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Report of the Intersessional Panel Meeting

Palais des Nations, Geneva, 26–28 November 2014

Prepared by the UNCTAD secretariat¹

¹ This report summarizes the intersessional panel's discussions; it does not necessarily reflect the views of the UNCTAD secretariat. This document has not been formally edited.

I. Introduction

1. At its seventeenth session held in May 2014, the Commission on Science and Technology for Development (CSTD) selected the following substantive themes for its 2014–2015 intersessional period:

- Strategic foresight for the post-2015 development agenda;
- Digital 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.

2. To help address these themes, a panel meeting was organized by the CSTD secretariat in Geneva, from 26 to 28 November 2014. The aim of the panel meeting was to study in depth the various issues related to the substantive themes, with a view to contributing to the eighteenth session of the CSTD in May 2015.

II. Organization of work

3. The CSTD panel meeting was attended by members of the Commission; representatives of international organizations; civil society, technical and academic community and business entities; and other observers (see the annex for the full list of participants).

4. The documentation for the meeting included issues papers prepared by the CSTD secretariat, presentations and policy papers by the participants. All the meeting documents are available online at the Commission on Science and Technology for Development website (www.unctad.org/cstd).

III. Opening

5. The panel was opened by Dr. Omobola Johnson, Minister of Communication Technology of Nigeria and Chair of the Commission. She provided an overview of the Commission's work during this intersessional period, as well as an update on the decisions taken by the Economic and Social Council and the General Assembly since the seventeenth session of the CSTD.

IV. Priority theme 1 Strategic foresight for the post-2015 development agenda

6. The Director of UNCTAD's Division on Technology and Logistics and Head of the CSTD Secretariat² made a presentation on the theme 1 issues paper. She drew attention to the mandate contained in Economic and Social Council resolution 2014/28 on STI for development, where the Commission is encouraged to act as a forum for horizon scanning and strategic planning, providing foresight about critical STI trends and drawing attention to emerging and disruptive technologies that could potentially affect the achievement of the emerging post-2015 development agenda. Strategic foresight is a participative process to assess the long-term future of STI and their potential impacts on society. It has been widely practiced in all world regions, where a number of foresight tools and methodologies were used. The CSTD's horizon scanning for the issues paper contains a critical meta-analysis of

² Ms. Anne Miroux, UNCTAD.

relevant studies and inputs from foresight experts from around the world. It has identified key trends in the following areas that are likely to have a significant impact on the draft sustainable development goals (SDGs): natural resources, sustainable energy, climate change mitigation/adaptation/carbon offset, converging technologies, health and disaster resilience, urbanization and habitat, and finally, sustainable transportation and mobility.

7. The trends identified by the CSTD's horizon scanning exercise show the importance of technology convergence, particularly driven by continuous advances in ICTs. New technologies do not automatically translate into societal benefits, and policy intervention is needed to prevent the creation of new inequalities or the amplification of existing ones. The issues paper illustrates that foresight can be used to harness the potential of new and emerging technological trends to advance socioeconomic policy objectives. It can also help anticipate future innovation policy and private sector investment needs, particularly for infrastructure development.

8. The first expert speaker of the panel³ provided participants with a historic overview of foresight. Foresight activities had started in the 1950s and 60s, but only recently evolved into systematic activities with the participation of multiple stakeholders. Especially as of the 90s, foresight became a tool for STI policymaking by Government, industry and academia. Today, strategic foresight consists of a systematic attempt to look into the broader future of STI, to identify research and technology areas likely to yield the greatest benefits for the socioeconomic development of societies. It is a process already being practiced around the world, with increasing focus on innovation, the development of service economies, as well as global demographic, cultural, and environmental trends. Systemic foresight aims to combine the questions of what is feasible, what is possible, and what is desirable. Outputs of foresight include STI priority-setting and identification of critical technologies and strategies to allocate limited resources towards tackling grand societal challenges. The speaker pointed out that the foresight processes themselves are just as important as the outcomes, especially with the engagement of all relevant stakeholders and segments of society.

9. The second speaker⁴ emphasized that foresight methods were particularly useful when addressing long-term challenges that require a collaborative response. The World Economic Forum (WEF) uses a multi-method, multi-stakeholder approach to foresight that includes the analysis of geopolitical questions, which is indispensable when thinking about emerging technologies. The speaker shared insights on international foresight projects of WEF in collaboration with Mongolia and Ukraine, and on the future availability of natural resources. She highlighted key areas of focus of the Emerging Technology Project of WEF. In the near future, technologies may replace today's natural resources such as gold or oil that determine geopolitical power relations. There are many areas where technologies can have a positive impact. For example, with increased availability of ICT-enabled monitoring tools, political leaders could be held more accountable. At the same time, new technologies raise issues and concerns that deserve attention. Some of the examples are personal genomics, the increasing interconnection of technology with the human body, and the control over the ecosystem of data and technology. The speaker observed that the equality of access to technology is likely to become a human rights issue.

10. The third speaker⁵ made a presentation on the impact of technology trends on employment. The nexus of technology, education, and job creation is a challenge for policymakers. The potential scope of automation is rapidly expanding, particularly due to

³ Mr. Ozcan Saritas, Professor of Innovation and Business, National Research University, Higher School of Economics, Moscow.

⁴ Ms. Kristel Van der Elst, Head of Strategic Foresight, World Economic Forum.

⁵ Mr. Carl Benedikt Frey, Oxford Martin Programme on the Impacts of Future Technology.

the declining cost and expanding scope of computerization, such as the expansion of big data. Some jobs which were once thought irreplaceable are now replaceable. Low-skilled jobs would be most affected by such trends, while generalist tasks are harder to automate. In the future, human labour would continue to be preferred in areas that require social intelligence, creativity, and perception/manipulation, which are difficult to be automated. At the same time, technology would also create jobs, above all in the high-skilled, high-income category. The speaker presented findings of an analysis of various occupations and identified those most susceptible to automation. The analysis found that 47 per cent of all jobs were under high risk of automation. A substantial upgrading of skills, particularly soft skills such as entrepreneurship and creativity, would therefore be necessary in the future to prepare for the emergence of new industries.

11. The final speaker of the panel⁶ presented two case studies from Nigeria on revitalizing vocational and technical education to prepare the workforce for disruptive technologies, particularly through public-private partnerships. Less than five per cent of secondary education in Nigeria is oriented towards vocational education skills. There is relatively low interest in structured vocational education, inadequate infrastructure and a shortage of instructors, which also results in a shortage of well-trained technicians in several sectors. The speaker proposed three instruments to respond to this shortage: (a) Establishing a separate national vocational training board, which is a step already taken by some other countries in Africa; (b) exposure of vocational education teachers and students to industry and emerging technologies; (c) revamping the existing Industrial Training Fund in preparation for disruptive technologies, for example by supplying equipment and training facilities, student exchange programmes and the like.

