Third Session of the Asia-Pacific Information Superhighway Steering Committee and WSIS Regional Review

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SUMMARY REPORT
(DRAFT)

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Acronyms

AI	Artificial Intelligence
AP-IS	Asia-Pacific Information Superhighway
AP-IS MDDI	AP-IS Multidimensional Digital Divide Index
APC	Association for Progressive Communications
APNIC	Asia-Pacific Network Information Centre
ASEAN	Association of South East Asian Nations
CAICT	China Academy on Information and Communications Technology
CLMV	Cambodia, Lao PDR, Myanmar, and Viet Nam
ESCAP	Economic and Social Commission for Asia and the Pacific
ICT	Information and Communications Technology
ITU	International Telecommunication Union
IXP	Internet Exchange Points
NIA	National Information Society Agency
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private-Partnership
SDG	Sustainable Development Goal
UNICEF	United Nations International Children's Emergency Fund
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNODC	United Nations Office on Drugs and Crime
WSIS	World Summit on the Information Society

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Overview

1. The third session of the Asia-Pacific Information Superhighway (AP-IS) Steering committee and World Summit on the Information Society (WSIS) Review was held from 26 to 27 August 2019 at the United Nations Conference Centre. The meeting was attended by more than 150 participants representing 30 government, 18 specialized agencies and related organizations, 24 private sector companies and 18 experts in Bangkok, Thailand. The exhibition was organized outside the meeting room to showcase partners' initiatives, research and solutions which are relevant to the implementation of the initiative.
2. Specific proposals and suggestions by members of the Asia-Pacific Information Superhighway Steering Committee are summarised below as key outcomes of the third session:

    a) The Internet Society proposed to conduct a feasibility study on setting up a shared Pacific Internet Exchange Point (IXP). Papua New Guinea, Samoa, Solomon Islands and Tonga agreed to work further on this issue (Session 3: Infrastructure Connectivity)[1];
    b) The China Academy of Information and Communication Technology proposed a 'Trans-multi-country terrestrial cable sharing model' for interested subregions and corridors (Session 4: Internet Traffic & Network Management). The proposal was supported by China and the Islamic Republic of Iran and requested the secretariat to establish a working group to cooperate on this issue (Session 8: Conclusion);
    c) The National Information Society Agency of the Republic of Korea proposed the establishment of a neutral IXP carrier for Cambodia, the People's Democratic Republic of Lao, Myanmar, and Viet Nam (CLMV), for improved Internet traffic management. The proposal was supported by the People's Democratic Republic of Lao (Session 4: Internet Traffic & Network Management)[2];
    d) The Indian Institute of Management Kashipur proposed the establishment of a working group on an AP-IS Academia Network. The proposal was supported by Timor-Leste, Maldives, Bangladesh & the Islamic Republic of Iran (Session 7: AP-IS Academic Network);
    e) The representative of China requested the secretariat to assist in establishing working groups on specific subregional connectivity challenges. The proposal was supported by the Islamic Republic of Iran (Session 8: Conclusion).

3. The sections below summarise the deliberations in each session followed by conclusion and way forward.

Session 1: Opening of the Third Session of the Asia-Pacific Information Superhighway (AP-IS) Steering Committee and WSIS Regional Review

A.1 Opening Remarks, Mr. Kaveh Zahedi, Deputy Executive-Secretary of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

4. In his opening remarks, Mr. Zahedi highlighted the vital role significant progress on advancement of digital technology such as artificial intelligence (AI), robotics, the Internet of

[1] A Pacific subregional meeting took place on the following day and 7 Pacific island countries agreed to be included in the study (Papua New Guinea, Solomon Islands, Vanuatu, Kiribati, Tuvalu, Samoa & Tonga) plus Timor-Leste. These 8 ESCAP member States supported the establishment of a working group to review the findings of the feasibility study.

[2] A CLMV meeting took place on the following day and CLMV countries advised Mr. Lee of NIA on additional issues that his current study on IXP in CLMV may explore further (study to be completed by 1st quarter of 2020).

things, fintech, blockchain and 5G technology with the Republic of Korea as the first country in the world that launched 5G network. Nevertheless, he warned that most of the 17 sustainable development goals (SDGs) may not be achieved by 2030 but new digital technologies can be a significant driver for acceleration of efforts. Despite the priority on seamless broadband connectivity to make the latest technologies accessible and affordable, the Asia-Pacific region is one of the most digitally divided in the world. The digital divide is not only across countries but also across gender, age, and minority groups within countries. Therefore, he emphasized the importance of combating the digital divide by providing affordable and reliable connections to leverage the full potential for sustainable development.

5. Mr. Zahedi reminded the meeting that the Asia-Pacific Information Superhighway (AP-IS) initiative with its four pillars of connectivity, network Internet traffic management, broadband for all; and e-resilience, aims to bridge the digital divide in the region as one of ESCAP's flagship initiatives. At the 75th ESCAP Commission session, resolution 75/5[3] invited members and associate members to consider developing and implementing subregional implementation plans for the initiative. Mr. Zahedi emphasised that partnership between governments and the private sector is critical for the expansion of broadband infrastructure. He used the example of an effective public-private partnership between the Ministry of Digital Economy and Society of Thailand and Google as a best practice on improving broadband connectivity in rural communities.

A.2 Statement, Mr. Malcolm Johnson, Deputy Secretary-General of the International Telecommunication Union (ITU)

6. Mr. Malcolm Johnson began his statement by highlighting that 16 of the member States in Asia-Pacific region have less than one-third of their population connected to broadband Internet. Hence, accessible broadband for all remaining to be of high importance. He further noted that access to broadband alone not sufficient, but users also needed to be aware of the benefits that connectivity brings with it. Local content in local languages must be available. He further stated that broadband affordability is a key issue for isolated rural communities due to low return on investment. New technologies could have a significant impact to find solutions including new satellite technologies with lower costs for remote islands. He highlighted the importance to harmonize standards and the role of the regulatory environment in ensuring affordable broadband. He noted that the ITU has successfully collaborated with ESCAP on the implementation of the Asia-Pacific Information Superhighway initiative through an interactive transmission map with the data of 400 operators showing the network of 2,700,000 km of global fibre-optic cable connections. Mr. Malcom re-emphasized the continued support and willingness of ITU to assist the region in overcoming the ICT connectivity challenges the region faces. He further emphasized the importance of collaboration, coordination, and cooperation between governments, private sectors and other stakeholders.

A.3 Statement, Mr. Mohamed Shareef, Permanent Secretary, Ministry of the Communication, Science and Technology, Maldives

7. Mr. Mohamed Shareef started his statement by highlighting that robotics, AI, and automation are expected to create a wide range of life-changing new products and services, but they also bring new challenges. He noted that these technologies required seamless broadband connectivity and hence building the infrastructure for that has been a priority in the

3 https://www.unescap.org/commission/75/document/E75_Res7E.pdf

Maldives. Further, he noted that the Maldives have tried to create new and inclusive policies to enable connectivity and achieving the SDGs targets. The Ministry of Communication, Science and Technology, of the Maldives drive the development of communication, science and technology as a cornerstone of national development. The Ministry promotes a vision of a nation empowered by technology as an enabling environment for an inclusive, sustainable and resilient digital Maldives.

8. As a result, the Maldives has experienced significant growth on access to broadband connectivity. At the end of 2018, the mobile-broadband access subscriptions were at 75% of the general population, compared to 5% in 2010. Fixed-broadband subscriptions has doubled to 12% in the same period. Mobile network coverage as a percentage of the population is at 100% with nationwide coverage. The International Internet bandwidth per user has continued to grow substantially in the last decade thanks to cross-border connectivity through submarine fibre-optic cables from India and Sri Lanka.
9. Despite these significant developments, challenges remain. Mobile and fixed-broadband subscription prices are considerably high, amongst the costliest Internet services across the globe. The Maldives is vulnerable to natural disasters requiring the national ICT infrastructure to be resilient with higher cost implications and risks. The digital divide continues to be a challenge especially for isolated and outer islands and communities. Digital literacy is an important priority for the Maldives in order to ensure proper and productive use of connectivity for sustainable development. And of course, the opportunity posed by emerging technologies will be a missed opportunity if the most basic element of a reliable and affordable access to broadband connectivity is not available to all citizens of the country.
10. He noted that the meeting included several topics of great significance. By sharing experience and good practices at the regional level, he expected that concrete partnerships and innovative solutions will be developed and ready for scaling up and replicated throughout the region and beyond to support more inclusive development and digital transformation.

A.4 Statement of Chairman of second AP-IS Professor Rohan Samarajiva, Chairman of the Information and Communication Technology Agency, Sri Lanka

11. Professor Rohan Samarajiva began his statement by outlining the objectives of the 2nd session of the AP-IS Steering Committee, from 27 to 28 of August 2018 in Bangkok. The objectives included discussion and finalization of the updates to the AP-IS Master Plan and Regional Framework Document 2019-2022; sharing the analytical work/projects/ initiatives of partners with member States; and to review subregional initiatives and activities.
12. He updated the meeting that significant improvements have been achieved in all three objectives. The updated AP-IS Master Plan 2019-2022 was reviewed by the AP-IS Steering Committee and endorsed by the 2nd session of the Committee on Information and Communications Technology, Science, Technology and in August 2018. He further noted that other important issues came out of the deliberations included the digital divide (including gender access divide); misinformation/fake news; capacity building; research analyses; connectivity and digital economy (including e-commerce); affordability and quality access; data sharing; cyber security; e-resilience; Internet traffic management issues; digital literacy; electricity and broadband access; and AI and emerging technologies. He further informed the meeting that a resolution (75/7) ‘Advancing the implementation of the Asia-Pacific Information Superhighway initiative through regional cooperation’, during the 75th session of the ESCAP Commission in May 2019. The resolution encouraged member States and implementing partners to cooperate on implementing the AP-IS initiative at the subregional level.

A.5 Election of the Bureau and Adoption of Agenda

13. The election of the Bureau was conducted. Members of the Steering Committee unanimously agreed on the following bureau composition until the next session of the Steering Committee elects the new Bureau:

    - Chair: H.E. Mr. Keosothea Nou, Deputy Secretary General, National Committee for ESCAP, Cambodia
    - Vice Chairs: (1). Mr. Guolei Cai, Deputy Director, Department of International Cooperation, Ministry of Industry and Information Technology, China; (2). Mr. Emil Ahmadov, Leading adviser, Department of International Cooperation, Ministry of Transport, Communications and High Technologies, Azerbaijan; (3). Mr. Mohamed Shareef, Permanent Secretary, Ministry of Communication, Science and Technology, Maldives; (4) Mr. Talatalaga Matau Matafeo, Chief Executive Officer, Ministry of Communications & Information Technology, Samoa

14. List of participants (Annex 1) is attached.
15. The Agenda (Annex 2) for the meeting was adopted by the meeting.

Session 2: Asia-Pacific Information Superhighway (AP-IS) Update

B.1 Update to the AP-IS Master Plan 2019-2022, ESCAP

16. Ms. Atsuko Okuda, Chief of the ICT and Development Section of ESCAP, opened the session by outlining the objectives of the meeting which were to: 1) Enhance awareness and knowledge on latest research, emerging trends, and technologies for evidence-based policy-making; 2) Deepen regional cooperation and policy dialogue in the development and implementation of the AP-IS sub-regional implementation plans and ongoing project activities; 3) Expand partnerships among government, academia, private sector and civil society organizations for the development of joint initiatives; 4) Review and discuss the AP-IS business plan to guide the implementation of the Master Plan and Regional Cooperation Framework Document (2019-2022); and 5） Facilitate information sharing and networking among government officials, academia, private sector and other stakeholders.
17. She also informed the meeting of the AP-IS Strategic Initiatives (2019-2020): 1) regional backbone network; 2) Internet Exchange Point; 3) regional social and economic studies; 4) ICT infrastructure resilience; 5) Policy and regulations; 6) Capacity building; and 7) project funding mechanism.

