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Report of the intersessional panel meeting

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11–13 January 2016

Prepared by the UNCTAD secretariat*

* 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. This document has not been formally edited.

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I. Introduction

1. At its eighteenth session held in May 2015, the Commission on Science and Technology for Development (CSTD) selected the following substantive themes for its 2015–2016 intersessional period:

- Smart cities and infrastructure;
- Foresight for 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 Budapest, Hungary, from 11 to 13 January 2016. 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 nineteenth session of the CSTD in May 2016.

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). 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

4. The panel was opened by the Chair of the Commission, Mr. Peter Major. He 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. This was followed by a keynote address by His Excellency Mr. István Íjgyártó, the Minister of State for Cultural and Science Diplomacy, Hungary. He noted that there is a need to have a clear path to improve the living standards for the world's poorest through inclusive and sustainable growth and added that science and technology can help in this regard. He emphasized that the digital revolution is the driving force of today's industrial and economic development and highlighted several regional and national initiatives aimed at improving ICT access and digital development.

5. The session continued with a statement by the Chair of the CSTD Gender Advisory Board Ms. Shirley Malcom. She discussed four issues that are common to these themes and should be considered when applying STI to development challenges, i.e., identifying development-oriented STI applications that improve the lives of all, considering the gender dimension of research and development, expanding roles for women in STI driven development, and developing metrics and assessment tools to measure the gender dimension. She concluded by underscoring that there are clear cases where the Sustainable Development Goals will not be reached unless gender dimensions are considered, and that women can bring talent and perspectives to address the human capital needed to apply STI to development challenges.

6. The session concluded with the statement of Mr. Taffere Tesfachew, Acting Director of UNCTAD's Division on Technology and Logistics, and Director Division on Africa, Least Developed Countries and Special Programmes. He highlighted that STI are key drivers of the inclusive and sustainable development to which the 2030 Agenda aspires. He recalled that all major international agreements completed in 2015 or so have recognized the role of STI in the development process and emphasized four points: the recognition of the role of STI in the development process; the difficulty to achieve the Sustainable Development Goals without developing an appropriate application of STI; the need to apply STI in an inclusive manner; and the need to consider the trade-off between the benefits and risks of applying STI for achieving Sustainable Development Goals.

IV. Theme 1: Smart cities and infrastructure

7. The moderator, Mr. Andrew Reynolds (United Nations Global Network on Digital Technologies for Sustainable Urbanization) opened the panel discussion on the priority theme by stating that the Goal 11 on urbanization encompasses elements of all other Sustainable Development Goals and called for participants to link the priority theme to issues related to climate change as well as the upcoming UN-Habitat III conference.

8. Mr. Arun Jacob (UNCTAD) presented the issues paper on the priority theme. Urbanization trends suggest that by 2050, two-thirds of the global population will live in urban areas. Africa and Asia are urbanizing more rapidly than other regions of the world. Cities are constantly under pressure to meet the needs and to provide better quality services to its expanding population. This opens up a new urban challenge, which brings us to the core issues of sustainable development. It is in this context of sustainable development that the concept of smart cities becomes relevant. Here "smart" would mean doing things better, more efficiently and with a smaller environmental footprint.

9. This was followed by two expert panel discussions on the theme. Mr. Kálmán Kovács (Budapest University of Technology and Economy) highlighted the importance of smart city agendas responding to local and regional challenges. The panellist cited the example from the European Union, where the smart city agenda is seen to respond to seven societal challenges related to health and demography, food and sustainable agriculture, energy, transport, climate, changes in world economy and society, and security. The panellist called for linking smart city agendas to national STI and ICT policies, involving small and medium enterprises (SMEs) and promoting new viable business models.

10. Mr. Rick Robinson (The Birmingham Smart City Alliance) stated that local governments have a variety of tools at their disposal for promoting smart cities, including procurement policies, planning and development frameworks, social and entrepreneurial investment funds and support services. The panellist noted that the vast majority of smart city initiatives to date are pilot projects with very few sustainable, repeatable solutions yet. The speaker concluded by highlighting the following six sustainable business models for smart cities: (a) incentivizing entrepreneurial businesses and investors; (b) scaling up social enterprise; (c) harnessing education and innovation; (d) regulated industries; (e) outcomes-based public procurement; and (f) harnessing property development.

11. Ms. Yessica Cartajena (Fundación País Digital) provided an overview of pilot smart city projects in Latin America. The speaker underlined the need to establish public policies that facilitate implementation of smart cities strategies, including supportive regulatory frameworks. Further, national digital agendas and STI policies should be long term and facilitate smart cities.

12. Mr. Aromar Revi (United Nations Sustainable Development Solutions Network) discussed that, while cities provide economies of scale and economies of scope in terms of

opportunities, they also lead to diseconomies of scale associated with factors such as pollution and congestion. He advocated for looking at technologies that help to bring together different infrastructure components in a smarter way, for example through better understanding the linkages among water, energy and food systems. Technologies can help to better manage our cities, provide equitable access to resources, better adopt our urban systems to shocks and changes and promote co-evolution of urban systems with socioeconomic systems.