12. The speaker described a Certificate Programme in Automotive Technology established by the Distance Learning Centre of the University of Ibadan, in partnership with a private auto-mechanical workshop. The Programme provided for an upgrade of skills for auto mechanics in several states of Nigeria, which enabled their adaptation to changes in vehicle manufacturing technology. The three-month Programme included training in technical and service delivery skills. It enabled many participants to improve job opportunities, and provided a good model for university involvement in vocational training using distance learning. The speaker also gave an example of the Institute for Industrial Technology in Lagos, an NGO-private sector initiative that provided practical skills training mainly for participants from lower-income groups. The Institute provided both classroom and hands-on practical training through industrial exposure. Scholarships were provided through a stipend, while companies were encouraged to contribute to the financing. Many participants secured employment through interviews with partnering companies.

13. The speaker concluded his presentation by underlining three lessons from the two case studies: (a) Universities, NGOs and the private sector could play major roles in supporting the government to prepare the workforce for emerging disruptive technologies; (b) appropriate strategies need to be devised for both pre-employment and on-the-job training; and (c) programme certification could be arranged through tertiary institutions, national vocational education regulatory boards and international certification bodies.

14. In the ensuing discussion, participants raised various issues related to the implications of technology trends on policymaking. Public funding of STI, the size of the workforce and working hours may all be impacted as a result of the increasing automation of employment. It is imperative for societies to understand the implications of the digital revolution when transitioning from the MDGs to the SDGs. Sound metrics are needed to guide policymakers. At the global level, further research is needed to better understand the

⁶ Mr. Abel Olorunnisola, University of Ibadan, Nigeria.

implications of technology trends in areas such as biotechnology and ICTs on the global economic geography.

15. One participant noted that when conducting technology foresight, it is imperative that sufficient attention be devoted to the social, economic and environmental dimensions of development. For example, to ensure that the development outcomes are socially inclusive, one must take into account the educational needs of women in designing these foresight studies. He also pointed out the need to examine the policy implications of the demand for open data and intellectual property sharing to promote local manufacturing.

16. A speaker underlined that a key role of foresight is to reveal the global nature of some of the challenges, increase the awareness of societies and prepare for joint action. Not all countries are faced with identical challenges; each is at a different stage of development, with different technological capabilities, cultures and priorities. The CSTD could serve as a platform to bring these communities together, and encourage them to share good practice examples and lessons learned, especially in how they use foresight to address their development challenges.

17. Many participants underscored the importance of education: They noted the need to evaluate the education system in view of the advent of disruptive technologies, and the need to establish mechanisms which support life-long learning, continuous education, and the retraining of trainers.

18. During the afternoon of the first day, the CSTD intersessional panel successfully made use of the World Café format to organize simultaneous group discussions on three sub-themes. The group discussions were preceded by a presentation of a speaker on the guidelines for the World Café format⁷. Each sub-theme discussion was chaired by a CSTD delegate who reported the group findings to the plenary⁸. Several participants encouraged the use of the World Café format in future intersessional panels and sessions.

19. The salient points raised by participants in the “Technology Foresight Café” are highlighted under the respective sub-themes below.

(a) STI and ICT trends, implications for MDG/SDGs transition and post-2015 development agenda

20. When discussing the STI trends mentioned in the issues paper on strategic foresight, participants stressed that technology selection should be based on the specific socioeconomic and cultural context of countries. One participant mentioned that the trends of the issues paper addressed all the nine themes prioritized in their national economic agenda. Meanwhile, the seven themes mentioned in the issues paper could also emphasize additional areas, such as education and ICTs for society. Education was an important theme, both in terms of upstream/higher education and vocations. The discussions covered the notion of the pervasiveness of ICTs, both in positive and detrimental terms. Participants said that the underlying requirements of STI and ICTs, such as access to electricity, access to data and supercomputing (to make use of big data) should be included among the trends as well.

21. Participants underlined the need to increase the visibility of the CSTD’s work on STI and ICT trends, to ensure that they would be firmly embedded as enablers of the SDGs, which currently did not include specific references to STI. Technology trends should be

⁷ Mr. Vicente Carabias-Huetter, Lecturer of Technology Foresight at Institute of Sustainable Development, Zurich University of Applied Sciences.

⁸ The discussions were guided by a set of questions contained in appendix 1 of this summary report.

linked with the socioeconomic needs of countries, especially given that some technologies could facilitate progress towards multiple SDGs. A participant proposed that the CSTD should share its findings on issues including foresight not only through the Economic and Social Council platform, but the High-level Political Forum (HLPF) on Sustainable Development, the Global Sustainable Development Report (GSDR) and SDG implementation processes.

22. Participants also highlighted particular issues related to conducting foresight studies, such as undertaking foresight at the sectoral and regional levels. Finally, participants mentioned that STI played an important role in natural resource management, which is a critical issue to reach the SDGs.

(b) Foresight: Sharing of national experiences and methodologies

23. It became evident from interventions by several participants that foresight initiatives are widely used in CSTD member states, especially in relation to national development plans. Some delegates shared experiences on foresight exercises covering multiple countries. There were differences between countries in terms of the institutional setup, funding and accountability of these exercises, which very much depended on their objectives. Some of these initiatives trickled down from national development plans, while others started with STI foresight exercises, moving up to national plans. Public consultation involving all relevant stakeholders, for example by using national surveys, and inter-ministerial decision-making were important elements of developing national plans. In terms of accountability, there was diversity in practices. In some countries, foresight was stipulated by law, for example to provide advice for Governments and parliaments, while in others, expert advisory groups were formed on various themes. Participants expressed the need to have national strategies in place that superseded politics and government changes. Ensuring continuity was especially important for STI-related work. Foresight studies could be used to inform and review national plans on a frequent basis, for example by using scenario planning to identify which scenario was currently playing out.

24. Participants recommended that STI be fully integrated into economic development plans instead of remaining as an elite consideration. Foresight studies that incorporated societal needs could also lead to entry points to new national economic sectors. For example, the needs-based development of local medicine could serve as an entry point to biotechnology. One participant mentioned that close collaboration between researchers and decision makers was necessary to ensure that foresight studies would be realistic in terms of identifying goals that are desirable (societal need), possible (research) and feasible (funding) all at once.

25. Participants underlined the importance of setting precise goals and developing metrics to review progress towards national plans. They also discussed about capacity-building efforts on conducting their own foresight studies and suggested various ways to enhance capacity, such as meeting needs through cooperation with international experts or universities.