B.2 State of ICT connectivity in Asia and the Pacific, Mr. Siope Vakataki ‘Ofa, Economic Affairs Officer of the ICT and Development Section, ESCAP

18. Mr. Siope Vakataki ‘Ofa began his presentation by informing the meeting of the broadband connectivity trends. He noted that the Asia-Pacific region lacks behind North America and Europe on access to broadband connectivity; the digital divide continues to be a challenge in low-income and lower-middle-income countries; and Internet bandwidth divide significant among low-income countries. He moved to explain that South and South-West Asia and the Pacific Developing (excluding Australia & New Zealand) are lacking behind other subregions in broadband connectivity. He further stated that countries in the region have significant divergent on affordability, quality, and speed of broadband connectivity. He finished his presentation by noting that the digital divide is a challenge in vulnerable groups of the society and there is a persistent limited trust on the use of the Internet in most countries in the region.

B.3 Digital projects in Asia and the Pacific, Ms. Natasha Beschorner, Senior Specialist of the World Bank's Digital Development Department, World Bank

19. Ms. Natasha Beschorner began her presentation by introducing a World Bank report titled, "The Digital Economy in Southeast Asia: Strengthening the Foundations for Future Growth". She informed the meeting that growing the digital economy requires key foundations in place including universal access to affordable, high-speed broadband; skills; payment; logistics; and digital policy, regulation and digital ID. This foundation needs to be supported by a conducive macroeconomic and business climate, including stable macroeconomic situation, tax policy, trade openness, and competition policy.
20. She moved on to discuss a digital government readiness assessment tool which evaluate government's digital readiness on factors including Leadership and Organisation, User focus, business process change, data driven approaches, data ecosystem and analytics, shared infrastructure, capabilities, culture and skills, and cybersecurity, privacy and resilience. She further pointed out that digital identity could help to build trust in the digital economy and online transactions. For example, there is a strong engagement on digital identity in the Philippines because the government is planning to introduce a new ID and register system within the next three years. Also, Cambodia has many ambitions to put the digital economy into its' national development strategy while Malaysia tries to reduce the broadband digital divide.
21. In the Pacific, several connectivity (cross-border submarine fiber-optic cable projects) program has been implemented including the Tonga-Fiji connectivity project; Palau FSM connectivity project; Samoa connectivity project; Kiribati connectivity project; and Tuvalu connectivity project. She also noted that the World Bank is also assisting Pacific islands on digital transformation program including a regionwide analytical and advisory program on digital economy (2019-2021); regionwide engagement on digital ID; Tonga digital government support; Samoa digital ID and digital government platform; with FSM and Marshall Islands being planned.

B.4 Investing in digital infrastructure and digitalization of infrastructure, Mr. Paul Lam, Investment /Strategy Officer, Asian Infrastructure Investment Bank

22. Mr. Paul Lam started his presentation by informing the meeting that AIIB's is a multilateral development bank founded to address Asia's daunting infrastructure funding gap estimated at US$26 trillion through to 2030. He noted that the 4th wave of digital technologies has started with countries focussing on supporting the digital economy; increasing and diversifying financing sources; managing new risks; and a dialogue on rethinking if private sector financing is the only way for infrastructure project development. He further noted that emerging markets' users are spending more than half of daytime using the Internet.
23. He informed the meeting that the digital economy is on the rise, driving more demand for digital infrastructure. However, not all countries are the same with digital divide a challenge between developing and emerging markets, as well as between rural and urban digital divide. He noted that digital infrastructure is the building block of a modern economy with global digital economy in 2016 worth US$11.5 trillion, or 15.5% of the world's GDP and expected to reach 25% in less than a decade. Despite the rising importance of digital economy, the digital infrastructure gap in Asia is growing significantly, estimated to reach $512 billion by 2040. He informed the meeting that financing gaps is mostly found in middle and low-income countries, with more than 50% of digital infrastructure investment gap will be seen in Asia by 2040, which might slow down growth. He noted that different digital maturity required different digital infrastructure development priorities, with the abilities to leapfrog. He further noted that private sectors remained to be the major funding source

for digital infrastructure, but it may require future diversifications. He finished his presentation by emphasising that digital infrastructure financing gap is rising and the private capital alone is not solving the problem of digital divide. He added that new financing sources are required for creating new opportunities.

B.5 Country updates and discussion

24. The representative of the Islamic Republic of Iran asked if assessments has been conducted on ICT infrastructure financing in the region. Ms. Atsuko Okuda responded that the school connectivity in rural areas is still missing among middle-income countries. She further highlighted the need to investigate social networking in education and healthcare. Mr. Paul Lam responded that the region may need at least U$300 to U$500 billion financing gap on the ICT sector. He suggested that the financing gap could be narrowed in two ways; 1) promote private sectors funding of digital infrastructure. 2) seek a new way of thinking about digital infrastructure investments. Ms. Natasha Beschorner responded that the World Bank has a detailed analysis of the financing gap of countries and noted that infrastructure sharing is a factor that does contribute to the reducing the costs of the telecom service for Internet service providers and rolling out of infrastructures.
25. The representative of the Republic of Korea expressed his delegation's appreciation to the secretariat's support on the implementation of the updated Master Plan of the Asia-Pacific Information Superhighway. He informed the meeting of the Republic of Korea's continuing support to the implementation of the AP-IS Master Plan.
26. The representative of Sri Lanka raised to the attention of the meeting that cybersecurity would continue to be a challenge if additional data centres are developed and scattered around the region and therefore highlighted the importance national capacities to address cybersecurity risks.

Session 3: Infrastructure Connectivity

C.1 Experience of co-deployment in India, Mr. Suresh Kumar, Executive Director, RailTel, India

27. The representative of the RailTel, Mr. Suresh Kumar, Executive Director, started his presentation by outlining his organization's objective, organizational structure, existing network infrastructure, and service portfolio. He moved on to introduce his organization's work, including station WI-FI and Signalling Project Business, and the socio-economic benefits of these projects. He informed the meeting that RailTel has co-deployed fibre-optic cables along the railway nationwide with more than 50,000 kilometres. As a result, other services including the development of data centres and WI-FI stations have benefitted from codeployment along the railway network.

C.2 5G+ Strategy in the Republic of Korea, Mr. Woo Hyuk Choi, MIST, RoK

28. The representative of the Ministry of Science and ICT, the Republic of Korea, Mr. Woo Hyuk Choi, started his presentation by sharing the experience of the Republic of Korea on strategies for 5G deployment. He stated that the 5G technology provides critical infrastructure for the fourth industrial revolution with ultra-fast speed connections processing massive amount of data in real time. He further noted that 5G connections create new industries through high-tech devices and innovative services from autonomous vehicles, smart factory, smart city, and digital heath care among others.
29. He informed the meeting that the Republic of Korea the world's first commercial 5G services in April 2019 and scheduled to expand 5G networks to 85 cities (93% of population) by the end of 2019. Since the launch of 5G connections, more than 2 million users had

subscribed, and 84,322 base stations built (as of 7 August 2019). As a result, various content services combining 5G smartphones and virtual reality (VR) equipment are available (for example, watching online gaming on multi-divided screen, 360-degree multi-angle sports broadcasting, and 5GX VR content among others). He further noted that partnership requested has been received from other countries and Telco's around the world to learn from the Republic of Korea's successful experience.

30. As a way forward, Mr. Woo Hyuk Choi outlined the 5G strategy and key direction. He stated that as new first-mover-type industries and services are created by 5G-based intelligent innovation, the government would continue to provide support to these 5G strategic industries as well as reinforcing of public and private partnership and cooperation. In addition, he noted that the government would also need to focus on creating a safe use environment for the industry and users alike. He informed the meeting that the ultimate policy goal is to increase production of 5G+ strategic industries (180 trillion won) by 2026 (or around 15% of the global market share). Ten key industries identified included network device; next-generation smartphone; VR-AR device; wearable device; intelligent surveillance camera; future drone; connected robot; 5G V2X; information security; and edge computing. In addition, five service industries including immersive content; smart factory; autonomous vehicles; smart city; and digital healthcare.
31. He moved on to discuss other strategies that government could consider including the need for assistance of public sector on expanding the market for 5G during the initial phase. Also, government support (such as text deduction for investment in the 5G network and dedicated government funds for promoting investment in 5G+ innovative companies) for investment in 5G+. In addition, the need to remove regulatory barriers on 5G+ expansion, though adoption of ICT regulation sandboxes and other domestic regulations that may be hindering the growth of 5G strategic industries and services.

C.3 Community Networks, Mr. Rajnesh Singh, Regional Director, Asia-Pacific, Internet Society

32. The representative of Internet Society, Mr. Rajnesh Singh, began his presentation by highlighting that the digital divide across the world continues to be a critical challenge with 49% of the world is still not connected. He pointed out that rural areas face a 'double digital divide,' with insufficient investment in next generation access infrastructure (supply-side constraint), as well as a lack of basic skills and knowledge to exploit connectivity and digital technology, leading to digital highways being under-utilised (demand-side constraint).
33. He informed the meeting that one solution for connecting rural, remote and under-served communities is community networks. These small do-it-yourself networks are already connecting communities in remote parts of more than 43 countries, from the Amazon rainforest to the Himalayas. Community networks are viable and affordable alternatives to connect remote and rural areas as they provide access for communities that are not being served by commercial operators; allow communities to actively connect themselves to the Internet;
34. He proposed community networks as one solution for connecting rural, remote, and underserved communities. He suggested that community networks are a viable alternative to connect remote and rural areas because they provide access for communities that are not reached or served by traditional or commercial operators and allow communities to actively connect themselves to the Internet. Community networks are often small (serving under 3,000 people), relying on wireless and optical fibre and often using a distributed architecture. As a policy recommendation, he suggested that the governments should include community network experts in regulatory proceedings. He also indicated that the governments should be responsible for increasing regulatory transparency, ensuring regulatory fairness, lowering costs of the spectrum based on special circumstances, increasing spectrum allo-

cation transparency, and providing public funding for community networks. He gave national experiences of community networks established in India, Nepal and Pakistan which had assisted with improving rural connectivity.

35. However, he noted that challenges remain for deployment of community networks in rural areas including the difficulty of securing enough spectrum for community networks (rather than focusing on scarcity, countries may consider spectrum as a common resource to be managed efficiently and effectively). He further noted that traditional regulations have led to inefficient use of spectrum. Exclusive licenses (in contrast to shared use) provide one licensee exclusive use of a particular spectrum which has led to large portions of spectrum being unused or underutilized. In addition, broad licenses which cover large geographic areas often given to incumbent service providers who may not have the economic incentive to expand their networks and utilise fully all of the spectrum licensed to them. He noted that users may use unlicensed spectrum with the need to pay for high costs of obtaining a spectrum license (for example, Australia, Malaysia, New Zealand, Singapore and the European Commission have recommended the 433-434 MHZ band for unlicensed use).
36. Mr. Singh therefore recommended that governments may consider including community network experts in regulatory proceedings in order to provide new perspectives on access discussions on network development. He further recommended the need for better regulatory transparency, ensuring regulatory fairness; need for lower costs of spectrum based on special circumstances (social inclusion and expanding socio-economic benefits to vulnerable communities); increase spectrum allocation and transparency and availability; and public funding (universal service fund to include funding of community networks development).
37. Mr. Rajnesh Singh moved on to deliver his second presentation titled, 'Pacific Regional IXP – a feasibility study to determine how the Pacific islands can better connect together'. He updated the meeting that the Internet Society and ESCAP are collaborating on a joint study on the feasibility of a regional IXP for the Pacific islands. The feasibility study would review current Pacific Islands submarine cable inter-connectivity (i.e. which countries are linked directly by cable to each other); tabulate number of international gateways in the Pacific Islands and their international connection hub (i.e. where does the international link terminate for traffic exchange); where data is available, tabulate international transit capacity of each country; based on data available, assess technical feasibility of establishing a regional Pacific IXP; and if a regional IXP is feasible, identify potential location(s). He informed the meeting that since 2018, Papua New Guinea, Samoa, Solomon Islands and Tonga have expressed interest to be part of the study.