13. The second panel began with the presentation from an entrepreneur, Mr. Juliano Forster (Paralelo Vivo) from Latin America, who initiated a first-of-its-kind sustainable innovation zone in Porto Alegre, Brazil. The speaker highlighted its role in promoting sustainable urban development, and its potential applicability for other regions.

14. Ms. Eva Bufi (Centre on PPPs in Smart and Sustainable Cities) highlighted that smart cities would need smart governance. This would involve strategic planning, developing a systemic view of the city, integrating modern management practices, promoting open and transparent innovative business models, and Public-Private Partnerships (PPPs). She highlighted the important role of PPPs in smart cities, stressed that they must integrate citizens and academia as agents in the equation, and shared success stories of PPPs in smart cities.

15. Mr. Shinji Yamamura (Nikken Sekkei Research Institute) described the “Kashiwa-no-ha” Smart City project in Japan. The original idea of the project was aiming for a “Low-Carbon and Environmental Friendly Smart City”, but after the earthquake the concepts of “safety”, sustainability and resilience were integrated into the smart city idea. It is important to start the smart city agendas from recognizing the key sustainable development challenges of the city. In Kashiwa-no-ha these were (a) environmental and energy problems (b) aging society (c) need for revitalizing the economy. People-centred smart cities would need a new life style by its citizens: public and private schools can be training grounds for creating the same. The project also includes an Open Innovation Laboratory to promote open innovation models.

16. Ms. Jennifer Bellisent (Forrester Research) stated that Government needs to adopt a “system of systems” approach in dealing with smart cities. This includes systems of engagement, automation, record and insight. Governments across the world are currently facing a data maturity gap with only 20 per cent of local governments reporting an ability to access the data in a timely manner. She suggested that governments develop systems of insight by better leveraging data to improve services and operations, sharing the data and insights across city departments, with city partners and with citizens. She highlighted success stories of harnessing data from several cities (Chicago, Jakarta and Buenos Aires).

17. The panels were followed by very active discussions. Delegates proposed ways to improve the Issues paper. Some noted the need to agree on a common definition of smart cities and the need for benchmarking best practices. The panellists discussed the difficulty in coming up with a common definition on smart cities due to the variance in context for each city. Some panellists were of the opinion that rather than trying to define smart city, cities should try to focus on a “smart process”. Such processes will help to identify the challenges in a city and then look at ways to solve these challenges through applying the most appropriate technology. There was a general consensus that a United Nations led initiative to share best practices on smart cities and infrastructure would be helpful.

18. During their interventions, delegates gave examples of smart city projects, including the Konza Techno City (Kenya), the smart city implementation process in Jelgava (Latvia), and the Cities Standards Institute in the United Kingdom of Great Britain and Northern Ireland. One delegate stated that smart city concepts are equally relevant for countries in transition, especially in deriving cost-effective solutions. The need for technology transfer

for implementing smart city projects was raised by a delegate. Another delegate called for looking at more detail into the privacy issues raised by smart cities. The importance of promoting open data models in smart cities was raised by another delegate. One delegate highlighted that cultural and livelihood issues need to be integrated into smart city discussions. Another delegate appreciated the idea of bottom-up meeting top-down governance model and called for giving greater attention to policy approaches that supports smart cities.

19. One participant voiced the concern that there is still need to focus on core digital infrastructure such as optical fibre. Another participant highlighted the need for effective spectrum management to support smart cities. One participant proposed that we need to think of “smarter” cities rather than “smart” cities and the need to agree upon some milestones for achieving this. In terms of strengthening the issues paper, one participant requested to include a broader understanding of “health” in the context of smart cities. Another participant highlighted that the ecosystems required to support several technologies related to smart cities (such as the Internet of Things or IoT) is not well developed and suggested that governments prioritize the development of such ecosystems.

20. The discussions benefited from the interventions from representatives of several United Nations agencies. Mr. Bilel Jamouss (ITU) said that service delivery platforms can help in integration of different infrastructure silos in smart cities. Further, the work of ITU related to IoT standardization for smart cities was also emphasized. Mr. Indrajit Banerjee (UNESCO) highlighted that the “learning City” work of UNESCO would be useful in capability building related to smart cities. Ms. Domenica Carriero drew attention to the key performance indicator work for smart cities carried out jointly under the leadership of UNECE and ITU.

V. Theme 2: Foresight for digital development

21. The moderator, Mr. David Souter (ict Development Associates), opened the session highlighting the importance of technology foresight, especially for ICTs. From his perspective, Governments and other stakeholders need to work out how to maximize the positive and mitigate the negative for every group within society.

22. Mr. Bob Bell (UNCTAD) introduced the issues paper on “Foresight for digital development”. He stressed that the digital divide persists among and within countries. He highlighted that technology foresight is an important tool for understanding current and future digital trends for the purposes of policymaking. He introduced Big Data, the Internet of Things, Massive Open Online Courses (MOOCs), 3D printing, and automation, offering definitions and illustrative examples of their potential benefits as well as challenges for sustainable development. The future of these digital trends is unclear, therefore it is important that policymakers consider engaging in foresight exercises. He highlighted the potential for pro-poor inclusive innovation and suggested policymakers consider establishing regulatory frameworks for data privacy, security, and sharing, invest in human capital in the short-term and longer-term, and continue to provide and ensure inclusive access to digital technologies.