(c) Regional and international collaboration in foresight

26. In the group discussion on the role of regional and international collaboration, participants highlighted the importance of North–South and South–South cooperation. They noted that foresight should not be a top-down exercise carried out in isolation; it should involve all segments of the society. As well, foresight could take place at all levels including, inter alia, local communities, municipalities, nation States, subregions and

regions. They observed that it has been proven beneficial for countries in the same region to pool existing resources and maximize impact through joint foresight exercises to address common challenges for example in the area of health, agriculture, water and energy. In this context, existing regional mechanisms, such as the Economic Community of West African States (ECOWAS), could usefully serve as a platform. Countries that are not be in the same region, but face similar development challenges -for example landlocked developing countries (LLDCs), least developed countries (LDCs) and small island developing States (SIDS) might also consider joint foresight initiatives. Cooperation should not be limited to South-South: it is important to foster the exchange of experiences among developing countries and the more advanced countries that have been successful in overcoming similar challenges in the past. Participants underscored the importance of diversity, consultation and participation in conducting foresight.

27. In the discussion on how to prepare the STEM workforce for disruptive technologies, participants emphasized the importance of training-the-trainers, continuing education and life-long learning. In this context, foresight could be useful in identifying gaps in the education system with a view to addressing the problems in a timely manner. Other issues raised under this sub-theme were: preparing the overall workforce for the future, including the need to better incorporate practical training opportunities in education, fostering the transfer of technology and know-how, setting quotas and targets to encourage STEM enrolment, using social media as an important channel for education and training, providing vocational counselling, and ensuring open access to scientific data and material. Participants argued that it is not only STEM education, but the entire education system that needs to be re-examined for its relevance. Besides STEM skills, participants noted that analytical skills, critical thinking, creativity, and problem solving skills are just as important in preparing the workforce.

28. With regard to engagement with the private sector in foresight, participants observed that any foresight exercise without the private sector participation is unlikely to yield useful outcomes. They suggested ways to incentivize private sector participation, including funding companies, particularly SMEs, to undertake joint research and development projects and foresight initiatives. Finally, participants noted that the CSTD could contribute towards capacity-building, awareness creation, and impact assessment for various foresight initiatives. To this end, it could serve as a knowledge portal for peer-reviewed foresight practices carried out at the national and regional levels, as well as a platform that which identifies global trends that deserve attention and call for strategic partnerships. Participants recommended that the Science, Technology and Innovation Policy (STIP) reviews of UNCTAD should focus more on foresight in the future, possibly by devoting a dedicated chapter on foresight in these reviews.

V. Priority theme II Digital development

29. The CSTD secretariat⁹ introduced the issues paper on digital development. Harnessing the potential of emerging ICT trends would require reliable, high-quality infrastructure. In this context, two emerging technologies that hold the potential to strengthen ICT infrastructure were highlighted, namely, TV whitespace and next-generation small satellites. With respect to changes in digital demographics, the emergence of millennials and ‘digital natives’ is noteworthy. It is important to ensure that millennials have the necessary skills, capabilities and access to resources to reap the potential benefits provided by ICTs. All three core themes of the emerging post-2015 development agenda

⁹ Ms. Dong Wu, UNCTAD.

(transformation, inclusiveness and sustainability) are closely linked with ICTs. In order to strengthen these linkages, a strong digital ecosystem is required. Countries may wish to undertake an audit of their own digital ecosystem to identify the weaknesses of individual components or inter-linkages between these components. At the same time, targeted policy interventions are required to reinforce the linkages between ICTs, inclusiveness, and sustainability.

30. The first expert speaker¹⁰ pointed out the key limitations of the existing ICT for development (ICT4D) landscape. The main limitation is that the current ICT4D discourse sees ICTs merely as one among many elements of the development landscape, and not as part of a digital nervous system that underpins the entire development landscape. The speaker called for a paradigm shift in how we perceive the relationship between ICTs and development. This new paradigm, which could be called ICT4D 2.0 or Development 2.0, would recognize ICTs as a platform to deliver development, hence giving them a more central role in the development process. Further, to respond to the overarching role of ICTs, there is a need for ‘digital development policy collaboratories’ within national Governments that will help different ministries collaborate with relevant stakeholders to undertake coherent policy interventions.

31. The second speaker¹¹ focused on emerging whitespace technology applications that enable cost-effective rural Wi-Fi. Whitespace technology, which takes advantage of unused radio/TV spectrum, can cover large distances in difficult terrain. It can help convert the “digital divide” into “digital opportunities” especially for millennials, as they can find direct and indirect employment by using it. Faster development of regulations is required to support wider deployment of whitespace technology. Governments can further support quicker adoption of whitespace technology through promoting pilot projects and ensuring licence-exempt access to spectrum.

32. The third speaker¹² described the application of mobile technology in response to emergencies and disaster management through the use of the Ushahidi platform. Innovative mobile technology applications are originating from developing countries to solve specific local problems. ICT applications have facilitated the emergence of ‘digital humanitarians’, who are able to respond fast and effectively to crisis situations using ICT tools. Since many of these applications originate in developing countries, they can be easily adapted to developed country settings as well. The key message from the case studies provided by the speaker is that innovative ICT applications could be a powerful channel through which local solutions to address local problems could be developed and promoted.

33. The last speaker¹³ highlighted the linkages between ICT and sustainability. While ICTs could potentially have a negative direct impact on the environment through the creation of e-waste, they could also contribute to reducing the negative environmental impact of other sectors through smart applications. The panellist pointed out that the term sustainability should be broadened to include not only environmental sustainability, but the sustainability of economies and societies. More research is needed to understand the linkages between ICTs and sustainability, especially in the context of the post-2015 development agenda.

34. Through a video message, another speaker¹⁴ informed the audience about the potential benefits of next-generation small satellites. These small satellites provide easy access to space world for developing countries, as they are cheap to build and launch.

¹⁰ Mr. Richard Heeks, University of Manchester.

¹¹ Mr. Apurva Mody, Whitespace Alliance.

¹² Ms. Angela Oduor, Ushahidi Inc.

¹³ Mr. David Souter, ict Development Associates.

¹⁴ Ms. Victoria Alonsoperez, Space Generation Advisory Council.

Further, advances in the electronics field have increased the capabilities of smaller satellites, making them increasingly comparable to that of their larger and more expensive counterparts. These small satellites have a variety of useful applications in areas such as agriculture monitoring, climate change mitigation and adaptation, disaster response, weather monitoring and rescue operations. They also facilitate a wide range of scientific research and generate in-house knowledge. Hence, starting a small satellite program is a highly cost-effective way to enter into the field of space technologies and applications.