C.4 Affordable Broadband Solution & Standards for Connecting the Unconnected, Dr. Haruo Okamura, President, Global Plan Inc.

38. The representative of Global Plan, Dr. Haruo Okamura, began his presentation on affordable broadband solutions highlighted the critical role of fiber-optic cables in connecting rural areas. He gave an example of rural communities in Wales deploying their own cables due to limited Internet quality. He noted that a new ITU standard on optical cable standard, cable laying standard, and concept standard has assisted in bringing broadband to rural communities. He informed the meeting that there are three types of cables commercially available in Japan (with a lifespan of 20 years, and reaching 20,000km). He noted that these cables had been tested extensively against rodent, fire and pressure damage. He pointed out that these fiber-optic cables are crucial to connecting rural areas and making broadband connectivity affordable.

C.3 Country updates and discussion

39. Following the presentations, a participant asked a question to Mr. Rajnesh Singh. He stated that his organisation is currently developing a subregional IXP with the assistance of ISOC along the Fergana Valley between Kyrgyzstan, Uzbekistan and Tajikistan. He noted that he Internet cost is very high and slow. He informed the meeting that commercial Internet operators have not been eager to connecting to the IXP and wondered why is this the case? In response, the representative of Internet Society stated that from experience, there has always in hesitancy by commercial operators to connect to neutral IXPs. He stated that this could be due to different technologies (changes in telecommunications environment) used by different commercial operators evolving over time. He further suggested that competition between commercial operators with dominant operators pushing to protect their share of the market from any new entrant. However, he stated that if these operators are connected with each other through a neutral IXP, there is a lot of traffic that is wasted by going outside the country before it returns back.
40. The representative of India suggested that it would be helpful to develop a formula whereby the costs of interconnecting with IXPs can be set off to attract participation from the private sector.
41. The representative of the Saleem Akhtar Memorial Foundation made a comment about the importance of ensuring returns on investment is achieved when dealing with infrastructure projects. She shared her organisation's experience in Pakistan on rural connectivity by delivering tele-medicine services, her organisation found it useful when the needs of rural communities for the service was clearly identified which assisted in developing an effective business model for the project.
42. The representative of the International Institute for Trade and Development (ITD) asked the representative of the Republic of Korea about how to justify having 5G given the lack of investment in the region? She then asked the Internet Society about their thinking of which countries identified from the list of countries mentioned in his presentation as the hub for a subregional IXP? Lastly, she asked the representative of Global Plan about the cost of laying the new proposed fiber-optic cables? The representative of the Republic of Korea replied that the speed of change for ICT technology is very fast and he expected that the price 5G is expected to decrease. The representative of Internet Society responded that the location of the IXP hub depends on the research result of an ongoing study, which hopefully will be drafted by November. Dr. Okamura responded that while conventional fibre-optic cables are four times cheaper than the proposed new submarine fiber-optic cables, he stated that construction cost of conventional cables is 70 to 80 percent of total cost compared to the new submarine cable.
43. The representative of the Institute for InfoSocinomics of Tama University posed a question on assessment of the economic impacts of digital development and how to facilitate ICT development. The representative of ESCAP responded that there is growing consensus on the economic benefits of broadband connectivity in academia but not so widely agreed upon between governments or at national levels. She therefore encouraged academic researchers to develop effective partnerships with policymakers on generating evidence-based policymaking.
44. The representative of Azerbaijan shared his country's continuous efforts and remarkable achievements in developing sustainable broadband infrastructure. He noted that his country is now at a new stage of technological development, with the state being the largest customer of high-tech products in the country's market. He stated that as a result of the measures taken by the Government for the development of ICT, important steps are being taken towards intensive integration of the country into the global electronic environment, the emergence of new forms of social and economic activity (e-government, e-commerce,

online education, etc.), the formation of the information and knowledge market, increasing efficiency in various sectors of the economy, as well as improving the quality of products and services.

45. He explained that the main policy document for the future development of this sector is the "Strategic Roadmap on Development of Telecommunication and Information Technologies in the Republic of Azerbaijan", approved by a decree of the President of the Republic of Azerbaijan on 6 December 2016. An important role is given in the roadmap to the application of ICT to achieve sustainable and high economic growth. Further, he stated that UNESCAP has recently ranked Azerbaijan in a study as the first among countries in North and Central Asia on broadband Internet penetration. He informed the meeting that the number of mobile subscribers in Azerbaijan is about 106 percent of the country's population and that more than 80 percent of the population are Internet users while 68 percent of households have computers.
46. He further informed the meeting that a 2018 Presidential decree led to the establishment of an Innovation Agency under the Ministry of Transport, Communications and High Technologies. The main objective of this Agency is to identify products and services for digital transformation; robot and cloud technologies; the processing of large-scale data; artificial intelligence solutions; as well as coordination of programs financed by foreign states and international organizations.
47. The representative of Azerbaijan stated that his country continues to cooperate with various agencies of the United Nations including the UNECE, ESCAP, UNDP and ITU. Lastly he informed the meeting about Bakutel 2019 - the 25th International Telecommunications, Innovations and High Technologies Exhibition and Conference which is a traditional meeting place for business leaders and professionals to solve global issues, discuss promising projects, and make important decisions, that will be held in Azerbaijan’s capital in December of this year.

Session 3: Continued

C.6 Digital inclusion initiatives in Asia, Ms. Manisha Dogra, Vice President - Sustainability Asia, Telenor Group

48. The representative of Telenor, Ms. Manisha Dogra, started her presentation on digital inclusion initiatives in Asia by stating that Telenor operates in 9 markets worldwide with 181 million subscribers and generating 11.5 billion Euros annual revenues. She stated that Asia had been the growth engine for her organisation and Telenor has been an integral part of the social-economic development of the Asian market serving Bangladesh (since 1996), Malaysia (1999), Thailand (2000), Pakistan (2004) and Myanmar (2014). As a result, 150,000 jobs have been created with US$15 billion in economic value created as well as US$1.7 billion in taxes paid. She used several examples on three key demographic groups which are children, women, and farmer community to show how Telenor is taking initiatives to close the digital divide and increase the livelihoods of people in the region. In closing, she emphasized the partnership among organizations countries and society as important.

C.6 Redefining Inclusion, Mr. Michael McDonald, Huawei Southeast Asia

49. Mr. Michael McDonald, the representative of Huawei Southeast Asia, began his presentation by stating that people now have access to information for had before and information goes far beyond just simple information that allows for education, employment opportunities, and e-commerce. He pointed out that 5G was one of the most economical ways to really connect people in creative ways and gave them the bandwidth and scalability that the

previous generations of technology just were not capable of providing. Huawei was now developing a program called "Tech4ALL" with three key coders. For connectivity, it was about reducing costs and increasing coverage. For applications, it was about trying to create platforms including AI, IoT, as well as all kinds of other technologies and building an ecosystem which attempts to bring people together in the community. For skills, it had a program called "Seeds for the Future" to educate people about digital technology. He stated that their goal in the next five years is to connect 500 million people.

C.6 Increasing investment in Internet development in the Asia Pacific, Mr. Duncan Macintosh, CEO, Asia-Pacific Network Information Centre (APNIC) Foundation

50. Mr. Duncan Macintosh began his presentation by outlining his organizations' work on increasing investment on Internet development in the Asia-Pacific region through education and training, human capacity building, community development, research, and related projects and activities. He stated that APNIC manages Internet number resources (IPv6) by supporting training, education and Internet development. As a result, APNIC has conducted trainings and provided technical assistance in the Asia-Pacific region including CERT training and provided support in the Pacific, technical training and support for PNG and local IXPs, training, and support for Law Enforcement Agencies (LEAs), and technical training for university networks. He informed the meeting of the organization's Information Society Innovation Fund Asia (ISIF)[4] program, which provided grants and awards program empowering communities in the Asia Pacific region to research, design and implement Internet-based solutions for their own needs, placing particular emphasis on the positive role the Internet has in social and economic development in the region. He concluded his presentation by announcing the ISIF Asia 2019 winners with USD 120,000 invested across two categories for 6 projects in 5 Asia-Pacific economies.

C.7 ISP Investments in Frontier Markets - A 'forgotten' piece of the connectivity puzzle, Mr. John Garrity, Advisor, Connectivity Capital

51. Mr. John Garrity opened his presentation by emphasizing the huge progress made in the expansion of the global Internet driven by connectivity infrastructure investment in the past 50 years. He moved on to elaborate the two major gaps in the current connectivity ecosystem, namely the access gap, especially outside of major markets, and the funding gap for non-high average-revenue-per-user customers. He stated that the Alliance for Affordable Internet estimated that the target for SDG9c will only be reached in 2042, 22 years after the target date. He further stated that the growth of Internet users worldwide has been declining from an average global growth rate of 14.8% in 2008 to 7.1% in 2018. He noted that despite the mobile miracles, affordability and network availability issues remain for billions of people especially outside major markets. He further noted that mobile operator network coverage maps often overstated the actual network availability and used the example of apparent and real coverage in Uganda (based on actual tower data) to show significant difference.
52. He informed the meeting that development in fiber infrastructure; falling capital expenditures; mobile network operators (MNOs) are unlikely to disrupt their own markets; decreasing cost and prices of smart phone devices and increasing demand on Internet data; and significant development of new smart devices applications which drives higher Internet demand for connectivity. He noted that his organization believed that Internet service providers (ISPs) could complement MNOs; lack of capital slows ISP growth and access to

4 For further details, please visit: https://www.apnic.net/community/support/isif/

connectivity; and a sector-specific debt fund allows for proprietary deal flow and better risk mitigation.

C.8 Country updates and discussion

53. Following the presentations, the representative of Tonga, Mr. Anitelu Toimoana asked Mr. MacDonald of Huawei about the requirements and costs to participate in Huawei's educational programs. He explained that in Tonga the technology is available, but due to the lack of digital education, its potential is not fully used. The representative of Huawei responded that the Huawei educational programs are free of charge and come in a great variety and depend on the objective and purpose of the outcome. Some programs focus on mediating educational programs and setting up support technologies in universities. Other programs are so-called "open labs" on the community level which invite business and governments to cooperate and to create next generations of innovative applications for the growth of the economy.
54. The representative of the Islamic Republic of Iran asked about the importance of security, safety, and vulnerability for kids with increasing access to ICT. Also, he asked about the priority of goals, if it was focussed on access or capacity building? Further, he emphasised the different cultural backgrounds of member States must be considered when answering the question on priority. The representative of Telenor responded that she agreed with the concern of child safety and the parental context. She explained that her organization works with experts' organizations like UNICEF to control for the appropriateness of the interactions and initiatives.
55. The representative of Malaysia, Ms. Normaya Binti Nordin of the Ministry of Economic Affairs asked a question to Mr. MacDonald and Mr. Garrity. She requested for examples of best practices or studies that would assist decision-making on which appropriate technology a country should focus upon. She elaborated that in Malaysia, the fixed-broadband development mostly happened through public-private partnerships. The difficulty is that technology is changing fast and therefore it is a challenge for the government to identify which technology to invest in since it is going to be replaced soon. This is especially relevant for the development of digital infrastructure in rural areas. Mr. MacDonald from Huawei responded that the technology for fixed-line Internet infrastructure has not change much while fibre-optic cables did change but this was not a problem since replacing fiber-optic cable is cheap. However, deployment of fibre-optic cables (trenching) is expensive and therefore investing in fibre-optic infrastructure is best. In addition, he agreed that the technology is changing fast and with artificial intelligence potential, new return on investment (ROI) models are available. He recommended investment in 5G technology. He further stated that some business models today may favour wireless Internet infrastructure deployment as an investment for the private sector. Therefore, public-private partnerships are important to incentivise costlier investments in fiber-optic cable infrastructure deployments and to create more favourable ROI models. He further stated that mobile Internet connectivity has not yet reached the speed of a fiber-optic cable network connection and hence he expected that investing in fiber-optic cable network will continue to be a favourable investment choice.
56. Mr. Garrity from Connectivity Capital highlighted that the change of business models and technology were not the biggest problem. He noted that the biggest challenge is the regulatory environment that supported new business models and the deployment of new technology. He explained how community-based solutions could assist with more cost-effective business models for deployment of mobile Internet in rural areas. Further, he noted exciting developments in the satellite industry with new business models and concluded by stressing that the regulatory environment is the key challenge.