23. Mr. Martin Hilbert (UC Davis) noted the growth of big data, digital footprints and artificial intelligence for creating new opportunities for understanding the world and solving pressing problems. Because such digital technologies have uncertain trajectories, are all-pervasive, have unpredictable side effects and are international, it is important to engage in foresight exercises to understand their potential impacts. He then discussed the eLAC project (Building Inclusive and Innovative digital societies in Latin America and the Caribbean) conducted in the United Nations ECLAC 2005–2015. Relying on a number of

foresight methodologies, the region engaged in an extensive online participatory policy-making foresight exercise that led to specific benchmarks for connectivity and other targets.

24. Mr. Banning Garrett (Singularity University) noted that connectivity is the foundation for future digital development, serving as a “platform of platforms.” He discussed how internet and digital technologies were the result of massive S and T investment, leading to an exponential increase in capabilities and declines in cost. However, despite the potential promise of these digital technologies, they remain out of reach for the poor because internet access is limited for billions of people across the world. He concluded by proposing policy considerations for governments, including the need to expand affordable Internet access to 100 per cent penetration, supporting bottom-up innovative efforts, and using foresight to take the long view of technological change.

25. Mr. Mike Sharples (FutureLearn) discussed foresight for digital development in education and noted that the increasing demand for higher education is a potential driver for pedagogical change in scaling up education. Though digital technologies can play a role, they alone cannot solve these problems. He described digital development at scale in three categories: enhanced education (e.g., open educational resources, flipped classrooms, and MOOCs), new education (e.g., seamless learning, learning analytics, embodied learning, dynamic assessment, and social networked learning), and sustainable education (e.g., hybrid courses and blended learning). He concluded that there is a need to rethink online education not only as a set of technologies that extend the existing paradigm of teaching but as a tool for radically rethinking how to deliver educational experiences.

26. Mr. Gábor Bojár (Aquincum Institute of Technology) presented on the “IT Revolution: a 40,000 years story.” He started with an overview of technology revolutions, including the production revolutions (e.g., stone axe, iron tools or industrial revolution), transportation revolutions (e.g., horse riding, navigation, and motorization), and information revolutions. He concluded by noting that despite the difficulty of forecasting the technological trajectory of current and future information revolutions, it is still important to engage in foresight exercises to anticipate and plan for the potential socioeconomic and environmental implications.

27. Mr. Marco Zennaro (Abdus Salam International Centre for Theoretical Physics) informed the audience about the lessons learned on the Internet of Things (IoT) and Development. Pointing out the expected growth of connected devices to eight billion by 2020, he focused the talk on his training activities on IoT, which he has carried out in Africa, Italy, Latin America and Asia. Lessons learned from these capacity-building exercises include (a) importance of mobile connectivity; (b) focus on keeping final users in the loop; (c) balancing data privacy vs. openness; (d) need to maintain sensors; (e) thinking through scalability of projects; (f) business models as a strong driver for IoT adoption; and (g) how data ownership is negotiated. He mentioned the need for more long-term capacity-building in IoT potentially through dedicated degree programmes.

28. Ms. Anriette Esterhuysen, (Association for Progressive Communications) discussed about the privacy, rights and related aspects of emerging digital technologies. She commented that technological progress can achieve productivity and improved quality of life. However, without the human and institutional capacity to leverage this progress, it is very unlikely that systemic, sustainable development will take place. She offered four ways to respond to these challenges: (a) integrate foresight into existing institutional infrastructure and policy and planning processes; (b) foresight should begin with the needs of society instead of technology trends; (c) harness global collaboration and solidarity for national foresight; and (d) prioritize the building of human and institutional capacity.

29. During the discussion, a number of participants commented on education. Some participants asked if there were any implications of MOOCs for future primary and

secondary schools, especially in developing countries. The speaker on this theme responded that teachers in primary and secondary schools will increasingly equip students to be more discriminating consumers of information. Another participant noted that, considering the importance of investing today on skills for the future, it is necessary to explore further the reasons explaining why, to his knowledge, only one country has elevated ICT on education to the national level and the deployment of these types of initiatives is limited. One expert noted that e-learning initiatives should start from existing pedagogical approaches and cultural context and apply appropriate technologies.

30. On the issue of big data, one participant noted the importance of the long-term preservation of digital heritage or digital data. Another participant suggested that big data as well as Internet search behaviour along with the advanced personalization algorithms could potentially lead to a narrowing of the perspectives of those on the web, leading to narrow worldviews and threats to civil society. One participant noted that exploring the potential societal impacts as a result of big data and the other digital technologies could also be considered when addressing this priority theme.

31. On the topic of automation and artificial intelligence, one participant reported on findings of a recent study on the impacts of automation on employment, concluding that simpler and repetitive tasks would disappear as new jobs in IT, data analysis and research would be created. One participant asked if artificial intelligence poses an existential threat to humanity as proposed by high profile researchers and technologists in recent times. Several expert speakers responded that though they perceive this threat to be unfounded, there is still a lot unknown about the potential impacts of such technology, necessitating the role of foresight in national contexts.

