeholder actions address the need for digital skills, given that an increasing proportion of work activities in the future would be based at least in part on such skills. Teachers' education and skills were also key issues that should be addressed. With regard to the connection between trade and ICTs, the percentage of funding in Aid for Trade allocated to these technologies had declined, despite their increasing importance. Since the Internet enabled more inclusive trade, it was necessary to coordinate trade and ICT policies to help developing countries join global value chains.

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[23] Mr. Peter Major, Permanent Mission of Hungary to the United Nations in Geneva.
[24] Mr. David Souter, ICT Development Associates.
[25] Ms. Doreen Bogdan-Martin, International Telecommunication Union.
[26] Ms. Scarlett Fondeur Gil, UNCTAD.

45.   Another speaker[27] presented recent trends about basic access to, and use of, ICTs in Asia. The data had been collected by LIRNEasia, a regional ICT policy and regulation think tank active across Asia and the Pacific. She noted that Asia had made large strides in providing affordable access to the Internet. However, smartphone penetration remained relatively low, although there were a few exceptions, such as Myanmar, which had managed the leap towards smartphones. People in Asia were using the Internet extensively for social media purposes. According to the data, a lack of skills was the most important issue, but policies that regulated online activity were equally relevant and would require international mechanisms. One positive development was that many people in emerging Asia were now online and earning money as major suppliers of remote digital work. Going forward, there was a need for constant upgrading of skills through "learning how to learn".

46.   A representative of the Internet Governance Forum Secretariat[28] briefed participants on the Forum's intersessional progress towards implementing the recommendations of the Working Group on Improvements to the Forum.

47.   The Multi-stakeholder Advisory Group had held a meeting during the 2017 WSIS Forum. It had undertaken new initiatives, for example, one concerning concise policy messages, and would soon be undergoing a handover process. The secretariat provided updates on linkages between the WSIS Forum and other Internet governance entities as well, including the international Geneva track.

48.   The Head of the Commission secretariat and the Director of the Division on Technology and Logistics gave a briefing on behalf of the Chair of the Working Group on Enhanced Cooperation, providing updates on its fourth meeting.

49.   During the ensuing discussion, delegates considered what might be the minimum required standard for meaningful access to the Internet, and key elements to accelerate progress. There were various targets, such as the Connect 2020 targets of the International Telecommunication Union. They concluded that some connectivity was better than none at all and that measuring progress towards targets required adaptable targets that were based on community inputs, as well as on benchmarks and data.

VII. Findings and suggestions

50.   The following findings and suggestions were highlighted by the intersessional panel and put forward for consideration by the Commission at its twenty-first session.

A. The role of science, technology and innovation in increasing substantially the share of renewable energy by 2030

1. Main findings

51.   The achievement of the Sustainable Development Goals is highly dependent on increasing access to clean energy services. Increasing renewable energy deployment has a substantial implication on income generation, and other development outcomes such as gender equality, health and efforts to combat climate change. Countries have different renewable energy pathways, depending on local contexts, including geographical patterns, cultural and institutional conditions, and policy and regulatory frameworks. Due to their strategic importance for sustainable development, renewable energy policies should be part of a country's national development strategy. Further, policy mixes and a systematic approach to innovation are necessary to increase the share of renewable energy. These include measures targeting both the demand and supply for renewables, but also a mix of supporting policies to stimulate research and development, build skills locally, ensure affordability and create a supporting regulatory environment. Finally, international cooperation, including North–South and South–South cooperation, has a major role to play in expanding substantially the share of renewable energy by 2030. International cooperation

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[27] Ms. Helani Galpaya, LIRNEasia.
[28] Mr. Chengetai Masango, Internet Governance Forum Secretariat.

can not only facilitate knowledge sharing, policy learning, capacity-building and technology development, but it can also make a major contribution to developing interconnected grid infrastructures.