Discussion

35. Following the presentations by panellists, a lively discussion ensued. Participants raised issues related to the changing digital development landscape and also shared country experiences.

36. There was more detailed discussion on what can be done to facilitate regulations to promote broadband Internet through TV whitespace applications, especially in developing countries. It was discussed that regulations are already emerging in a number of countries such as Canada, Singapore and the United States of America. In developing countries, lots of spectrum remains unused, hence it would be good to work on existing regulations and perhaps start with experimental licensing of TV whitespace for broadband Internet deployment. The private sector should work together with regulators of developing countries to develop regulations suitable to the specific country context.

37. The global regulatory implications of new technologies such as small satellites and TV whitespace were further discussed. Small satellites were developed initially to facilitate research purposes. One participant observed that with the widened range of capabilities and their commercial applications, small satellites should come under the appropriate space communication regulations set by the ITU. If they remain unregulated, small satellites can potentially create interference to other larger commercial satellites. It was noted that this issue will be dealt with specifically by the next ITU conference in 2015. Also, it would be perhaps more appropriate to use the ITU terminology of “momentarily unused spectrum” when referring to “whitespace”. While domestic issues related to spectrum management need to be dealt with by respective national Governments, the related cross-border issues would need to be discussed by the ITU. The 2015 World Radio Communication conference of the ITU has an agenda item on this issue. The Chair thanked the participants for informing the audience about these specific global regulatory issues. There was a general understanding that the challenges posed by these new technologies need to be addressed by involving the private sector in the policymaking process.

38. Several speakers proposed ways to strengthen the issues paper. It was suggested that the paper could put more emphasis on digital content and services, and the related need for capturing more local content. Another speaker highlighted the need to emphasize further the role of the private sector. Market-driven inclusive development is important. So is building innovation capabilities in the global South. One speaker presented the example of China, where large State-owned enterprises played a key role in promoting broadband access in rural areas. As a result, according to 2013 statistics, penetration rates of broadband in China in all regions had reached 91 per cent. Companies in the private sector also play a key role in digital development. E-commerce companies, in addition to their core services, provide specialized services such as big data services and micro-loan services for micro-enterprises.

39. Skill development and education needs to be more central to the process of digital development. We need to enhance skills not only in terms of using technologies but also to develop and create technologies. The example of Costa Rica’s community-based approach

to ICT capacity-building was discussed in this context. There are about 250 community smart centres that are staffed by millennials who are enrolled in local technical universities. These centres teach community members how to use ICTs and ensure uninterrupted access to the Internet.

40. Issues regarding digital threats, particularly with regard to online privacy, were discussed. The importance of reflecting on the linkages of digital development issues in combination with intellectual property rights was also highlighted. One speaker noted that “offline” rights recognized by the United Nations should hold in the online world as well. The specific fragments of policy responses required to deal with digital rights are clearly evident. Countries should focus more on bringing these fragments together in a coherent manner, using digital policy collaboratory-type models. While dealing with digital threats, it is important not to be judgmental about topics such as pornography, and the issues paper needs to deal more comprehensively with digital rights, founding the discussions more strongly with a human rights perspective.

41. There was an active discussion on what the CSTD can do to raise the profile of ICTs in the SDGs and the post-2015 development agenda process. There was general agreement that at this stage, it would be difficult to alter the basic parameters of the SDGs, but the most useful insertion point of ICTs would perhaps be at the targets/indicators level. Also, learning from the MDGs experience, there is a need for adaptive SDGs to accommodate a more central role of ICTs in the future. The panel was also of the opinion that this is more a political rather than technical question. Perhaps the question to ask is: why aren't ICTs more centrally placed in the post-2015 development agenda discussions? The two main reasons cited were: (a) the current policymakers most actively involved in the post-2015 discussions have not been adequately exposed to the potential of ICTs; (b) the ICT4D communities have not been effective in demonstrating the role of ICTs in development.

42. It was argued by one speaker that technology is moving faster than the capacity of developing countries to finance it. Hence there is a need to ensure technology transfer from developed to developing countries in order to bridge digital gaps. At the same time, another speaker pointed out that there could be limitations to the transfer and application of technologies originating from developed countries in developing countries. The speaker underlined that developing countries need to make sure that they make best use of available technologies before venturing to procure complex new technologies.

43. The panel noted that the next edition of the *World Development Report* (World Bank) deals with the issue of digital development. It was suggested that the CSTD should also consider the possibility of submitting a contribution based on its issues paper as an input to the next edition of the *World Development Report*.

44. The contributions made by Japan to the global community for deploying TV whitespace applications for disaster prevention and management was welcomed. Japan is currently partnering with countries such as Indonesia and the Philippines to promote TV whitespace applications in disaster management and prevention. Also, Japan will be hosting the Third United Nations World Conference on Disaster Risk Reduction in March 2015, which will discuss these matters further.

45. Several case studies from national digital policy experiences were highlighted by delegates. The multi-stakeholder model of Chile in developing a national digital agenda was discussed. The Ministry of Economy, Transport and Telecommunication and the Ministry of Governance work simultaneously with the private sector, providing an example of the digital collaboratory proposed by one of the panellists. Further, this digital agenda is linked to the national economic and productivity agendas. In Mexico, ICT is not seen as an add-on to the national development strategy, but as its very core. A unit within the President's office has been devoted to the implementation of the national digital strategy

and has visibility among all Ministries. Complementary reforms in the telecommunications sector supported the implementation of the national digital strategy. Another participant cited the initiatives of the Government of Mauritius to reduce the digital divide, such as providing ICT access in all schools, teachers training in ICTs, cybercaravans that enable community empowerment programmes, ICT literacy programmes for women in rural areas and subsidised broadband access.

46. Some significant ICT initiatives of Nigeria were also brought to the attention of the panel. A full Ministry, along with a technology development centre, was established to champion ICT development. There is increased use of ICTs to run government services, provide telemedicine services to meet the critical needs of the health sector, enhance capacity-building initiatives, introduce mobile Internet systems to ensure access of Internet in rural areas, establish e-learning initiatives through Open University systems, and launch e-wallet systems to support farmers. The participant sought experiences from other countries in deploying ICTs in deforestation activities, as well as towards preventing terror attacks. The Chair supported this statement by mentioning that Nigeria has fully embraced the notion of digital development.

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

47. Under this theme, the meeting considered two topics: (a) the 10-year review of progress made in the implementation of WSIS outcomes; and (b) the mapping of international public policy issues pertaining to the Internet. It based its discussion on the work that was carried out by the secretariat on these topics.