32. With respect to IoT, some participants had questions about how IoT deployments could be financially sustainable and as well as support development-oriented applications for local communities, especially in developing countries. One expert speaker noted that with respect to IoT deployments can be supported in a number of ways, including by Government, academic research or local industry needs (e.g., horticulture). However, to his knowledge, there are very few studies on sustainable business models for IoT.

33. On the theme of foresight, one expert speaker noted that foresight needs to be done at “big picture level” and also at the sectoral level with a multi-stakeholder approach. This speaker also noted that foresight activities should be articulated within the established policy and planning activities. Finally several expert speakers suggested that CSTD serve as a forum for sharing foresight experiences in a way that encourages member States to discuss failures and address key critical issues they face with the benefit of other member states as well as experts.

34. During the afternoon of the second day, the panel was divided into three discussion groups on the following sub-themes: impact of digital developments on sustainable development, impact on citizens, and how technology foresight can be used to understand the socioeconomic and political implications of digital developments. Each sub-theme discussion was chaired by an expert speaker who reported the group findings to the plenary. The salient points raised by participants in the thematic group discussions are highlighted below.

(a) Impact on sustainable development

35. Participants stressed that the digital developments present significant opportunities for development but that they must be selected appropriately. They underlined the need to shape how future digital technologies relate to socioeconomic and political contexts and stressed the fact that digital applications must be inclusive. Participants also highlighted

specific issues related to threats that come with digital technologies, including new digital dependencies, the creation of new power structures, and challenges related to big data (e.g., internet access, privacy issues, data ownership, security frameworks, and the incoherence of legislations across the world). Participants suggested promoting capacity-building, establishing legal frameworks for enabling technologies and forging international collaborations.

(b) Impact on citizens

36. With respect to individual human rights, participants highlighted the need to monitor and hold public and private sector actors accountable. In relation to freedom of expression, emerging digital developments increase such opportunities, including in contexts where offline rights are not adequately respected, but they may also pose new vulnerabilities. Participants noted that new technologies enable new forms of participatory governance, but many developing countries are not yet prioritising this and it is unclear how to get them to. The group noted that though new technologies have the potential for increasing workplace productivity, they potentially create job losses. On the issue of big data, the group stressed the need to address data sharing, protection and stewardship.

(c) Technology foresight

37. Participants concluded that foresight depends on many different levels of hierarchies, where issues might be directed at global, regional, or local concerns. With regard to influencing policy making the challenge, it is not so much what to foresight but on how to influence policy. With regard to institutionalizing foresight into governmental processes, participants reported that satisfying local demands is the main challenge of the foresight process. In terms of best practices, the group identified the use of team of trainers that train others in foresight exercises and share best practices as a useful tool to conduct foresight exercises. The group recommended that it may be good to share experiences in CSTD about what has been done and what training methods have worked in order to facilitate how to implement foresight recommendations.

VI. Panel on the role of science, technology and innovation and information and communication technologies in contributing to achieve the Sustainable Development Goals

38. A special panel was devoted to the role of STI and ICTs in contributing to achieve the Sustainable Development Goals. The panel was moderated by the Deputy Secretary-General of UNCTAD, Mr. Joakim Reiter. He started by noting that the achievement of the SDGs would imply an entirely new development blueprint and require no one to be left behind, especially the least developed countries (LDCs). These countries will need to achieve unprecedented economic growth, while doing so in an environmentally sound and socially inclusive manner. He concluded by underscoring the need to explore the full potential of technology and innovation to solve both current and future developmental challenges.

39. Director of the ITU Telecommunication Development Bureau, Mr. Brahima Sanou, discussed the potential role of ICTs in contributing to achieve the Sustainable Development Goals. He noted that ICTs rather than technical issues are above all about people and that they will accelerate the attainment of the Goals. However, the increasing convergence of the ICTs and other economic sectors requires putting in place new policy and regulatory

frameworks to nurture the ICT ecosystem. This requires moving from vertical policy and regulation to collaborative policy and regulation. He concluded by stressing the need for collaboration among stakeholder to ensure an enabling environment.

40. Ms. Gillian Marcelle (University of the Virgin Islands) made an argument for rethinking and reframing of STI in order to allow STI to make an optimal contribution to achieve the Sustainable Development Goals in the Global South. She claimed that there are three key areas in which interventions are required: 1) reconceptualization of STI; 2) diversification and democratisation of knowledge sources that inform STI implementation and policymaking; and 3) definition and development of more effective tools, mechanisms and institutions with the view to better align STI with the challenges of sustainable human development, including within the context of the Technology Facilitation Mechanism for the Sustainable Development Goals.

41. Ms. Lucilla Spini (International Council for Science (ICSU)) described the main activities of the International Council for Science (ICSU) in strengthening international science for the benefit of society. Additionally, she discussed the potential synergies between the Commission and ICSU and proposed collaboration mechanisms between these organisations.