2. Suggestions

52. Member States may wish to consider the following suggestions:

(a) Increase national support for research and development activities in renewable energy technologies and enabling technologies, and bring together Government, academia, the private sector and civil society in these activities, from basic research to implementation;

(b) Adopt policy mixes that allow for flexibility to support renewable energy innovation and deployment, and improve policy coordination and policy coherence with sectoral policies such as science, technology and innovation policies;

(c) Ensure the coherence of renewable energy policy with the broader national development agenda;

(d) Enable the contribution of grid and off-grid approaches by creating a supporting regulatory environment and tariff structure;

(e) Consider policies on renewable energy technologies aimed at increasing income-generation opportunities and contributing not only to household use, but also to the industrial, commercial and agricultural sectors;

(f) Support new business and financing models to ensure the affordability of renewable energy technologies by spreading upfront costs;

(g) Recognize and consider social and cultural contexts of local communities, especially women, and support innovation, scaling and deployment of technologies in household-related energy services;

(h) Promote North–South, South–South and triangular partnerships on renewable energy technologies, and investigate collaborative research and development mechanisms that might be effective in facilitating technology transfer;

(i) Build domestic innovative capabilities, including skills for installing, maintaining and repairing renewable energy technologies, and engage with local communities, including women, in training and maintenance of these systems.

53. The international community may wish to consider the following suggestions:

(a) Facilitate international and regional joint research activities on renewable energy, including in forecasting trends, and apply holistic approaches to examine the relation between water, food, energy and the environment;

(b) Encourage international science, technology and innovation collaboration in renewable energy;

(c) Improve interconnection of grid infrastructures for renewables across borders.

54. The Commission is encouraged to take the following steps:

(a) Support multi-stakeholder collaborations for policy learning, capacity-building, and technology development;

(b) Improve coordination between stakeholders and enable partnerships in renewable energy that harness the specific expertise and interest of stakeholders;

(c) Encourage the sharing of lessons between countries and regions, while recognizing that policies and policy mixes cannot be simply transplanted from one context to another;

(d) 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.

B. Building digital competencies to benefit from existing and emerging technologies with a special focus on gender and youth dimensions

1. Main findings

55. Digital technologies are already affecting many areas of social and economic life, including employment opportunities. The deployment of existing and emerging technologies offers potential to support the achievement of the 2030 Agenda, particularly in areas such as health, education, agriculture, new enterprise development, gender equality and environmental sustainability. However, rapid technological change also gives rise to concerns and challenges, since new technologies can also increase inequalities. Building digital competencies can help countries maximize the benefits and reduce the negative effects of new technologies in societies.

2. Suggestions

56. Member States are encouraged to take the following steps:

(a) Implement initiatives and programmes that encourage and facilitate investment and labour participation in the digital economy. These include, among others, training (including digital entrepreneurship), online platforms, community activities, financial incentives (for example, tax breaks, low-interest rate bank loans), funding for digital small and medium-sized enterprises, promotion of e-business and entrepreneurship, and automation or digitization of existing business;

(b) Implement policies aimed at establishing adequate ICT infrastructure. These include promoting investment in infrastructure and data resource capabilities, including facilities for data collection, storage, and transmission, capabilities for big data analysis and decision making, and appropriate tools to provide and benefit from open government data;

(c) Incorporate the provision of digital competencies and complementary soft skills, including entrepreneurship, in formal education curricula and lifelong learning initiatives. This should take into consideration best practices, local context and needs, and ensure that education is technology neutral, that is to say, that it does not promote specific technologies;

(d) Promote the study of science, technology, engineering and mathematics, particularly among women students, while also recognizing the importance of adding the arts to the traditional combination of technical subjects. Training also should be provided to teachers, particularly in areas such as digital skills and computational thinking. Capacity-building in these areas can be provided in combination with training in other general skills, such as entrepreneurship and soft skills, and should consider mandatory training on gender bias awareness;

(e) Support firms and other stakeholders in the provision of training of broad digital competencies for the workplace and in wider social life, lifelong learning capabilities and entrepreneurship skills. Collaboration among stakeholders, including public–private partnerships, should be promoted to support infrastructure development, and data facility building. Special attention should be devoted to policies and partnerships that target the creation and strengthening of digital competencies and skills in youth and women;

(f) Implement support mechanisms to identify trends in ICT development and skills needs, such as foresight, that help workers to meet the current and emerging demands for competence, and workers and enterprises to adapt to change.