57. Mr. Suresh Kumar from RailTel India commented on the deployment of public WIFI. He stated that 3 years ago there was a lot of demand for public WIFI although there were concerns about the security of this system. However, the paradigm has shifted, and the government has prioritised the deployment of public WIFI with fewer concerns about the security which increased the overall benefits of the technology.
58. Mr. MacDonald from Huawei commented that the perspective of the younger generation was often overheard in the discussion about technology deployment. He stated that the young generation thinks differently about fixed broadband connection. For them everything is wireless, even when they use WIFI at home, they do not think about that the WIFI requires a fiber-optic connection to operate. In addition, he explains with regards to the comment of Mr. Kumar from RailTel on the deployment of WIFI, that as technology evolves the demand on technology changes as well. WIFI became a priority because it was the only legitimate option for mobile internet for many users. Today WIFI is predominantly used to avoid the higher costs of mobile internet. At the same time, the new priorities are focussed on developing better technologies for enhancing smart devices' battery life. He noted that WIFI technology consumes significant battery power hence influencing users to shift further away from the WIFI technology. He concluded that the shift users demand is not always driven by usability or costs but also 'soft' aspects which are often neglected or highly underrepresented. This should be kept in mind for the negotiations between governments, businesses and the operators.

Session 4: Internet Traffic & Network Management

D.1 Operation model for cross-border broadband initiative, Mr. Hui Chen, Academy of Information and Communication Technology, China

59. The representative of the China Academy of Information and Communications Technology (CAICT), Mr. Hui Chen, started his presentation by sharing the experience on implementation of the Greater Mekong Subregion Information Superhighway (GMS-IS). First, he informed the meeting that the GMS-IS phase I which focussed on the development of a fiber-optic backbone network connecting six countries within subregion, was completed in 2008. However, he noted that the GMS-IS phase II has not started yet, and one reason is the challenge of not having in place an appropriate operation model. Also, the lack of a charging settlement on trans-multi-country terrestrial cable was not adequately resolved.

60. Mr. Hui Chen moved on to propose a solution – 'Trans-multi-country terrestrial cable sharing model'—which has two fundamental principles. One is an end-to-end circuit distribution determined according to the proportion of cable length. The second is the need for a unified network planning, construction, operation, maintenance, and management of projects. He stated that the advantages of the proposed model included timesaving and achieving efficiency in network configuration; simplified the negotiation between countries based on a unified and fair standard; and benefit of reducing international Internet access cost for landlocked countries. He concluded his presentation by updating the meeting of the progress of operation model standardization in the ITU working group and noted that some potential cases which maybe adopt the model.

D.2 Internet traffic management for CLMV countries, Mr. Yeong Roo Lee, National Information Society Agency, Republic of Korea

61. The representative of the National Information Society Agency (NIA) of the Republic of Korea began his presentation by informing participants that ESCAP and NIA had conducted studies to improve Internet traffic management through the possible establishment

of neutral IXP carrier and estimated cost with focus on Cambodia, the People's Democratic Republic of Lao, Myanmar, and Viet Nam (CLMV) in 2017 and 2018. Therefore, his presentation focussed on the results of the CLMV study.

62. Mr. Lee stated that he measured Internet speed and traffic flows in CLMV countries. Ookla servers in the capital cities were selected as the target points and 'NetInfoTrace' was used as test tool with the 'WHOis' and 'Max Mind' to take information of packet paths. Additionally, speed and path measurements were conducted in a one-way manner to neighbouring countries outside the CLMV countries as well.
63. As a result of the traffic measurement for the neighbouring countries by country, the study found that some Internet traffic flows within CLMV countries goes outside (often to the United States or other distant countries) before returning back to another CLMV country. Most of the CLMV countries have been physically linked with a fiber-optic cable, but actual traffic flows through undesired routes to each other, often determined by agreement between carriers or ISPs. He further noted that even if country specific IXPs and fiber-optic cables exist, it may be ineffective if Internet traffic does not travel along those paths thereby increasing connection costs.
64. Mr. Lee therefore proposed that Asia-Pacific countries should seek to reduce costs and improve Internet traffic quality through establishing of neutral Internet traffic exchanges, conducive routing policies, and establishing data centres collocated with a content-delivery-network (CDN) system. He pointed out that the Malaysia Internet Exchange (MYIX) is a good country case as a non-profit and neutral Internet Exchange where ISPs and content providers connect to exchange Internet traffic.

D.3 Country updates and discussion

65. Following the presentations, the representative of Armenia briefed the meeting of Armenia's technological and Internet traffic development path. She stated that innovation and hi-tech development are at the heart of Armenia's development strategy to build a truly technological and industrial economy. She further stated that over the past twenty years, the ICT and hi-tech sector in Armenia has grown five-fold with an annual average growth rate of about 27%. The telecommunication market in Armenia is well developed, especially on mobile and fixed-broadband services with 3G mobile network covering 99.6% of population, while LTE+ (4G+) mobile network covers 93.9% of population. Fixed (telephone, Internet and TV) services are available for around 71% of population through fiber-optic cables.
66. She informed the meeting that the private sector and the Government of Armenia recognised the potential of developing terrestrial connectivity corridors through the South Caucasus connecting the Middle East, Central, and South Asia. She stated that Armenia entered into transit market in 2014 and currently reached 1TB of transit capacity towards Middle East and Central Asia regions. She further stated that Armenia connects countries from the Middle East and Central Asia to datacentres in Europe, with point-of-presence (POPs) in Frankfurt, Sofia, Moscow and soon in Amsterdam. She concluded by stating that the reason why countries preferred transit-routes through Armenia was because of the high quality, stable services and the short paths. In addition, she informed the meeting that road infrastructure project called North-South Highway, financed by the Asia Development Bank and other donors, which includes huge capability for fiber-optic cable codeployment along road.
67. The representative of APNIC Foundation asked Mr. Lee of NIA's presentation that all CLMV countries already have national IXPs in place, and therefore if he could clarify what is his study proposing? Mr. Lee responded that many national IXPs in this subregion are established by carriers and service providers providing service with their own commercial

interests and conditions. This creates a challenge especially for new (often smaller) ISPs who faces significantly high charges for using existing IXP for international connectivity. Therefore, Mr. Lee stated that his suggestion is for a neutral IXP established with the assistance of Government and used the example of a neutral IXP established through the intervention of Government in Malaysia as a good example. He stated that in the case of the Republic of Korea, while carriers have established their own IXPs, the Government also assisted to establish a neutral IXP of which new ISPs have connected to. By doing so, all ISPs (including new entrants) can compete in both domestic and international services.

68. The representative of Sri Lanka asked a question on Mr. Hui Chen's presentation. He explained that Mr. Hui Chen's presentation suggested a submarine-cable consortia as a potential business model for managing this multi-country cable systems. He asked if his proposal would include a consortium where every party has got voting rights (joint venture), or is it proposing a European-type with terrestrial cables managed by a commercial entity (profit oriented)? Mr. Hui Chen responded that his proposal is along the line of a joint venture business model. He further noted that this issue of an appropriate business model is currently being discussed at the ITU and stated that in many European and North American countries, with large operators and license to operate in each country, so each big operator developed their own infrastructure network in each country and subsequently connect across the border thereby allowing to form an integrated infrastructure backbone in different countries. This could be another solution. Mr. Hui Chen however noted that his proposal is for countries that does not have big operators and therefore not able to secure license in each of the countries.
69. As a follow-up question, the representative of Sri Lanka began by noting that there were restrictive conditions imposed by some member States on connecting to fiber-optic cables. He gave an example of the 4 submarine cables landing in Bangladesh, of which all operators were required to connect to only one company's fiber-optic cable (incumbent operator). He therefore wondered if Mr. Hui Chen's proposal opted for the consortium business model for managing multi-country cable systems, such restrictive condition could be a challenge considering it has been one of the problem with multi-country cable systems including the Greater-Mekong-Bangladesh-India-Nepal proposal that was funded by the ADB. Mr. Hui Chen responded that there is a need for all operators in each country involved to agree to a set of basic principles such as each operators' share of the multi-country circuit being determined by the length of fibre-optic cable they contribute to the multi-country network. He informed the meeting that deployment of the fibre-optic cable comprised of the highest costs on fiber-optic infrastructure development, hence why his proposal used the length of the fiber-optic cable contributed by each operator as investment to the multi-country network or alliance.
70. Mr. Talant Sultanov from Internet Society - Kyrgyz Chapter asked Mr. Lee if any ISP or business/banks is able to connect to a neutral IXP and if there are licensing requirements? Mr. Lee responded that there is no registration process for Internet service providers in connecting to domestic IXPs.
71. The representative of the People's Democratic Republic of Lao noted that Mr. Lee's presentation stated that high transit charges remained a challenge for a long time in CLMV countries as well as network connectivity between China, the People's Democratic of Lao, Cambodia, Thailand and asked if his study has explored possible solutions to solve this challenge. He supported Mr. Lee's proposal of establishing an alliance of countries involved may be useful since negotiating one-by-one with each country involved may take a long time. He stated that the length of the cable in each country as well as the standard of the equipment used in each country differs. He informed the meeting that in the case of Lao, People's Democratic Republic , different operators/ISPs used different technology and

different bandwidth which imposes a challenge on negotiating cross-border interconnectivity. He also posed a question to Mr. Lee of NIA if his study used the latest data available for CLMV countries.

72. Mr. Lee of NIA responded to the question posed by the representative of the People's Democratic of Lao by stating the study was conducted in 2017 and it was not easy to update the state of each country. He further noted that this may result in some difference in recent data and informed the meeting that there will be separate meeting the following day to discuss updates from CLMV on the study. The representative of the People's Democratic of Lao replied that his ministry is prepared to support with the providing updated information to assist with updating of the data from his country. Mr. Chen of CAICT responded that his organisation is promoting Chinese operators for cooperation with different operators from the Greater Mekong subregion to establish an alliance in the attempt to solve the challenges of cross-border connectivity.
73. The representative of the Republic of Korea asked Mr. Lee of NIA and the secretariat on the reaction of CLMV countries to the study? Also, what is the secretariat planning to do with study as a way forward? Ms. Atsuko Okuda of ESCAP responded that the secretariat is planning to host a CLMV meeting the following day to discuss the study with the four countries involved. In response to way forward, she noted that the representative of the People's Democratic of Lao stated that cooperation in specific areas is needed, the next step is to establish a working group or similar mechanism to continue working on it. She further noted that as mentioned by Mr. Lee, a possible agreement or principles, modalities, and structure of cooperation needs to be discussed with member States in more detail.
74. The chair of the session, Mr. Talatalaga Matau Matafeo, Chief Executive Officer, Ministry of Communications & Information Technology, Samoa summarized the key issues discussed in the session. He stated that given the crucial need of member States to work collaboratively and given the swift and wide advances of technology, the chair proposed that member States may consider the adoption of the 'Trans-multi-country terrestrial cable sharing model' with great benefits that Mr. Chen's presentation outlined in fast-tracking the development of highways for broadband connectivity. He recognised that Mr. Lee's presentation encouraged consideration of neutral Internet exchange points to reduce transit cost as well as establishing datacentres in colocation with IXPs.