42. Ms. Carol Bothwell (NetHope) highlighted how ICTs provide significant opportunities to contribute to the Sustainable Development Goals. She stated that the NetHope SDG ICT Playbook is a resource aimed at helping citizens and stakeholders to take full advantage of the opportunities that ICT offer to enhance the social, economic and environmental impacts. It introduces users to ICT solutions that enable new and impactful ways to address development issues and explores the benefits that result from their use. Lastly, she stressed the important role stakeholders must assume in addressing those challenges and the areas where partnerships are needed to do so.

43. During the discussion, a speaker drew attention to an European Union report on the role of STI in implementing the Sustainable Development Goals. Another participant asked panellists' views on how to help women and girls develop confidence to participate in science and innovation. One speaker replied that innovation is not only new technology but also new ways of using technologies. Another speaker underscored Ghana and Kenya as examples of countries that provide effective enabling environments for innovation and entrepreneurship. Regarding gender issues, another speaker added that getting women into STEM education is a challenge in developing and developed countries, possibly reflecting cultural issues as well as a need to make technology industries more welcoming to women. Other speakers added that there are several international programmes and prizes that help to build women's confidence and encourage women in science. She suggested that the Commission include gender issues in science as one of its priority themes for the future. In addition, the moderator noted that even in sectors in which women dominate in terms of participation, such as in health and education, there may be also gender differences in the capitalization of sectoral ICTs enabled applications. This is because men are the ones capitalizing on these applications. He suggested that a cross sectoral approach may be needed to tackle these differences.

44. In response to the call to propose areas of further improvements for the Commission and its one participant underscored that the Commission has done significant work and has set an example in applying WSIS principles by ensuring participation of non-governmental stakeholders. She suggested this should continue. One of the speakers underlined the importance of the stakeholder process. As regards areas for improvement, one participant suggested that it would be important for the Commission and other United Nations agencies to consider mechanisms to ensure linkages between the Sustainable Development Goals and WSIS follow-up processes. She added that the Commission could consider collaboration with other regional institutions as well as ensure that developing countries'

voices are effectively heard. In terms of gender, she suggested that the CSTD could consolidate and integrate gender in its work and not treat it as a separate issue. Another participant suggested the CSTD could devote efforts to increase the visibility of its work.

VII. 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

45. Under this theme, the meeting considered the following topic: The overall review of WSIS and its implications to the implementation of and follow-up to the Summit outcomes.

46. Mr. Peter Major, Chair of the CSTD, provided introductory remarks. He addressed the WSIS review process, the outcome document, and implications to the implementation and follow-up.

47. During this session, speakers expressed that they were pleased with the Outcome document of the WSIS+10 High Level Event agreed by the General Assembly and pointed out that the Commission's role in assisting the Economic and Social Council as the focal point in the system-wide follow-up of progress made in implementing WSIS outcomes has been recognized and reaffirmed. They also welcomed CSTD's forthcoming role as the convener of the new working group on enhanced cooperation

48. Following the remarks of the Chair of the CSTD, there was a presentation by one of the Co-Facilitators of the overall review of WSIS, H.E. Mr. Janis Mazeiks (Permanent Representative of Latvia to the United Nations). He stressed three elements of the outcome document relating to CSTD including: (1) the continued recognition of the Information Society as people-centred, inclusive, and development-oriented; (2) the reaffirmation of previous work established in Geneva and Tunis document visions; and (3) the role of ICTs in the 2030 global development agenda. He alluded to the renewal of IGF's mandate through 2025 as well as the many references to CSTD.

49. This was followed by remarks from the Deputy Secretary-General of UNCTAD, Mr. Joakim Reiter, who focused his comments on three themes: opportunities, synergies, and coherence. With respect to opportunity, he recognized that 2015 was a landmark year for the international community in setting a new bar for development as well as explicitly articulating ICT as a critical enabler of the 2030 global development agenda. On the issue of synergies, he mentioned there is a need to fully explore the synergies between the WSIS outcomes and the implementation of the Sustainable Development Goals. Finally, on coherence, he stressed that all actors should pull in the same direction to assume collective responsibility for meeting the Sustainable Development Goals.

50. Ms. Anriette Esterhuysen (APC) remarked that she was pleased with the focus on people-centred development, human rights and gender inclusivity. She commented that though the WSIS+10 Outcome document makes the link between the Sustainable Development Goals and WSIS follow-up, it does not provide mechanisms for that integration. She expressed the concern that the expert advisory panel of the Technology Facilitation Mechanism (TFM) does not have sufficient representation from the ICT community. With respect to the IGF, she is pleased that its mandate has been renewed but wishes for more developing country participation.

51. Ms. Elizabeth Thomas-Raynaud (ICC-Basis) focused on three aspects of CSTD's work. First, the business community looks to CSTD to demonstrate vision and leadership again as it seeks to fulfil its role in an inclusive and open manner with stakeholders on identifying and promoting suitable actions. Second, the business community counts on the CSTD within the capacity of its role as part of the new TFM to leverage and engage its

experts and community of stakeholders to fully and openly consider policy implications. Third, the business community feels confident that CSTD can establish a working group on enhanced cooperation in keeping with a multi-stakeholder approach.