1) Ten-year review of progress made in the implementation of WSIS outcomes

48. The CSTD secretariat¹⁵ introduced its draft report, entitled “Ten-year review of progress made in the implementation of the outcomes of the World Summit on the Information Society”. The objective of the report was to assist the Commission in considering the review of WSIS outcomes which it has been requested to make, through the Economic and Social Council, to the General Assembly in 2015. The presentation outlined some of the key points of the report, including the main changes in the ICT landscape and in the development of the Information Society over the past 10 years. It highlighted some of the achievements and challenges and concluded with some suggestions regarding the WSIS implementation.

49. The first speaker¹⁶ presented his views and experiences regarding the Geneva phase of the WSIS. First, he outlined the main outcomes of that phase, the Declaration of Principles which defines the framework of the “people-centred, development-oriented and inclusive Information Society” and the Geneva Plan of Action which illustrates the political will to implement that vision. He noted that although the advances in ICTs have improved the life and the working conditions of countless of people, we are still far from achieving an inclusive Information Society, as advocated by WSIS. This is especially true in the developing regions of the world such as in Africa. He called for more attention on transforming the digital divide into digital prosperity for all and on accelerating the

¹⁵ Ms. Anne Miroux, Director, Division on Technology and Logistics, UNCTAD.

¹⁶ Mr. Adama Samassekou, President of the Preparatory Committee of the Geneva phase of WSIS.

achievement of the MDGs through ICTs. He highlighted the importance of education, training, content issues, and infrastructure. He concluded by noting that the spirit of the Geneva phase should be invigorated by putting ICTs for the service of humanity.

50. The second speaker¹⁷ provided the panel with a review of the implementation of WSIS outcomes from the perspective of the Tunis phase of the World Summit. He outlined the main outcomes of the Tunis phase, namely, the financial mechanisms to bridge the digital divide, the Internet governance and the follow-up and review mechanisms to WSIS. As regards to financial mechanisms, he noted the importance of analysing the impact of changes in ICTs landscape on the needs. He noted the failure of the digital solidarity fund and the importance of investment in capacity development as well as in infrastructure and local content development as complementary issues. On Internet governance, he informed, among others, on the developments within ICANN in the context of the management of critical Internet resources. He discussed the development of the Internet Governance Forum (IGF) as a global multi-stakeholder platform, noting also the growing number of regional and national IGF initiatives. He explained the origins of enhanced cooperation, set up in Tunis as a compromise concept and his views on the evolution of the concept. He pointed out the difference of views that still persists around the concept. In relation to the follow-up and review mechanisms to WSIS, he mentioned that the 10-year review of WSIS should be an integral part of the MDGs review and regretted that the preparations for the MDGs review take place before the overall review of WSIS in December 2014. Therefore, he claimed, we face a dilemma on how to make sure that the lessons obtained from reviewing the implementation of WSIS would find reflection on the MDGs review.

Discussion

51. Participants reflected on the achievements and challenges of the WSIS implementation over the past 10 years. They also raised issues that would require particular attention in the 10-year review. Many participants also noted that the secretariat's draft report provides a good overview of the history of the WSIS process and of the development of ICTs in the past 10 years.

52. Several participants mentioned the importance of integrating ICTs into the post-2015 development agenda and the sustainable development goals. They noted the progress made towards achieving WSIS targets and access to ICTs, especially in reducing the digital divide in terms of access. Yet, it was felt necessary to recognize that the digital divide is a moving target and therefore goals and strategies need to adapt to the changing landscape. In general, participants noted the increase in the availability of ICTs in terms of access but they also acknowledged that new divides have emerged. Nowadays the digital divide is more related to quality of access, and how it is used, its economic and environmental outputs, and contribution to development, among others.

53. Various participants noted the lack of broadband connections as one of the main reasons explaining the digital divide, in particular, in the Latin American region where there are big challenges in reducing gaps in terms of access, quality and affordability of Internet connections. Challenges were pointed out in terms of reducing the gap between the developed and the developing countries and in reducing regional heterogeneity. Participants also noted the need to pay particular attention to the advantages offered by broadband as well as to the challenges in its realization.

54. Further, some participants suggested that there should be more data evidence of the impact of ICTs in the life of those with limited resources. One participant noted the

¹⁷ Mr. Janis Karklins, President of the Preparatory Committee of the Tunis phase of WSIS.

importance of the review in terms of better addressing the needs of developing countries in the implementation of WSIS outcomes, including the analysis of the challenges that these countries face in realizing WSIS goals and targets.

55. A number of participants mentioned the relevance of the so-called soft components of the Information Society. They pointed out to issues such as capacity-building, local content and multilingualism. One participant noted that sustainable outcomes can only be achieved through the capacity to create, to develop and to use technology. Thus, the role of education and building STI capacity and skills was particularly highlighted. Some also mentioned the role of cultural and creative industries and economies and wished for their integration in the review.

56. In various interventions the role of the private sector in WSIS implementation and the importance of economic issues were highlighted. In particular, several participants noted the importance of competition and of good and stable regulatory environment as factors that promote investments. They also noted the open markets, creativity and entrepreneurship as positive contributors to the Information Society.

57. Regarding Internet governance, some participants discussed the advances in the Internet Governance Forum (IGF) and the process towards enhanced cooperation. One participant argued that with meetings such as the annual IGF and the NETmundial Global Multi-stakeholder Meeting, held in São Paulo, Brazil, from 23 to 24 April 2014, the goals set by WSIS on Internet governance are close to being attained. Another participant emphasized the importance of taking into account the discussions that have taken place over the years on enhanced cooperation when assessing the implementation of WSIS.

58. Several participants mentioned inclusiveness and multi-stakeholder participation as critical factors in the development of an Information Society and in the implementation of WSIS commitments. One participant noted that the multi-stakeholder approach is at the heart of development and called for all actors' involvement in the development of the Information Society. Another participant noted that WSIS has created a baseline for full and open engagement of all stakeholders. She added that further work is needed on the analysis of how to increase the participation of technical society and academy from developing countries. She also highlighted the continuing and growing challenges that all stakeholders face, in particular, the ones from developing countries, as far as their participation in relevant meetings is concerned.

59. Finally, several participants mentioned the importance of the first WSIS+10 review event "Towards Knowledge Societies for Peace and Sustainable Development", which was co-ordinated by the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the WSIS+10 High-Level Event, which was coordinated by the International Telecommunication Union (ITU), and their outcomes as important contributions to the review. Particular attention was paid to various WSIS related activities and initiatives such as the WSIS Forum, the WSIS stocktaking activities, and the Partnership on Measuring ICT for Development. One participant also noted the NETmundial Global Multi-stakeholder Meeting in this context.