Session 5: E-resilience

E.1 ESCAP-ITU Transmission Map, Mr. Sameer Sharma, Senior Advisor, ITU

75. Mr. Sameer Sharma began his presentation by informing the meeting that there is a huge digital divide even though more than 50% of the world population has got access to the Internet, so ICTs have the potential to fast forward progress on the attainment of the SDGs. As a result, ESCAP and ITU in 2013 embarked on a joint project to creating an online interactive transmission map. He noted that the terrestrial transmission map is a powerful tool for stakeholders to assess market opportunities in closing connectivity gaps. The online interactive map includes information from around 500 operators, around 20,000 nodes and 3.5 million route kilometres of transmission around the globe. He moved on to show that the online interactive map include indicators such as fiber-optic cable, mobile network coverage, population density, microwave links, submarine fiber-optic cables, satellite earth stations, and Internet Exchange Points. He ended his presentation by showing how to use the online interactive map and how to acquire relevant information.

E.2 AI-enabled emergency communication, Mr. Abdo Shabah, Founder of Humanitas Solution, Humanitas

76. Mr. Abdo Shabah began his presentation by introducing that Humanitas tries to solve the problems of people working and living in limited connectivity conditions. He then shared his experience to save lives in Haiti in 2010 and noted that one of the challenges was limited or no Internet connectivity which hindered coordination between stakeholders assisting with management of the operation. He noted that the intensity as well as cost of natural disasters is increasing. As a result, his organisation put Internet connectivity as a very critical component in disaster context, so it was crucial to have the right information at the right time for the right people. He further stated that other challenges included not enough data on the ground or in some instances, too much data; unorganised decision flows; costly communications; and limited human expertise to operate new technology;
77. He moved on to explain his organisation's project on disaster response software platform. The project relied on using existing technology to connect a mash of smart phones on the ground even when there is no connectivity, routers or server. The software platform can be embedded on any mobile platform such as drones to bring connectivity to disaster-affected areas. Through drones, the software platform is able to collect and analyse data and creating 3D maps. He concluded by informing the meeting that his organisation is looking for partners in the region in order to complete his organisations' mission of improving connectivity and cloud computing for people in need.

E.3 APT's activities towards e-resilience, Mr. Masanori Kondo, Deputy Secretary General of APT

78. Mr. Masanori Kondo started his presentation by discussing the definition of e-resilience which could be the ability of ICT systems to withstand and recover from external disturbance. He also stated that e-resilience could also be understand as the ability to reduce risk related to the external disturbance by using ICT. Mr. Kondo explained that in our daily living environment, two aspects are important to consider, namely telecommunications infrastructure and ICT application/services. He informed the meeting that three issues are important to consider, business continuity (acceptable level of discontinuity); redundancy in infrastructure (affordability and sustainability of investment in redundancy if possible); and social application (use of software applications such as person finder application by Google to find people during disaster times). He moved to discuss that risks under e-resilience context for policymakers can be categorised by natural disasters or man-made disaster.
79. He moved on to discuss APT's function by stating that APT has 38 Members and 4 Associate Members, and 136 Affiliate Members. He stated that APT activities focussed on 5 key areas including capacity building; partnership; trust (promoting security); connectivity; and innovation (enabling conducive environments for new technologies). He informed the meeting that APT has delivered several training courses in the focus area of trust, focussing on cybersecurity in several countries. He further stated that APT has also implemented several pilot projects since 2015, including an ICT and quick access deploying MDRU for disaster management/mitigation in Vanuatu among others. He concluded by informing participants of an APT survey research report conducted on information for ICT policy and solutions related to disaster between countries.

E.4 Connecting the unconnected for resilience, Mr. Hung Tran, Business Development, SES Network

80. Mr. Hung Tran began his presentation titled, 'Connecting the unconnected for resilience', by informing the meeting that SES Networks is a provider of global managed data services,

providing services to governments, operators, ISPs, cloud services among others. He stated that SES Networks has satellites in GEO Orbit in C, Ku, Ka, MIL Ka & X band Satellites through LUX GOVSAT (public private partnership). He further stated the SES Networks has partner with the Government of Burkina Faso on delivering a hybrid satellite and terrestrial network which expanded and improved Burkina Faso's legacy government network (RESINA). The network put in place was fully interoperable and integrated with co-existing technologies and systems and improved the overall quality and reliability of IT and communication infrastructure in the country.

81. In addition, SES Networks has also partnered with World Food Programme and other organisations in delivering connectivity in times of crisis. He used the example of the 7.2-magnitude earthquake in Papua New Guinea in May 2019, critical nodes of terrestrial and the Kumul fiber-optic cable were damaged. He informed the meeting that SES Networks worked with PNG DataCo (local company tasked by PNG government to build national transmission network) to restore the service within hours. He moved on to discuss SES Networks work on addressing connectivity needs in the Pacific with next-generation MEO satellites with fiber-like connectivity, connecting outer islands, enables digitalization and support other existing terrestrial networks in countries.

E.5 Country updates and discussion

82. The representative of Bangladesh, Mr. Mohammad Fazlur Rahman, Joint Secretary, ICT Division, Ministry of Posts, Tele-communications and Information Technology, updated the meeting of developments in the ICT sector in Bangladesh. He informed the meeting that Bangladesh has reached a significant milestone in terms of achieving an inclusive digital milestone under the Digital Bangladesh vision using ICT as enabler for socio-economic transformation to realise a prosperous and equitable Bangladesh by 2021. As a result, the present Government has taken steps to implementing AP-IS targets focussing on the sustainable development goals as outlined the strategic initiatives 2016-2018 of the AP-IS Master Plan. This included enhancement to connectivity which resulted in the increase in Internet penetration due to lowering the price of Internet bandwidth. He informed the meeting that Bangladesh as an active member of the AP-IS initiative proposes to utilise the right-of-way (RoW) of the Asian Highway Network and Trans-Asian Railway Network for co-deploying high speed fiber-optic cable. He stated that Bangladesh was connected with a second submarine fiber-optic cable in 2017. In ICT infrastructure and connectivity issues, the Government has launched projects (DR3 and DR4) establishing more than 120,000 kilometres of national ICT network. High speed Internet connectivity is being expanded in villages with 2,600 Unions (provinces) have been connected with fiber-optic cables, with a target to connect 4,500 Unions in the near future.
83. He further stated that his Government focused on making ICT as an important component for quality education and skilled-manpower for preparing the future workforce of the country. As a result, 6,000 digital laboratories has been established in secondary schools throughout the country and 50,000 more are in progress. Furthermore, interactive digital contents have been developed for primary-level students and installed more than 35,000 multi-media classrooms and a number of e-learning sites. A Digital and Linguist Training Lab project in education institutions throughout the country has been established. Under this project, 4,176 labs has been established including 65 linguistic training labs with 9 different languages taught. Another 20,000 labs will be set up in primary, secondary and higher-education level. By using these labs, 8,500 teachers have been trained.
84. Mr. Carlos Rey Moreno from the Association for Progressive Communications (APC) asked clarifications about the transmission map presented by the ITU. He asked if the transmission map can also show information about GPS? He added that the industry might find

it useful to know where the location points of fibres are for a better design of networks. He further asked if the ITU is planning a similar coverage map like the GSMA presented the day before and asks if it would be extending to towers, 3G, 4G as well as other information. Mr. Moreno asked the ITU if they have plans to make the transmission map data open to public so it can be updated to any GIS platform? This would enable easier collaboration with other maps and hence display correlations between different infographics.

85. The representative of the ITU responded to the questions asked by Mr. Moreno from APC by stating that needed to consult with his team about making the data of the ITU online map open source. He recognised the value that is created by making it open source and that the ITU already established a few partnerships and hence is open to talking to APC about a partnership as well. He moved to explain that mobile coverage (2G and 3G) was already included in the ITU online map, and he added that the map is continuously being updated on a monthly basis. He offered Mr. Moreno to discuss offline more details and other information that is available to the members of the ITU.
86. The representative of the People's Democratic Republic of Lao, Mr. Thavisak Manodham asked Mr. Abdo Shabah of Humanitas Solution about further information on country case studies showing the use of drone and enabling Internet connection helped people in a disaster situation?
87. The representative of Humanitas responded that so far, the system has been tested only in a controlled environment, but that the company planned to release the technology and test the system in the field by the end of the year. In addition, he explained that the technology is very complex which allows drones to fly controlled and organized following the teams on the ground and connect their smartphones to the Internet.

E.6 Digital Forensics and Cryptocurrencies, Mr. Himal Ohja, Digital Forensics / Cybercrime Consultant, United Nations Office on Drugs and Crime (UNODC)

88. Mr. Himal Ojha delivered a presentation titled, 'UNODC tackling cybercrime in support of a safe and resilient AP-IS. He noted that UNODC main goal is 'to better equip governments to handle drugs, crime, terrorism, and corruption-related issues, by maximizing knowledge on these issues among governmental institutions and agencies, and also to maximizing awareness of said matters in public opinion, globally, nationally and at community level. He stated that UNODC have global programme on cybercrime, online child protection and digital forensics. He further stated the UNODC support member States through field-based technical cooperation, research and analytical work, and normative work to assist member States in the ratification and implementation of relevant treaties.
89. He informed the meeting that UNODC is implementing a project on illicit cryptocurrency and terrorist financing in selected ASEAN member States. He explained that the objective of the project is to enhance the capacity of countries to prevent counter terrorism financing and money laundering through a better understanding of cryptocurrencies regulatory frameworks and enhanced capacities to identify and investigate crimes involving cryptocurrencies. As a result, a Southeast Asia Working Group on Cryptocurrencies was established to discuss the issue as well as a training on darknet cryptocurrencies investigation. He further shared with participants another capacity development project titled, 'Enhancing capacities to respond to cybercrime and to counter terrorist use of ICT throughout selected ASEAN member states'. He stated that the objective of the project was to enhance the capacity of ASEAN selected countries on responding effectively to cybercrime. In addition, UNODC is implementing another project on clear web and darknet threat assessment. The objective of the project is to enhance the awareness of ASEAN member States on cyber threat through Darknet investigation transnational organised crime.

E.7 E-resilience best practices, Mr. Nuwan Waidyanatha, Senior Research Fellow, LIRNEasia

90. Mr. Nuwan Waidyanatha focussed his presentation on e-resilience tools in support of emergency communication. He moved on to discuss ESCAP's e-Resilience online toolkit and highlighted that the ESCAP toolkit is not a toolkit for diagnosis and remedying vulnerabilities but rather sharing of best practices. He informed the meeting that another online tool (RASTER tool) can be used to assess business contingency readiness and risk assessment of networks under organisational, applications, and communications. He informed the meeting that the RASTER tool was applied in a training of Pacific island countries in 2018. The exercise focussed on sharing participant experiences of telecom outages during disasters and reviewing business continuity plans readiness. After the exercise, the results of evaluation using the RASTER tool found that Samoa and the Solomon Islands have well established Business Contingency Plans (BCPs). Also, the results pointed to some degree of readiness in Pacific island countries on management procedures but encountered challenges on implementing resilient communication. In addition, it was found from the exercise that only Solomon Islands has fully tested telecom emergency recovery procedures. Furthermore, Solomon Islands, Tonga, and Tuvalu have established mechanisms to be vigilant of threats and inform response teams but faced challenges on putting in place effective mechanism to alert events or threats.
91. He concluded by emphasising that while e-resilience is a system property and understood almost exclusively in terms of continuity and recovery, the "bounce forward" adaptive role of e-resilience remained unaddressed. He stated that e-resilience, in its current practices, has not included fundamental enablers such as robustness, self-organization, and learning. He further stated that the RASTER and BCP readiness methods has proven to serve as a catalyst for implementing an effective diagnostic tool.