52. Mr. Nigel Hickson (Internet Corporation for Assigned Names and Numbers (ICANN)) highlighted how the WSIS+10 negotiations and resulting Outcome document reinforce the role of the Commission. He discussed how other stakeholders (beyond CSTD) need to think hard about how to reflect the approach taken in the United Nations General Assembly resolution to use the WSIS process to help the implementation of the Sustainable Development Goals as part of the 2030 development agenda. He reiterated that there is much work to do and some hard decisions needed at global and national levels if we are to meet the goals in the 2030 development agenda.

53. Mr. David Souter (ict Development Associates) mentioned three ways WSIS made a difference. First, it built awareness of the potential of ICTs for development – particularly in developing country governments. Second, WSIS made Internet governance more prominent. And third, it introduced a new model of multi-stakeholder cooperation and dialogue. With respect to the future, the speaker commented that ICTs are not inherently egalitarian or benign, that the pace of change is so fast that policy and regulatory structures can't keep up, and that there is a need to anticipate the Information Society of 2025 with a critical role for the CSTD to play.

54. Ms. Grace Githaiga (KICTANet) opened her remarks with a story of how mobile phones can serve as financial mechanisms that help the poor, and especially those living in informal settlements, to improve their daily lives. She recommended a number of considerations for stakeholders interested in the practical implementation of WSIS principles, including commitment to affordable broadband; respect for human rights; national awareness programmes on hate speech; frameworks for data protection and security; conversations about how to balance security vs. privacy; and evidence-based ICT policy.

55. Ms. Marilyn Cade (mCADE IIc) stated her satisfaction with the WSIS+10 outcome document and its implications for CSTD, but she underscored the need to elevate awareness and visibility of CSTD's contribution. She made a number of suggestions for how CSTD could potentially reach out to stakeholders, including by engaging with STI and ICT-related ministers and ministers not only in technology-related ministries but across other sectors of government (e.g., health and education).

56. Mr. Carlos Afonso (Instituto Nupef) referred to an "inclusive and global digital economy" and stressed the importance of telecommunications infrastructure. He described how countries should make sure that conditions (legislation, incentives, and regulation) are optimal for facilitating innovation as well as e-governance. He noted several digital threats including disruption of traditional economic activities as well as the challenges of ensuring data privacy and protection. The speaker concluded arguing that despite these potential threats, the Internet is a tremendous and indispensable tool for development.

57. Ms. Olga Cavalli (Ministry of Foreign Affairs of Argentina) communicating through video-conferencing noted that the Latin American regional average Internet penetration is 56% which is better than the world average but new gaps are arising (e.g., Internet and mobile access, IPV6 readiness and IoT implementation). Some challenges persist, including: internet access, infrastructure readiness, internet governance debates, gender balance, sustainable development focus, and privacy, neutrality, security and freedom of expression. She concluded by stressing the role of capacity-building, multi-stakeholder participation and lowering barriers for participation.

58. Mr. Jaroslaw Ponder (ITU) highlighted that the Outcome Document of WSIS+10 addressed a number of issues including the alignment between WSIS and the 2030 Agenda

for Sustainable Development, digital divides, enabling environment, ICT focus in the new Technology Facilitation Mechanism, and a continuation of ongoing WSIS-related activities. He drew attention to the United Nations CEB Joint Statement on WSIS+10 and discussed the future of the WSIS Forum beyond 2015. He followed by highlighting ICT-related goals and targets within the Sustainable Development Goals, pointing to the WSIS- Sustainable Development Goal Matrix.

The way forward

59. Mr. Peter Major, Chair of the CSTD, concluded with remarks on the way forward. He highlighted the implication implications of the various international commitments - the 2030 Agenda, AAAA, and WSIS+10 for the work of the CSTD in the years ahead. He then drew attention to Paragraph 65 of the Outcome document of the high-level meeting of the GA on the overall review of WSIS implementation. Paragraph 65 requests the Chair of the CSTD, through the Economic and Social Council, to establish a working group to develop recommendations on how to further implement enhanced cooperation as envisioned in the Tunis Agenda.¹

60. Mr. Major proposed the group would follow the composition of the previous CSTD working group on the same topic, including allowing observers in the room during the group meetings. He provided a timeframe for the constitution of the group, suggesting that CSTD member States and stakeholders groups submit nominees to the CSTD secretariat by 15 March 2016, through their respective focal points. The modalities and working methods would be discussed and finalized by the working group.

61. Mr. Major concluded that the role of the Commission has been reinforced, and he urged the Commission to cooperate with United Nations agencies to support the Sustainable Development Goals, find new working methods, seek synergies between the mandates on STI and WSIS, and continue to assist the Economic and Social Council in its work.

62. Participants welcomed the overall review outcome that was adopted in New York in December and that it affirmed CSTD's role in WSIS follow-up. As for the new working group, the overall framework of the Chair's proposal gained support, while some said that they would need time to reflect on it and discuss it with their national counterparts. One participant suggested that the group would be co-chaired by a member State and a non-governmental representative. Several participants called for good planning, pragmatism and a results-oriented approach while avoiding unnecessary rhetorical and conceptual debate on the enhanced cooperation. One participant suggested a two-stage approach including identification of high-level characteristics of enhanced cooperation followed by more detailed reflection on recommendations. Other participants were interested in this proposal. One participant warned that without strict guidelines about the timeline, the working group may run out of time and not able to complete its work and report to the twenty-first session of the CSTD as requested by the General Assembly. One participant suggested that the CSTD secretariat would prepare a compilation of work that has been carried out on enhanced cooperation both in the previous working group and by other entities, including at regional levels. The Chair of CSTD indicated that the results of the earlier CSTD Working Group on enhanced cooperation would be made available through the CSTD website.