2) Mapping of international public policy issues pertaining to the Internet

60. The CSTD secretariat¹⁸ presented the methodology and the main findings of work that it had carried out on mapping of international public policy issues pertaining to the Internet, as recommended by the Economic and Social Council in its resolution 2014/27. The outcomes of the secretariat's work (i.e. a database of mechanisms addressing

¹⁸ Ms. Mervi Kultamaa, UNCTAD.

international Internet public policy issues and possible gaps in those mechanisms as well as a summary report) were made available to the Commission prior to the meeting. The presentation outlined the methodology defined by the secretariat, the main findings obtained from the analysis, its main challenges, and possible gaps. The analysis comprised 40 international public policy issues pertaining to the Internet and 643 mechanisms addressing these issues.

61. The analysis concluded in some overall gaps which were clustered in four broad categories: knowledge, policy, implementation, and capacity gaps. There were gaps that appeared to affect several issues. These were insufficient institutional capacity or resources; mechanisms for addressing Internet public policy issues in a holistic way; lack of data and research; participation and inclusiveness; and comprehensive capacity-building and information sharing. The main challenges of the work were the lack of a commonly agreed definition of a gap and the criteria through which the assessment of mechanisms could have been accomplished. The secretariat referred to the dynamism of the Internet governance; mapping it can only be a continued process. However, every step adds clarity and brings new elements to the understanding of this field and to the overcoming of possible weaknesses.

62. The first expert speaker¹⁹ pointed out that the work that had been carried out by the secretariat was based on Economic and Social Council resolution 2014/27 as well as on the work carried out by the CSTD Working Group on Enhanced Cooperation (WGEC). As the Chair of the WGEC, he informed the Commission on the work that was carried out on the mapping during the convening of the WGEC from May 2013 to May 2014.

63. The second speaker²⁰ remarked that there is a lack of mapping of Internet governance issues. He noted that the field is broad and dynamic, and an in-depth analysis would need to take into account close to 10,000 Internet governance mechanisms. He informed of the approaches that his organization has used to conduct such mapping, including a visual summary that demonstrates the interplay between different Internet governance issues.

64. The third speaker²¹ gave more details of the work that was carried out in the WGEC correspondence group. The correspondence group narrowed down the information that was collected by the WGEC and reorganized into a spread sheet that covered 24 broad Internet public policy areas. A further collection of information was organized to gather more evidence on different public policy mechanisms and possible gaps within those mechanisms. However, the information that it produced was limited. The speaker noted that the approach on the mapping has been right but more work is needed to collect more evidence and focus on the details.

Discussion

65. Many participants noted the value of the mapping and gap analysis as well as the usefulness of such exercise. One participant regarded the work as an important step forward in the collected effort to map Internet public policy issues and their gaps. Some participants observed that due to the constant evolvement of this Internet governance field, such mapping can be only a snapshot of the current situation. Therefore, the work has to be understood as continued progress.

¹⁹ Mr. Peter Major, Chair of the Working Group on Enhanced Cooperation.

²⁰ Mr. Jovan Kurbalija, Director, DiploFoundation.

²¹ Mr. Philip Rushton, Co-convenor of the WGEC Correspondence Group.

66. One participant hoped that the work would translate into meaningful discussion in the next CSTD meeting. He pointed out that the outcome should be considered as experts' report which would not be subject to intergovernmental negotiations. However, general comments could be given and from his part, he suggested, inter alia, that the concluding part of the report would better reflect the findings of the analysis.

67. Several participants commented on the scope of the mapping work. One participant noted that the mechanisms are the core issue of the mapping and therefore a definition of mechanism would be needed. In his opinion, mapping should concentrate in mechanisms that are international and focused on implementation.

68. Many participants suggested that the secretariat's report be further developed. Some emphasized the diverse opinions that prevail on the Internet governance. Some expressed their wish to focus on the gaps, while others felt that the mapping should pay attention to the positive aspects of Internet governance and to the richness of the ongoing activities. Some recommended the report be sent to relevant organizations to verify the facts presented in the document.

VII. Findings and suggestions

69. The following main findings and suggestions were highlighted by the Panel and put forward for consideration by the Commission at its eighteenth session, scheduled to take place in Geneva, Switzerland, from 4 to 8 May 2015.

1. Strategic foresight for the post-2015 development agenda

A. Main findings

(a) Strategic foresight has evolved in the last decades into a participatory process that is increasingly being employed by countries and regions to gather intelligence on future trends so as to allocate resources in a way that prepares societies for such trends. Various foresight methodologies and institutional arrangements are used, depending on their specific objective.

(b) Several emerging technology trends have been identified to have a major impact on the post-2015 development agenda: natural resources, sustainable energy, climate change mitigation/adaptation/carbon offset, converging technologies, health and disaster resilience, urbanization and habitat, and sustainable transportation and mobility. These trends do not automatically produce societal benefits, and policy intervention is needed to prevent the creation of new inequalities.

(c) Technology convergence, which is predominantly driven and facilitated by ICTs, necessitates interdisciplinary and transdisciplinary approaches when responding to complex societal challenges by using STI.

(d) Technology foresight can help policymakers better understand unsustainable trends and contribute to the implementation of the post-2015 development agenda by informing it on a regular basis. Technology trends should be analysed in the context of wider socioeconomic trends to identify their societal impact.

(e) Technology foresight can help anticipate future innovation policy and private sector investment needs, particularly with regard to critical infrastructure needed for sustainable development and attaining the SDGs. Foresight generates insights on the

dynamics of change, future challenges and options, and new ideas, to transmit them to policymakers as inputs for policy design.

(f) Systemic foresight combines the dimensions of technology and economics (what is feasible), science and ecology (what is possible), and socioeconomics, politics and values (what is desirable), to put in place technology roadmaps most suitable for the society concerned.

(g) Foresight is increasingly becoming an essential multi-stakeholder tool to make sense of and create strategic options to deal with today's complex global challenges, which are hard to define, require new ways of thinking, lack clear accountability, transcend national boundaries and need a long-term approach.

(h) The rapidly expanding scope of computerization is resulting in the automation of jobs. As a consequence, there is therefore a need to continuously upgrade the skills of the workforce through education.

(i) Vocational training can provide a major boost to preparing the workforce for emerging disruptive technologies. Appropriate strategies can be devised for both pre-employment and on-the-job vocational training. Partnerships between universities, NGOs and the private sector are indispensable for the success of vocational training at a significant scale.

B. Suggestions

70. The CSTD is encouraged to consider the following:

(a) Sharing findings on STI and ICT trends and their implications in the High-level Political Forum (HLPF) on Sustainable Development, the Global Sustainable Development Report (GSDR) and SDG implementation processes.

(b) Establishing a knowledge portal to share peer-reviewed foresight practices conducted at national and regional levels, thereby assisting member States in identifying future trends and potential strategic partnerships.