E.8 Findings of the Asia-Pacific Disaster Report 2019, Mr. Sanjay Srivastava, Chief, Disaster Risk Reduction Section, ESCAP

92. Mr. Sanjay Srivastava began his presentation on the disaster riskscape across Asia-Pacific, by stating that around 3.4 million people died from natural disasters between 1970 and 2018, of which around 2 million people from the Asia-Pacific region and around 1.4 million from rest of the world. He stated that the around 46% of fatalities in the Asia-Pacific region was due to earthquakes, followed by storm (37%) and floods (12%). He informed the meeting that the Asia-Pacific faces a new climate reality with economic losses are on the rise, including the impact of slow-onset disasters such as drought, increases overall natural disasters' economic losses (quadruple to US$675 billion).
93. He moved to explain that disaster risks accumulated and clustered in four hotspots in which environmental fragility, poverty and inequality are converging in a 'perfect storm'. The hotspots included the transboundary river basins, the Asia-Pacific ring of fire, vulnerabilities of Small Island Developing States, and sand and dust storm risk corridors. As a result, he noted that disasters widen inequalities in incomes and opportunities with a 1% point increase in exposure to climate events estimated to increase income inequality (Gini coefficient) by 0.24% point. In addition, a 1% point increase in exposure to climate events also estimated to increase under-five mortality rates by 0.3% point and decreases education enrolment rates by 0.26% point respectively.
94. He further stated that investment in resilience is needed to outpace risk, particularly with inclusive investments that are affordable and can deliver important social co-benefits. He stated that the additional investments required is small compared to the damage and losses from disasters experienced in many Asia-Pacific countries.

95. He noted that Big Data plays an important role on mitigating challenges of the new climate reality with technology innovations enabling adaptation and empowering at risk communities. Big Data sources on disaster risk reduction has been sourced from satellite imageries, social media and crowd sourcing. With the availability of Big Data, predictive analytics of Internet of Things provided affordable earthquake early warning system to communities such as the start-up like 'Zizmos' (Stanford University) which uses smartphone application with cloud messaging services to detect motion and serve as seismic sensors in high-risk areas.

E.9 Connectivity & Disaster Resilience, Ms. Davina Egbuna, UAS Solution Engineer, Airbus

96. Ms. Davina Egbuna began her presentation by introducing that 'Zephyr Connectivity' which is a flight proven solar powered platform acting as a 'gap filler' operating around 21 kilometres in the atmosphere providing is a flight-proven solar-powered platform acting as a 'gap filler,' providing stationary and persistent high-resolution images from stratosphere with real-time video in high definition. She informed the meeting that powered by the sun, the Zephyr prototype has flown (non-stop) for 25 days, 23 hours and 57 minutes. She further noted that the Zephyr could also provide a flexible alternative for connectivity.

E.10 3D Digital Map, Dr. Hideo Imanaka, NTT Advanced Technology (NTT-AT)

97. Dr. Hideo Imanaka started his presentation by introducing AW3D (Global high-resolution 3D Map which produced global digital 3D map cover land space with of between 0.5 to 2-meter resolution. He informed the meeting that the AW3D is useful for disaster management and designing telecommunication equipment such as base stations of 5G mobile networks. He stated that the AW3D helps to prepare disaster management plans based on actual geographical information in advance. He ended his presentation by providing examples of the use of the technology for: (1) visible predicted disaster images; (2) flooding simulation; (3) landslide prediction; (4) flood simulation; (5) evacuation route; (6) and simulation of tower breakdown.

Session 6: Broadband for inclusive development

F.1 How to apply blockchain on top of the AP-IS initiative to achieve SDGs, Mr. Ryotaro Sekine, IBM Japan

98. Mr. Ryotaro stated his presentation on blockchain for sustainable development by highlighting the high potential of Blockchain as a technology to create business network platforms across organizations and countries. However, he noted that Blockchain entered a 'disillusion phase' in hype cycle due to the difficulty to create business value, governance model, and technical / regulatory challenges from implementing blockchain technology. He informed the meeting that his organisation is of the view that blockchain technology will mature; more traditional players and financial institutions will get involved in cryptocurrency; and strong blockchain ecosystems will become critical success factors.
99. He moved on to discuss how blockchain technology could contribute to the implementation of the AP-IS initiative under three important elements of Governance, Business Value, and Technology. In particular, he stated a governance model is needed to be aligned to member States' incentives to govern with fair, democratic, transparent and evolving marketplace rules and privileges. Also, an effective business model including appropriate monetisation, incentive and tokenisation is required to drive collaboration and network effects. Lastly, human experiences to drive mass adoption of new network economy digital products and services.

F.2 Gender and ICT, Ms. Cai Cai, Chief, Gender Equality & Social Inclusion Section, ESCAP

100. Ms. Cai started her presentation on gender, ICT and SDGs by highlighting the gender-ICT SDG targets (Target 5.B - Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women; and Target 9.C - Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020).

101. Ms. Cai Cai informed the meeting that gender digital divide continues to be a challenge in Asia and the Pacific with Internet user gap at 17.1% and a worldwide rate of 11.6% in 2017. She further stated that the mobile ownership gender gap is especially high in low and middle-income countries with South Asia (28%) compared to East Asia and the Pacific (1%). She further noted that mobile gender gap is widest in South Asia where women are 57% less likely to use mobile internet. She gave an example on meaningful access to digital financial services and stating that the percentages of female (compared to male) who received digital payments, access online bank account, pay bills or make purchases, and use mobile money services was much lower in Asia in 2017.

102. She moved on to discuss the key barriers to meaningful access by women (gender digital divide). She informed the meeting that the barriers included: availability of infrastructure (high cost, particularly for large areas with sparse populations); affordability (highest cost leads to lowest women users and largest gender gap); interest and perceived relevance (lack of relevant material in accessible languages); ability (limited basic skills and digital literacy by women users); safety and security (threat of cyber violence etc); and social-cultural contexts (adverse gender norms and negative perceptions of ICT).

103. Ms. Cai Cai noted that there are opportunities for improving gender digital divide including enhanced communications on access to information (cost-effective way to communicate); enhanced access to public services (with effective delivery of services regardless of time and distance); political participation (better representation from women in political debates and forums); and socio-economic participation (boost national and women's incomes). She gave best practices on e-health with the use of a mobile phone application in Aceh Indonesia, as well as an application in Myanmar which provides information for maternity care. As a way forward, she stated that there is a need for improving online security; improving connectivity; improving affordability by driving down the cost; provide equal opportunities to develop skills; and ensure relevant service content.

F.3 Integrated Rural Development through Agriculture Transformation, Dr. Salma Abbasi, Saleem Akhtar Memorial Foundation

104. Dr. Salma Abbasi started her presentation by informing the meeting that her organisations works with governments on how to use technology to achieve sustainable development. She stated that her organisation has conducted research in the areas of online harm and complex threats for children; Internet addiction and toxicity; ethical AI with humanity; influence of the social media; disruptive thinking for success in the digital economy among others. She further stated that her organisation has conducted capacity building workshops to government officials and other stakeholders on key research areas mentioned above.

105. She informed the meeting of a project (The Equal Initiative) her organisation is implementing with the goal of creating a movement where women and girls are equal participants in the digital technology revolution. She stated that the Equals Initiative has four areas of action including access (achieve equal access to digital technologies); skills (scale participation in ICT learning and skills); leadership (empower women as ICT leaders, creators and entrepreneurs, and research (ensure an evidence-based approach towards achieving the

Partnership goals). She further introduced an innovative integrated ICT enable agriculture, industrialization and trade ecosystem and value chain transformation initiative to drive the SDGs. She highlighted that there are three levels of enablers, first the core enablers, second the business enabler and lastly the agricultural operational enablers which drive the transformation. She concluded by emphasizing the crucial role of local-level engagement in the process.

F.4 Internet Assessment Framework – Internet Universality Indicators, Ms. Misako Ito, United Nations Educational Scientific and Cultural Organization (UNESCO)

106. Ms. Misako Ito started her presentation on an Internet Assessment Framework –Internet Universality Indicators—that her organisation is developing. She stated that there is a restriction on the freedom of expression, and this is related to the rise in restrictive law which is related to cybersecurity. She further stated that there is an increase in the number of digital platforms which create their own contents. Hence more content is produced, and more media is consumed as well. The rise of the Internet produced content which brings safety challenges with it because Internet bloggers are not as protected as normal journalists by the law and therefore easier targets.

107. Ms. Ito stated that UNESCO has a mandate on ensuring the free flow of information and the Internet Universality Framework is one of those standards that UNSECO has developed. She noted that UNESCO's Internet Universality framework for assessing Internet was passed by a UNESCO General Conference in 2015. She explained that the concept of Internet Universality promoted Internet for everybody. The concept is based on the R.O.A.M principles: (1) Human rights; (2) Openness; (3) Accessibility to All; (4) Multi-stakeholder participation. This led to the creation of the Internet Universality Indicators which are used to assess whether the Internet meets the four principals. She informed the meeting that more than 2000 experts and 66 national governments were consulted. The feasibility was tested in Brazil, Ecuador, Nigeria, and Pakistan. Pilot implementation was done in Brazil, Thailand, and Senegal. The final framework includes 6 categories, 25 themes, 124 questions, 303 indicators, suggested sources and an 8 steps implementation guide.

108. She explained that the objectives of conducting national assessment is to develop a clear and substantive understanding of the national Internet environment and policies. Further, to assess the national environment and policies related to the R.O.A.M. principles. By doing so, governments are able to formulate policy recommendations and practical initiatives based on the national assessment. She explained that the national assessment starts with the creation of a multistakeholder advisory board (Governments, universities, civil society and private sector among others), followed by the creation of a research team and a research action plan. Data gathering and data analysis follows summarised into a first report with a national multistakeholder validation meeting to look into the first report. She finished her presentation by inviting ESCAP member States to participate in the voluntary national assessment.

F.5 Country updates and discussion

109. Mr. Naveed Haq from ISOC reemphasized the case of persons with disabilities. He stated that inclusive financial development (including blockchain in financial services) are not accessible to persons with disabilities. He noted that in the area of education, many schools are not accessible for children with disabilities, especially in rural areas. He further noted that most of the websites including government websites in many countries in the Asia-Pacific region are not accessible to persons with disabilities. He therefore requested

to discuss how to improve accessibility of persons with disability through design. achieve more accessibility.

110. Mr. Carlos Ray from APC asked a question to Ms. Misako Ito from UNESCO and Ms. Cai Cai from ESCAP as well about SDG indicators. He noted that the SDG target 5b and indicator 5b.1 only look at the use of technology by women. However, he noted that the ITU statistics have limited available data on these indicators. He further noted that the same challenge is found with SDG indicator 9c.1 which looks at universal and affordable access to the Internet. However, in the new upcoming review of the SDGs indicators, neither indicators 5b.1 nor 9c.1 are considered as an outcome of the review and he wondered of the chances of changing these indicators because they are actually not collected by many countries. Ms. Misako Ito responded by stating that the set of indicators used for the UNESCO R.O.A.M framework are already quite complex. She stated that when they applied to the framework of China, they found data gaps. She further stated that it challenging to identify a country that can have data for the required 303 indicators (109 core indicators). She recognised that there is a need to adapt some of the indicators while noting that localizing and developing specific indicators could be a way forward. She noted that framework is a useful standard when application continues to be challenging.