¹ A/70/L.33.

VIII. Findings and suggestions

63. The following main findings and suggestions were highlighted by the Panel and put forward for consideration by the Commission at its nineteenth session, scheduled to take place in Geneva, Switzerland, from 9-13 May 2016.

1. Smart sustainable cities

A. Main findings

(a) The concept of a smart city is highly context specific, therefore it is important for national and city governments to work together with all relevant stakeholders to develop a common understanding of what a “smart city” would entail in their specific local and national contexts.

(b) Smart city and infrastructure design need to be people-centred and should respond to needs and challenges of specific urban systems. Such designs should recognize the potential of technology as an enabler and at the same time understand its limitations.

(c) In developing smart cities and smart infrastructure, an integrated approach needs to be adopted that will help to break down the silos that exist between the existing infrastructure verticals as well as between government departments that deal with these services.

(d) In designing smart cities and infrastructure several key design principles need to be followed, namely, inclusiveness, interoperability, flexibility, resilience, sustainability, risk mitigation and safety.

(e) Smart cities and infrastructure open up new avenues for the local STI community to actively contribute towards sustainable urbanization. The STI community can play a key role in addressing some of the main challenges confronted by smart cities and infrastructure projects.

(f) Existing national STI and ICT policies may not adequately integrate the needs of developing smart city initiatives. This would require the strengthening of the supportive ecosystem that will enable development of smart infrastructure, including legal frameworks, technology policies, institutional mechanisms, data usage policies, human capabilities both at government level and within work force

(g) Governments have at their disposal a broad array of policy tools to develop smart cities. This includes, inter alia, outcome based contracting, public–private partnerships, procurement policies, planning and development frameworks, social and entrepreneurial investment funds, research funds and provision of support services. These tools can enable governments to actively shape the markets and correct market failures related to smart infrastructure.

(h) Smart infrastructure has the potential to promote inclusive development (including gender inclusiveness) in cities by helping to generate data on the informal settlements and informal sectors and other marginalized groups of the society (including persons with disabilities and older persons, and women), this data can later be used to design infrastructure that specifically addresses the needs of these people.

(i) There is significant scope for regional and cross-country collaborations and inter-city learning with regard to design, development and management of smart city and infrastructure.

B. Suggestions

64. Member States are encouraged to consider the following suggestions:

(a) Adopt a participatory approach to smart city development that actively engages citizens at all stages of its development and ensure that the cultural and livelihood factors of all sections of the society are adequately integrated in the design of smart city plans.

(b) Collaborate with all relevant stakeholders to define the concept and vision of a “smart city” that is relevant for local context and would help to respond to specific local sustainable urban development needs and integrate the smart city agendas within national STI and ICT policies and within broader national development frameworks.

(c) Strengthen the core ICT infrastructure required to support smart cities and facilitate development of an ecosystem that supports the key technologies required to enable smart city and infrastructure, according to the specific needs of cities.

(d) Adopt an integrated approach towards conceptualization and design of smart cities and infrastructure to promote more efficient use of resources and provision of public services.

(e) Encourage the national science, technology and innovation system (including science parks and technology hubs) to make smart cities and infrastructure a priority theme by providing appropriate incentives. Create an enabling policy framework so that the local innovation system generates and implements innovative smart infrastructure concepts that respond to specific local needs.

(f) Create awareness within Governments about the various policy tools such as output based contracting, public private partnerships, procurement policies, long term contracting and targeted research funds to promote smart infrastructure implementation and encourage use of such tools to shape markets for smart infrastructure and to correct market failures.

(g) Ensure the inclusiveness of smart city projects by adequately addressing the special needs of the marginalized sections of the society including, inter alia, inhabitants of informal settlements and informal sectors, persons with disabilities and older persons.

(h) Use smart city and infrastructure concepts to make cities gender inclusive through, inter alia, making use of data generated by smart systems to make cities safer and more responsive to needs of women.

(i) Conduct skill gap analysis within workforce, including within public sector entities, with regard to skills required for design, development and management of smart cities and infrastructure. Promote multi-disciplinary learning and suitable curriculum reforms at school level, universities and TVETS, to meet skill requirements.

(j) Promote open data and open science models to trigger local innovation and draft appropriate data management policies and regulations to respond to concerns of privacy.

(k) Ensure that the design and development of smart city and its infrastructure integrates principles, such as, interoperability, flexibility, resilience, sustainability, risk mitigation and safety.

(l) Incorporate the insights obtained from data generated from smart city and infrastructure into the governance process by making available data in a timely fashion and effectively using it in policy formulation and decision-making.