(c) Contributing to capacity-building, awareness creation, and impact assessment for foresight initiatives in member States.

(d) Encouraging the Science, Technology and Innovation Policy (STIP) reviews of UNCTAD to focus more on strategic foresight, possibly by including a dedicated chapter on this theme.

71. Member States are encouraged to consider the following:

(a) Fully integrating STI into national socioeconomic development plans and ensuring that STI objectives are driven by societal needs, as opposed to analysing STI trends in an isolated way.

(b) Using strategic foresight to identify potential gaps in education for the medium-and-long term, and addressing such gaps with a policy mix including vocational training, setting quotas and targets to encourage enrolment in STEMs, counselling, and providing open access, among others.

(c) Strengthening vocational education to prepare societies for emerging disruptive technologies by establishing dedicated national vocational training institutions, increasing the cooperation between vocational training institutions and industry, and funding equipment, training facilities, and student exchange programmes.

(d) Using foresight as a process to encourage structured debate among all stakeholders, including government, science, industry and civil society representatives, and the private sector (particularly SMEs), towards a shared understanding of long-term issues and building consensus on future policies.

(e) Undertaking strategic foresight initiatives on global and regional challenges at regular intervals.

(f) Using existing regional mechanisms to kick-start cooperation on foresight studies, particularly to learn from countries that have overcome development challenges by using STI and ICTs, and also to jointly tackle common challenges.

(g) Cooperating towards the establishment of a mapping system to share technology foresight outcomes with other CSTD member States.

2. Digital development

Findings

(a) The potential of ICTs as cross-cutting enablers of sustainable development is not well embedded within the post-2015 development agenda discussions. The references to ICTs are limited and inadequate within the Rio+20 outcome document, as well as in the outcome document of the Open Working Group on SDGs.

(b) There is a need to broaden the current ICT for development (ICT4D) discourse to give ICTs a more central role in the development process. ICTs should not be seen just as tools that achieve particular aspects of development, but rather as a platform that mediates development.

(c) TV whitespace or “momentarily unused spectrum” applications have potential in bridging the digital divide by ensuring broadband rural Wi-Fi access in many countries. They also could contribute to generating jobs in areas such as disaster response, smart city applications and environmental monitoring. While regulatory measures are currently being developed in several countries to enable the development of TV whitespace applications, there is regulatory inertia in many countries that impedes wider application of this technology.

(d) Next generation small satellites provide an easy access route to space for developing countries, as they are easy to build and relatively inexpensive. These satellites have applications in areas such as agriculture monitoring, climate change mitigation and adaptation, disaster response, weather monitoring and rescue operations.

(e) While the ICT access divide has been narrowing with the increased penetration of mobile technology, the divide in terms of capabilities has been widening. As a result, ICTs can create and also exacerbate the inequalities that exist in society. Inadequate availability of appropriate local content on the Internet can also hinder inclusive digital development.

(f) A well-developed digital ecosystem is a primary requirement for effective digital development and for facilitating transformative impacts in society through ICTs. Recognizing and reinforcing the linkages between different components of the digital ecosystem and strengthening its weaker components are crucial.

(g) ICTs are an essential means to channel and unleash the potential of millennials and “digital natives” towards sustainable development processes. The majority

of millennials in developing countries, though they use ICT applications, lacks digital innovation capabilities to emerge as entrepreneurs and producers using ICTs.

(h) While ICTs have some direct negative impact on environmental sustainability through creation of e-wastes, they also have the potential to promote environmental sustainability indirectly through their application in other sectors and by improving the resilience of the entire ecosystem.

(i) The increased use of ICTs facilitates risks associated with digital threats such as curtailment of rights, cybercrimes, gambling, pornography and creation of monopolies. Millennials are particularly vulnerable to such threats.

(j) The cross-cutting nature of digital policies calls for the creation of digital policy collaborative structures, involving all relevant stakeholders, in order to ensure policy coherence and effectiveness.

Suggestions

72. The CSTD is encouraged to take the following steps:

(a) To inform the post-2015 development agenda process on the need for a more central role of ICTs as an enabler and means of achieving the sustainable development goals, through substantive inputs to relevant processes and bodies within the United Nations.

(b) To provide a forum for sharing best practices in terms of developing national and regional regulations and incentive mechanisms to facilitate the application of new emerging technologies such as TV whitespace applications and next generation small satellites, in bridging the digital divide and promoting sustainability.

(c) To act as a repository of best practices in policy measures to enhance digital innovation capabilities, particularly of millennials of developing countries, in order to enable them to make best use of the opportunities offered by ICTs.

(d) To collect evidence on how ICTs facilitate collaboration between millennials from developed and developing countries to tackle complex developmental challenges and to further undertake research on how best to facilitate such collaboration.

(e) To play an active role in creating awareness about the need to conduct digital ecosystem audits in developing countries and act as a forum to share best practices of digital ecosystem audit methodologies.

73. Member States are encouraged to consider the following:

(a) Collaborate with all relevant stakeholders, develop regulations and initiate pilot projects that will facilitate wider application of emerging technologies such as TV whitespace (“momentarily unused spectrum”) and next-generation small satellites, giving special attention to their potential to ensure digital inclusion and sustainability.

(b) Bring ICTs to the core of national and international development agendas by recognizing their cross-cutting enabling role in attaining the sustainable development goals.

(c) Conduct audits of national digital ecosystems to identify weaknesses and take effective policy interventions to strengthen the weaker components of the digital ecosystem, while recognizing the inter-linkages between its diverse components.

(d) Mobilize and direct financial resources through multiple channels, including crowdfunding and public-private partnerships, to strengthen ICT infrastructure, including human resources capabilities, in developing countries.

(e) Encourage the creation of “digital development policy collaborator” structures that will help bring together different stakeholders in order to create coherent policies to effectively deal with different focus areas of digital policies, such as promoting digital inclusion and digital sustainability, strengthening of the digital ecosystem and limiting digital threats.

(f) Use ICTs to create channels that engage millennials in the implementation process of national development agendas and in attaining the sustainable development goals.

(g) Through appropriate primary, secondary and higher educational and vocational training policies, enhance the digital innovation capabilities of citizens along with complementary skills such as analytical ability, communication and interpersonal skills.

(h) Encourage a community-based approach to ICT capacity-building, especially by providing platforms for the younger digital natives to share their knowledge of ICTs and train their community in ICT usage.

(i) Take adequate policy interventions and spread awareness to limit threats related to ICT usage such as cybercrime, gambling, pornography, curtailment of human rights and creation of monopoly power in ICT services.

(j) Encourage development of local content on the Internet and other ICT applications as a means to ensure digital inclusion and bridge the content divide.