111. Ms. Cai Cai from ESCAP responded to Mr. Carlos Ray by reminding the meeting that the SDG indicators are official indicators for the SDGs which has been negotiated by member States with negotiation of the indicators done between statistics experts. She used the example of SDG indicator 5b regarding access to technology, but the indicator used (proportion by sex who use a mobile phone) is quite basic in recognition of the challenges on data collection at national level. However, she stated that efforts on collecting and measuring progress on ICT should not be limited to the officially SDG indicators and targets and noted that the ITU's ICT statistics collects many other ICT-related indicators beyond the official SDG indicators. She further stated that with big data and new ICT tools becoming available, it assists to facilitate easier collection of information on ICT users.

112. The representative of the Islamic Republic of Iran informed the meeting that empowerment of women and girls and digital literacy are priorities of his country. He informed the meeting that the Islamic Republic of Iran hosted an international seminar on women empowerment via ICT and found that 27 % of university students are connected to ICT. In addition, he stated that almost half of the women have access to the Internet and using mobile phones. He noted that Internet addiction is not only an issue in the Asia-Pacific region but all around the world. He asked Ms. Misako Ito about her views on cultural diversity as a principal of the United Nations in the context Internet universality. In particular, how to promote diversity, but also respect different cultures? In addition, asked Ms. Salma Ababssi about her views on safety as a very important issue not only for children but for all the society.

113. Ms. Misako Ito responded that UNESCO put high importance to cultural diversity with the 2005 convention on the expression of cultural diversity, although she noted that not many countries in the Asia-Pacific region are yet to ratify. Cultural diversity put freedom of expression as an important component. She further stated that the Internet Universality Framework include several indicators relating to cultural diversity. She informed the meeting that this year (2019) is the international year of indigenous languages and there are more than 7000 languages in the world, but most are not expected to survive in the next 20 to 30 years. As a result, she stated that it is very important that the Internet also respects the cultural and linguistic diversity so that all communities can still access the information that are important to them.

114. Ms. Salma Ababssi responded that in the context of cultural diversity, her organization teaches children at a very early age about ethics, respect and understanding of the differences in cultural context. Most importantly in the context of safety and security, her organisation has created guidelines for parents that are currently going through revision. She recognised that each country has to continue working on Internet safety on a regular basis because the threats are always changing.

Session 7: AP-IS Academia Network

G.1 Overview and proposal, Professor Baharul Islam, Indian Institute of Management Kashipur

115. Professor Baharul Islam began his presentation on a proposal for the establishment of a working group to work on an AP-IS Academia Network. He noted that there are many universities and research institutions in the Asia-Pacific who could be connected for collaboration through this proposed research network with quality researches from institutions throughout the region. He informed the meeting that he presented the proposal in the first session of the AP-IS Steering Committee, November 2017, in Dhaka, and was discussed again in the second session of the AP-IS Steering Group Meeting, Bangkok, December 2017. He stated that the AP-IS Academia Network will be a platform for the academic community to collaborate / aggregate knowledge resources from the region's academic communities; provide critical input and support to the implementation of the AP-IS initiative; act as hub of strategic research; and capacity training. He noted that while there has been expression of interests from some ESCAP member States as well as other stakeholders, a task force needs to be formed to identify knowledge resources and funding partners.

G.2 UNU's Research and the AP-IS agenda, Dr. Mamello Thinyane, UNU-Macau

116. Dr. Mamello Thinyane began his presentation by outlining his organization's main projects, including EQUALS Research, Data and Sustainable Development, and Migrant Technology. He stated that EQUALS Research is a global partnership to promote gender equality in ICT access, skills, and leadership. He highlighted the key findings from EQUALS inaugural report that gender digital inequality and gender data gap persists, and the underlying causes are multi-dimensional and thus complicated. He further stated that the barriers to gender digital equality include factors such as: financial constraints; ability and aptitude; socio-cultural and institutional contexts; safety and security; interest and perceived relevance; and availability of infrastructure. He informed the meeting of his organisation's project examining how technology can be used to support migrant workers' structural empowerment, human dignity, and physical integrity. He stated that these projects contribute to multiple SDGs and the pillars of the AP-IS initiative. He then informed the meeting that his organization had developed a marginalized voices framework, which particularly highlights the way individuals are marginalized in social indicator monitoring.

G.3 Thammasat University and AP-IS, Dr. Daniel McFarlane, Thammasat University

117. Dr. Daniel McFarlane of Thammasat University started his presentation by introducing his university. He informed the meeting that his university was founded in 1934 and a leading public research university with 27 faculties and over 240 academic programs. He stated that students learn evidence-based policy analysis skills and examine the role of science, technology, and innovation policies for economic transformation at the School of Global Studies. He stated that one of the objectives of the School of Global Studies is to understand emerging technologies and discern their impact on economies in the region, as well as to

produce evidence-based insights to help policymakers in the development of an inclusive and prosperous ICT environment.

G.4 Digital Divide: A case of South Korean Older Adults, Dr. Hyunsun Yoon, University of Greenwich

118. Dr. Hyunsun Yoon of the University of Greenwich commenced her presentation by introducing the background of her study. She noted that while the digital divide is closing for young cohorts in South Korea, it is still an issue for older generations despite the government's efforts in facilitating digital inclusion. She stated that the research findings highlighted that the rate of smartphone users among older adults is still significantly lower than younger adults, and their usage of functions is extremely limited to calling and time checking. She further noted that ICT training courses are critical for older adults to gain full access to the potential benefits of smartphones. She called for policymakers to implement capacity building programmes in community centres, in collaboration with telecom retailers. She concluded by noting that the digital divide threatens citizens who are not participants in electronically mediated networks and underscoring the importance to overcome older adults' own reluctance to take up new technology.

G.5 1World Connected: Data-driven Research to bring billions online, Professor Christopher Yoo, University of Pennsylvania

119. Professor Christopher Yoo of the University of Pennsylvania began his presentation by stating that Internet penetration is lagging in Asia and the gender digital divide is particularly acute in South Asia. He further highlighted that while many innovative efforts are underway, data about these projects are ad hoc and usually at a national level. He therefore noted that a systematic data at a community level is therefore needed for better understanding of project effectiveness. As a result, his University developed a global research project to study grassroots projects that connect the unconnected in 2016 with a database covering 1085 projects and 151 countries. He stated that the goal of this project is to enable data-driven analysis on the effectiveness of connectivity projects. He informed the meeting of the organization's plan to access and use community-level data to measure the impact of connectivity on SDGs, with a focus on economic development, education, and health.

G.6 Professor Viktor Fersht, Russian Academy of Sciences Projects Support Center

120. Professor Viktor Fersht of the Russian Academy of Sciences Projects Support Center began his presentation by highlighting that the digital divide continues to be a challenge and an urgent development challenge in East and Northeast Asia. He informed the meeting that the Russian Federation is working on adopting Chinese and Japanese 5G frequency range. He stated that the Russian Federation Ministry of Communications adopted the 4.4-4.99 GHz bandwidth for the national 5G networks, and Huawei signed a deal with the Russian Federation's telecom company MTS aiming to develop a 5G network in the country over the next year. He further states that the first 5G commercial network in the country is scheduled to be launched by 2020.

121. Professor Fersht noted that ICT access disparities across countries could be eliminated by collaboration of academic networks. He therefore proposed the following: (1). launch of the Asia-Pacific Information Superhighway Academic Network, with a pre-feasibility study on broadband connectivity and resilient ecosystem in East and Northeast Asia; (2). conduct a study on enabling financing mechanisms for the implementation of AP-IS initiative; and (3). organize the AP-IS Steering Committee in 2020 and sub-regional Steering Group meetings in 2019, as well as online communities to disseminate findings of the above knowledge product outputs and promote common understanding.

122. He further noted that engaging current and new partners would strengthen the proposed activities. In addition, he informed the meeting that the Russian Academy of Sciences Project Support Centre together with Russian Centre of Presidential Projects "Kremlin" have collaborated with China-Russia Academy of Research and Training Programs UNSEPA and Hong Kong company You Tong for the implementation and harmonization of 5G spectrum frequencies at countries of One Belt –one Road, Shanghai Treaty, BRICS and China-Mongolia-Russia economic corridor. He stated that this project could be expanded in the framework of AP-IS Academic Network.

G.7 Measuring the digital divide in the Asia-Pacific Region, Catherine Qi, Calvin Chan (presenter), Helge Senkpiel, Julian Buschmaas & Leoni Mendler, London School of Economics

123. Mr Calvin Chan of the London School of Economics began his presentation by explaining how his team attempted to measure the digital divide. Using three indices that were selected based on the criteria of relevance and conceptual framework - ICT Development Index, Network Readiness Index, and Inclusive Internet Index, they found different country rankings for the level of digital divide because each index used different statistical tools to manipulate data into explaining their conceptual frameworks.
124. He therefore proposed an AP-IS Multidimensional Digital Divide Index (AP-IS MDDI) as a digital divide measurement for the AP-IS initiative. He stated that AP-IS MDDI is a multidimensional measurement approach, integrating the capacities approach for technology from Amartya Sen's 2001 study with a modified OECD definition. He further stated that the proposed index is novel in measuring individual inclusiveness, resilience, and future-readiness. Moving forward, he called for the attention of the meeting to address the problems of missing data and immeasurable indicators. He requested the meeting to consider reviewing the proposed variables and to facilitate the operationalization of the AP-IS-MDDI.

G.8 Country updates and discussion

125. Mr. Nicolau Santos Celestino from Timor-Leste expressed interest for potential collaboration between TELREN, the Timor-Leste research network, and UNU-Macau as well as the Indian Institute of Management Kashipur. He proposed for ESCAP or UNESCO to facilitate this collaboration of academic networks.
126. Mr. Izumi Aizu from the Institute of InfoSocinomics asked about clarification on the what are the benefits for access by elderly or women to mobile phones? He explained that perhaps the discussion is focused on 'access' at the cost of identifying the 'benefits' that would justify why there is a need for access to ICT.
127. Mr. Mohamed Shareef from the Maldives expressed his thanks to the panelist of the academic session and appreciated the idea of having an AP-IS academia network. He informed the meeting that the Maldives is willing to support the establishment of an AP-IS academia network and proposed to set up a working group. In addition, he offered his Ministry's assistance on identifying academic partners for the project as well.
128. Mr. Odkhuu Tsolmondelger from Mongolia informed the meeting that Mongolia has been working on the AP-IS network for the past two years. He stated that the actual broadband and 4G usages increased by almost 7 times. However, he noted that actual digital divide and where the gaps exist is difficult to identify. He thanked the research team from the London School of Economics and Political Science for the informative presentation and offered support and potential partnership with Mongolia on the digital divide research topic.
129. Mr. Mohammad Fazlur Rahman from Bangladesh conveyed Bangladesh's support of the proposal of Professor Baharul Islam, from the Indian Institute of Management Kashipur on forming a working group for the establishment of an AP-IS academic network. He also

stated that Bangladesh supported the proposal from the Maldives and informed the meeting that an academic network is important for the successful implementation of the AP-IS initiative.

130. The representative of the Islamic Republic of Iran supported the AP-IS academia network and suggested the academic network should have the capacity to conduct solution-oriented approach and researches on how to close the ICT gaps. Hence, he expected that the AP-IS academia network would concentrate on finding concrete ways to solve the ICT connectivity challenges that the region is suffering from at the regional and subregional levels.

Session 8: Conclusion

H.1 The way forward, Chair, H.E. Mr. Keosothea Nou, Deputy Secretary General, National Committee for ESCAP, Cambodia

131. H.E. Mr. Keosothea Nou, Chair of the third session of the AP-IS Steering Committee opened the final session that guides the implementation of the AP-IS initiative and future activities and invited Ms. Atsuko Okuda from ESCAP to summarise the key points of the two-day meeting.