65. The international community is encouraged to consider the following suggestions:
- (a) Collaborate with international standardization bodies to promote development of interoperability standards and other standardization measures required for enabling technologies related to smart cities.
 - (b) Promote regional collaborations in conducting pilot projects and benchmarking of projects related to smart city and infrastructure that responds to collective needs of the region.
66. The Commission is encouraged to take the following steps:
- (a) Inform the international community, including the UN-Habitat III and other relevant United Nations processes, on the critical role of science, technology and innovation community in facilitating smart cities and infrastructure projects with the aim of achieving sustainable urban development.
 - (b) Provide a platform to exchange lessons-learned, best practices and experiences on the policy approaches, in harnessing science, technology and innovation towards promoting smart cities and infrastructure.
 - (c) Share and analyse evidence on successful examples of localization of smart city and infrastructure concepts, especially in LDCs, which responds to pressing urban challenges.
 - (d) Provide a forum to share evidence on successful business models that would incentivize the local innovation system to scale up smart cities and infrastructure projects.

2. Foresight for digital development

A. Main findings

- (a) The emerging digital technologies discussed may create advantages for countries only if they have the required complementary infrastructure (such as, inter alia, human capital, energy infrastructure and legal frameworks) and good quality digital infrastructure (especially broadband connectivity)
- (b) Institutionalizing technology foresight as part of existing policy-making and national development planning processes can assist countries to make the best use of the opportunities offered by digital developments and simultaneously address challenges.
- (c) Big Data analysis and IoT have large potential to contribute to achieving the Sustainable Development Goals but they raise issues of privacy, security, and confidentiality of data.
- (d) Many big data technologies and artificial intelligence algorithms are built on technology with open access licenses. This provides opportunities for inclusive, pro-poor innovation, and for local adaptation of pressing development problems.
- (e) 3D printing has applications in a range of areas relevant for sustainable development, including enterprise development, environmental sustainability, construction, and education. However, it could potentially produce negative effects on labour markets, and create security and intellectual property concerns.
- (f) Although 3D printing is yet to become a widely used manufacturing process it offers technological opportunities that could reshape production processes. These include potential for mass customization, reduction of variable and fixed costs of manufacturing, and simplification of production chains. Further research is needed to identify the exact

scale of potential opportunities and challenges, especially in developing and least developed countries.

(g) Digital automation can potentially improve workplace productivity and the scale of operations. This could benefit workers by relegating more predictable, routine activities to robots, and can create jobs that require new skills. However, automation could potentially reduce the number of jobs available and lead to a change in the composition of employment as well as job functions across sectors. In order to reduce negative effects on employment, the labour force's skills should be aligned to the potential employers' new demands.

(h) MOOCs potentially provide an opportunity for countries, especially in resource-poor regions, to provide mass education at low cost. However, MOOCs could potentially widen educational and technological divides if not targeted to those most in need.

B. Suggestions

67. Member States are encouraged to consider the following:

(a) Engage in foresight exercises to understand the role of digital developments in their own national contexts, especially in terms of their potential to contribute towards achievement of national and global development goals.

(b) Adopt appropriate national policies to support the development, adaptation, and diffusion of emerging digital technologies in order to take advantage of the technological leapfrogging opportunities created by such technologies.

(c) Develop regulatory policies on data that balance individual and collective rights, safeguard privacy and security, while ensuring continuous innovation.

(d) Create awareness about the potential threats that digital technologies can pose to citizens' rights and develop appropriate policies and strategies to address them.

(e) Consider harnessing digital developments to the pursuit of sustainable development through government-led efforts (such as, inter alia, public funded pilot projects) that can inform society on the potential of particular digital technologies.

(f) Continue to promote an enabling environment for digital development through, inter alia, strengthening of the core ICT infrastructure and complementary infrastructure (such as, inter alia, human capital, energy infrastructure and legal frameworks).

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

(a) Serve as a forum where relevant lessons emerging from such foresight exercises could be shared, including failures and opportunities for growth and development.

(b) Monitor changing digital developments and their implications for sustainable development and particularly the least developed countries.

Appendix 1

Foresight for digital development: Expert panel questions

Theme 1: Impact on sustainable development

(Moderator: Mr. David Souter)

- To developing countries: What are the most significant opportunities and threats for development with these digital technologies?
- What technological capabilities do developing countries need to take advantage of opportunities and mitigate threats?
- How do you propose to use these innovations to monitor and implement the Sustainable Development Goals?

Theme 2: Impact on citizens

(Moderator: Ms. Anriette Esterhuysen)

- How can big data – and particularly open data – be used to advance human rights? How will human rights suffer as a result? For example, should policymakers think through privacy, security, and confidentiality of data given the need to safeguard consumer rights as well the challenge of ensuring the ability to innovate?
- How will new technologies that are potentially labour saving impact the rights of workers, especially as capital may increasingly substitute for more workers? On the other hand, how will the automation of work tasks enable new, low-cost services for SMEs in the developing world?

Theme 3: Technology foresight

(Moderators: Mr. Banning Garrett and Mr. Martin Hilbert)

- How can national governments create and institutionalize foresight for policymaking?
 - Do your countries currently have technological foresight exercises?
 - How do you insert foresight into policy planning process and what are the requirements? What does it take to make it work? How do you build the capacity for it?
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