57. The international community may wish to consider the following suggestions:

(a)   Foster closer collaboration among different international organizations and with civil society organizations to create initiatives that aim to build digital skills, including hackathons, workshops and other interactive forums;

(b)   Identify ICT infrastructure requirements that enable meaningful training on digital skills and competencies;

(c)   Promote the use of digital methods such as online platforms for international knowledge sharing and capacity-building.

58.   The Commission may wish to consider the following suggestions:

(a)   Strengthen the Gender Advisory Board, particularly with respect to building digital competencies, in collaboration with relevant United Nations entities focusing on digital technologies and gender;

(b)   Foster closer international cooperation to build linkages in academia across different countries, particularly to create opportunities for students in developing countries to take part in exchange programmes in other countries with sophisticated education systems, as well as for commercialization innovations from research institutions in developing countries;

(c)   Support the provision of training programmes for policymakers in interdisciplinary topics related to technological change and its development implications and facilitate dialogue between policymakers and science counterparts to keep them abreast of technological developments and their impacts;

(d)   Support efforts to build capacity to develop, use and deploy new and existing technologies in developing countries, particularly the least developed countries;

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

(f)   Encourage knowledge sharing between Member States and other stakeholders, not only about best practices and success stories, but also about failures and challenges associated with building digital competencies.

Annex I

The role of science, technology and innovation in increasing substantially the share of renewable energy by 2030

Theme 1: Good practices and lessons learned for renewable energy deployment

(a)   What are the opportunities and challenges in research and innovation for renewable energy technologies in your country?

(b)   What can countries do to integrate renewable energy in different economic sectors, for example, energy, industry, transport, food, and building?

(c)   What are the roles of off-grid and mini-grid solutions in improving access to electricity?

Theme 2: The role of international and interregional collaboration for renewable energy deployment

(a)   What has been your experience in international and interregional collaboration in the area of renewable energy?

(b)   Could you give concrete examples of effective mechanisms for collaboration?

(c)   What new mechanisms and areas of collaboration, including public–private partnerships, could be introduced to scale up renewable energy technologies?

(d)   What should be the role of the international community, including the Commission on Science and Technology for Development?

Theme 3: The role of public policies in the deployment of innovative renewable energy

(a)   What have been the most effective policy instruments and policy mixes for supporting research, innovation and wider diffusion of renewable energy technologies?

(b)   How can science, technology and innovation policy be coordinated with relevant sectoral policies to provide more effective support?

(c)   How can science, technology and innovation policy for renewable energy be aligned with the 2030 Agenda for Sustainable Development and the Sustainable Development Goals?

Annex II

Building digital competencies to benefit from existing and emerging technologies with a special focus on gender and youth dimensions

Theme 1: Digital capabilities for the labour market

(a)   How do you anticipate that the fourth industrial revolution will affect the digital competencies needed in your country?

(b)   How is your country responding to the new demands in terms of digital competencies? What are effective measures in this regard?

(c)   What policies related to digital competencies should be prioritized from a labour market perspective?

Theme 2: Digital capabilities and an enabling environment for ICT development

(a)   From your experience, what elements of the ICT enabling environment need to be addressed as a priority in order to build digital capabilities?

(b)   What is the role of the private sector and other stakeholders in trying to build an enabling environment?

(c)   What should be the role of the international community, including the Commission on Science and Technology for Development?

Theme 3: The role of education policies and lifelong learning in building digital competencies

(a)   How is your country incorporating digital competencies in education policies and lifelong learning?

(b)   From your experience, what are the considerations that should be taken into account when implementing these types of initiatives?

(c)   What policies can be most effective in leveraging digital competencies in education and lifelong learning?