(k) Collaborate with all relevant stakeholders, promote the application of ICTs in non-ICT sectors to improve environmental sustainability, and ensure the creation of suitable facilities to recycle and dispose of e-waste.

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

Suggestions

74. The CSTD should:

(a) Conduct its review of progress made in the implementation of WSIS outcomes during its eighteenth annual session, and submit the outcomes of the review through the Economic and Social Council, to the United Nations General Assembly as an input for the overall review of WSIS in December 2015.

75. In the context of its 10-year review, the CSTD should consider the following:

(b) The information provided in the secretariat’s report on the 10-year review of progress made in the implementation of WSIS outcomes;

(c) The information provided by the Member States and other stakeholders for the 10-year review, resulting from the collection of written contributions;²²

(d) The findings of the secretariat’s work on the mapping and gap analysis.

²² <http://unctad.org/en/Pages/CSTD/WSIS-10yearReview.aspx>.

Appendix 1

Strategic foresight for the post-2015 development agenda: Expert panel questions

Theme 1: STI and ICT trends, implications for MDG/SDGs transition and post-2015 development agenda

(Chair: Mr. Andrew Reynolds, United States)

1. With regard to the technology trends covered in Section III of the Issues Paper, do you agree with them, including their impact assessment? How relevant are these STI trends for your country? Would you propose other key trends that are more suitable for your specific national and regional context?
2. How can technology foresight be used to inform the post-2015 development agenda on a regular basis and how can it contribute to the implementation of the agenda?
3. How can findings of technology foresight exercise be used for more informed policy action and future investment decisions (particularly in the context of critical infrastructure needed for sustainable development and attaining the SDGs)?

Theme 2: Sharing of national experiences and methodologies on foresight

(Chair: Ms. Gisella Kopper Arguedas, Costa Rica)

1. Have foresight studies been conducted in your country before? What methodologies have been used? What are some of the good practices and lessons learned?
2. What are the key issues regarding institutional capacity and the requirements for undertaking such activities on a regular basis?
3. Which foresight models are more suitable for your national context? (For example, choosing between establishing dedicated in-house foresight units or undertaking limited-duration / sectoral foresight projects.)
4. How can foresight studies contribute to a better understanding of societal challenges and in shaping responses to them?

Theme 3: Regional and international collaboration in foresight

(Chair: Mr. A Min Tjoa, Austria)

1. What in your view are some of the potential collaboration opportunities – in the private or public sectors, involving multi-stakeholders – between countries and regions that face similar development challenges?
2. What role can the CSTD play in catalysing foresight collaboration initiatives?
3. How can the STEM workforce be prepared for the converging, disruptive technologies of the future?
4. How can the private sector be involved in national foresight studies?

Annex

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Internet Corporation for Assigned Names and Numbers

Mr. Markus Kummer, Member of the Board of Directors, Geneva

Mr. Nigel Hickson, Vice-President, Stakeholder Engagement, Europe, Geneva

Internet Democracy Project

Ms. Anja Kovacs, Project Director, New Delhi

Internet Society Bangladesh

Mr. Md Jahangir Hossain, Vice-Chair, Dhaka

Kenya ICT Action Network (KICTANet)

Ms. Grace Githaiga, Associate, Nairobi

Our Rights

Mr. Vernatius Ezeama, Executive Secretary, Abuja

Village Suisse ONG

M. Darby Lukombo Mayaemba, Membre Représentant au Congo Rdc, Genève

Academia

DiploFoundation

Ms. Roxana Radu, Research Fellow, Geneva

Oxford Martin School at Oxford University

Mr. Carl Benedikt Frey, Research Fellow, London

University of Zurich

Mr. Harry Spiess, Professor, Zurich University of Applied Sciences, School of Engineering,
Institute of Sustainable Development, Winterthur

Mr. William Drake, International Fellow and Lecturer, Onex

Private sector

Cisco Systems, Inc.

Mr. Hascall Sharp, Principal Engineer, Cary

Strategis Communications

Ms. Ana Perdigao, Director, Brussels

Other Invitees

World Economic Forum

Ms. Natalie Hatour, Associate Director Strategic Foresight, Geneva

ZHAW School of Engineering

Mr. Tilon Holtz, Student, Adliswil

ZHAW Winterthur School of Engineering

Mr. Tobias Kuehn, Student, Winterthur

Panellists

Ms. Victoria Alonsoperez, Co-Chair Space Generation Advisory Council and co-Founder at IEETECH (video message)

Mr. Frey Carl Benedikt, Research Fellow, Oxford Martin School at Oxford University, London

Mr. Vicente Carabias, Head Sustainable Energy Systems, Lecturer of Technology Foresight, ZHAW Zurich University of Applied Sciences Institute of Sustainable Development, Zurich

Mr. Richard Heeks, Chair, Development Informatics, Centre for Development Informatics University of Manchester, Manchester

Mr. Janis Karklins, Ambassador, Chair of the IGF Multi-stakeholder Advisory Group, Ministry Foreign Affairs of Latvia, Riga

Mr. Jovan Kurbalija, Director, Diplo Foundation

Mr. Peter Major, Vice-Chair of the CSTD, Special Adviser, Permanent Mission of Hungary, Geneva

Mr. Apurva Mody, President and Chair, WhiteSpace Alliance, Chelmsford

Ms. Angela Oduor, Director of Community Engagement, Ushahidi Inc, Nairobi

Mr. Abel Olorunnisola, Professor, University of Ibadan, Nigeria, Ibadan

Mr. Philip Rushton, Numbering and Standards Policy and Strategy, BTplc, Colchester

Mr. Adama Samassekou, President, Maaya Network, BAMAKO

Mr. Ozcan Saritas, Senior Research Fellow, University of Manchester

Mr. David Souter, Managing Director, ict Development Associates, Chislehurst, United Kingdom of Great Britain and Northern Ireland

Ms. Kristel Van Der Elst, Senior Director, World Economic Forum, Massongy

UNCTAD

Ms. Anne Miroux, Director, Division on Technology and Logistics

Ms. Dong Wu, Chief, Science and Technology Section

Ms. Mervi Kultamaa, WSIS Coordinator / Economic Affairs Officer, Science, Technology and ICT Branch

Ms. Claudia Contreras, Economic Affairs Officer, Science, Technology and ICT Branch

Mr. Tansuğ Ok, Associate Economic Affairs Officer, Science and Technology Section

Mr. Arun Jacob, Associate Economic Affairs Officer, Science and Technology Section

Ms. Tabea Seedoch, Intern, Division on Technology and Logistics, Knowledge Development Branch, Policy Capacity-Building Section, Geneva