132. Ms. Okuda began by stating that the secretariat structured the meeting into the four pillars of the AP-IS initiative, with excellent presentations in each session which shed light on some of the emerging topics, persistent challenges which are very useful to designing and implementing the AP-IS activities moving forward. She reminded member States that the AP-IS Master Plan was adopted for the next four years (2019-2022), and the discussions today will be useful for the implementation of the Master Plan, particularly at the subregional levels.

133. She stated that the meeting started with the discussion of trends on ICT connectivity for countries and particularly an excellent opportunity to interact with key stakeholders such as the AIIB as well as the World Bank. This was followed by presentations on connectivity modality including co-deployment by RailTel India; 5G strategy by MIST of the Republic of Korea; community networks; and DIY fiber optic cabling in rural areas.

134. She further noted interesting initiatives on digital inclusion from Telenor, Huawei, APNIC Foundation, and the Connectivity Capital, which provided tangible and successful initiatives that could be replicated and considered.

135. In addition, she informed that meetings and discussions earlier in the morning on Internet traffic management and IXP provide suggestions on way forward on the operational model and IXP studies.

136. She moved on to report that the morning of the second day started with the session on e-resilience and noted that were many eye-opening technologies and innovations discussed. She noted that the afternoon session started with broadband for inclusive development, particularly gender perspectives followed by the session on the academia network. She pointed out that the session on academia network illuminated how academia can contribute to the implementation of AP-IS and how AP-IS can influence the course of research, a synergy to facilitate evidence-based policymaking.

137. The Chair thanked Ms. Okuda for her summary and thanked participants on behalf of the members of the bureau, for their active participation and sharing ideas during the meeting. In particular, the Chair noted the importance of country updates and sharing of country experiences on ICT issues and broadband connectivity. The Chair thanked all the speakers of sessions who shared their insights and experiences. The Chair expressed his sincere appreciation to the ESCAP secretariat for the arrangements and facilitating the meeting and

called upon member States to continue supporting the implementation of the AP-IS initiative.

138. Ms. Atsuko Okuda informed the meeting that the next session of the AP-IS Steering Committee is expected to take place in August 2020 in Bangkok but flexible if member States requested for another time and venue. opened the floor to member States for any further interventions. The representative of China stated that the third session of the AP-IS Steering Committee was very successful with very good proposals from stakeholders such as the AP-IS academic network. He further stated that there are some projects that stakeholders are currently undertaking in order to implement the AP-IS initiative. He proposed that the AP-IS initiative should continue supporting the implementation of the AP-IS initiative and in particular for the ESCAP secretariat to encourage member States who are interested in the AP-IS initiative to propose more project proposals so that the Steering Committee could discuss and seek possible partnership and other necessary support to make it a reality.

139. The representative of China further requested ESCAP to establish a working group on the cross-border connectivity proposal that was earlier presented by the representative of CAICT. He stated that the working group could invite interested member States, operators, and relevant organisations to come together and develop a framework or guideline that could provide solutions for cooperation on the 'Trans-multi-country terrestrial cable sharing model. The framework or guideline could include information such as constructions of fiber-optic cable infrastructure, operation and maintenance, business model, charging settlements, among others.

140. The representative of China requested the ESCAP secretariat to assist in establishing working groups if a group of member States are interested in a specific subregional connection challenge, in order to assist these groups of member States work on those specific connectivity issues.

141. The representative of the Islamic Republic of Iran supported the proposals of China and further stated that it was timely to develop a framework for interested member States in specific issues that will be useful for ESCAP member States. Such framework or guideline will assist member States to improve partnerships at subregional and regional levels.

142. Ms. Okuda thanked member States for the additional proposals and suggestions for the effective implementation of the AP-IS initiative. She informed the meeting that two bilateral subregional meetings (by invite only) are planned for the following day, one for the Pacific and the other for CLMV countries. She stated that these are specific subregional meetings in response to requests by these respective subregions. She further added that these subregional meetings echoes the proposal of China on subregional working groups addressing specific subregional challenges.

H.2 Concluding remarks

143. Ms. Atsuko Okuda, Chief of the ICT and Development Section of ESCAP, thanked participants for their fruitful deliberation and contribution.

144. The meeting was closed by the Chair.

Annex 1: List of Participants

MEMBER

Armenia

Ms. Inga Vardanyan, Assistant to the Minister of High-Tech Industry, Yerevan.

Azerbaijan

Mr. Emil Ahmadov, Leading adviser, Department of International Cooperation, Ministry of Transport, Communications and High Technologies, Baku.

Bangladesh

Mr. Mohammad Fazlur Rahman, Joint Secretary, ICT Division, Ministry of Posts, Telecommunications and Information Technology, Dhaka.

Bhutan

Mr. Jigme Tenzing, Director, Department of IT and Telecom, Ministry of Information and Communications, Thimphu.

Cambodia

H.E. Mr. Keosothea Nou, Deputy Secretary General, National Committee for ESCAP, Phnom Penh.

Mr. Khema Van, Director of E-learning and Education Technology Department, National Institute of Posts, Telecom & ICT, Ministry of Posts and Telecommunications, Phnom Penh.

China

Mr. Hui Chen, Chief of ICT Division, China Academy of Information and Communications Technology, Beijing.

Mr. Guolei Cai, Deputy Director, Department of International Cooperation, Ministry of Industry and Information Technology, Beijing.

Ms. Sichen Fan, Assistant Engineer, China Academy of Information and Communications Technology, Beijing.

Georgia

Mr. Noshrevan Lomtatidze, Deputy Director, Department of International Economic Relations, Ministry of Foreign Affairs, Tbilisi.

India

Ms. Roshni Sen, Principal Secretary, Department of Technical Education, Training and Skill Development, Government of West Bengal.

Mr. Suresh Kumar, Executive Director, Northern Region, RailTel Corporation of India Ltd., New Delhi.

Iran (Islamic Republic of)

Mr. Javad Momeni, Director, Division for UNESCO and International Scientific cooperation, Department of Sustainable Development, Ministry of Foreign Affairs.

Mr. Abbas Tajik, Deputy Permanent Representative to ESCAP, Embassy of the Islamic Republic of Iran, Bangkok.

Kiribati

Mr. Kanaan Ngutu, Senior ICT Officer, Ministry of Information, Communication, Transport & Tourism Development, Tarawa.

Kyrgyzstan

Mr. Begmatov Myrzakmat, Head of External Affairs, Department of State Committee of Information Technology and Communications of the Kyrgyz Republic, Bishkek.

Mr. Talant Sultanov, Adviser to the Prime Minister of the Kyrgyz Republic, The Government of the Kyrgyz Republic, Bishkek.

Lao PDR

Mr. Thavisak Manodham, Director General of E-Government Center, Ministry of Post and Telecommunication, Vientiane.

Malaysia

Ms. Normaya Binti Nordin, Principal Assistant Secretary (Strengthening Digital Infrastructure), K-Economy Division, Ministry of Economic Affairs, Kuala Lumpur.

Mr. Mohd Shahrizad bin Mohamad Salleh, Ketua Penolong Setiausaha (IA), Infrastructure and Applications Division, Ministry of Communications and Multimedia, Kuala Lumpur.

Maldives

Mr. Mohamed Shareef, Permanent Secretary, Ministry of Communication, Science and Technology, Male.

Mr. Ahmed Munaz, Director, Ministry of National Planning and Infrastructure, Male.

Mongolia

Mr. Odkhuu Tsolmondelger, Chief Strategy Officer of Information Communications Network LLC, Ulaanbaatar.

Myanmar

Mr. Than Htun Aung, Deputy Director General, Posts and Telecommunications Department, Ministry of Transport and Communications, Nay Pyi Taw.

Pakistan

Mr. Adeel Aijaz Shaikh, Joint Director (Business), Ministry of Information Technology & Telecommunication, Islamabad.

Mr. Raza Iqbal, Director Implementation (DRR), National Disaster Management Authority, Islamabad.

Mr. Shoaib Taj, Deputy Director Coordination, National Disaster Management Authority, Islamabad.

Mr. Muhammad Idrees, Member (DRR), National Disaster Management Authority, Islamabad.

Mr. Syed Faraz Hussain Zaidi, Counsellor, Deputy Head of Mission and Deputy Permanent Representative to ESCAP, Embassy of Pakistan, Bangkok, Thailand.

Mr. Yasir Iqbal Butt, First Secretary and Alternate Permanent Representative to ESCAP, Embassy of Pakistan, Bangkok, Thailand.

Papua New Guinea

Mr. Veari Iru, Manager Projects, National Informational Communicational Technology Authority, Port Moresby.

Mr. David Bonjui, Tariff Analyst, National Informational Communicational Technology Authority, Port Moresby.

Republic of Korea

Mr. Chung Won Lee, Director, International Cooperation Bureau, Ministry of Science and ICT, Seoul.

Ms. Min Kyeong Kim, Deputy Director, Ministry of Science and ICT, Seoul.

Mr. Yeong Ro Lee, Vice President, Department of ICT Infrastructure & Platform, National Information Society Agency, Seoul.

Mr. Hochan Ahn, Department of ICT Infrastructure & Platform, National Information Society Agency, Daegu.

Mr. Sang Yirl Nam, Head of Center for ICT Trade and Inter-Korean Cooperation, Korea Information Society, Development Institute, Seoul.

Mr. Jong Hyun Lee, Optical Internet Division, Electronics and Telecommunications Research Institute, Seoul.

Mr. Seung-Hyun Cho, Research Staff, Electronics and Telecommunications Research Institute, Seoul.

Ms. Joonyoung Kim, Electronics and Telecommunications Research Institute, Seoul.

Mr. Eon-sang Kim, Electronics and Telecommunications Research Institute, Seoul.

Russian Federation

Ms. Irina Burova, Attache, Assistant Permanent Representative of the Russian Federation to UN ESCAP, Embassy of the Russian Federation in the Kingdom of Thailand, Bangkok.

Samoa

Mr. Talatalaga Matau Matafeo, Chief Executive Officer, Ministry of Communications & Information Technology, Apia.

Solomon Islands

Mr. Wilson Leguvaka, Director Regulatory Resources, Telecommunications Commission, Honiara.

Sri Lanka

Mr. Rohan Samarajiva, Chairman of the Information & Communication Technology Agency (ICTA), Colombo.

Mr. L.P. Jayampathy, Secretary of Ministry of Transport and Civil Aviation, Colombo.

Timor-Leste

Mr. Nicolau Santos Celestino, Director General of Transport and Communications, of the Government of Timor Leste, Dili.

Thailand

Ms. Ajarin Pattanapanchai, Permanent Secretary, Ministry of Digital Economy and Society, Bangkok.

Ms. Kalaya Chinatiworn, Executive Director of International Affairs Division, Ministry of Digital Economy and Society, Bangkok.

Ms. Ishariyaporn Smiprem, Director of Regional Cooperation Group, International Affairs Division, Office of the Permanent Secretary, Ministry of Digital Economy and Society, Bangkok.

Mr. Boonlit Adipat, Computer Technical Officer, Senior Professional Level, Office of the Permanent Secretary, Ministry of Digital Economy and Society, Bangkok.

Ms. Natthaleeya Narash, Foreign Relations Officer, Practitioner Level, Office of the Permanent Secretary, Ministry of Digital Economy and Society, Bangkok.

Mr. Jackrakrit Srisun, Foreign Relations Officer, Office of the Permanent Secretary, Ministry of Digital Economy and Society, Bangkok.

Ms. Autsanee Suwannarat, Foreign Relations Officer, Office of the Permanent Secretary, Ministry of Digital Economy and Society, Bangkok.

Mr. Sombhop Wongwilai, Director of Meteorological Digital Services Division, The Thai Meteorological Department, Bangkok.

Mr. Amorn Kaewmorakot, Director of Information Technology Center, The Thai Meteorological Department, Bangkok.

Mr. Pravead Tanakunkit, Computer Technical Officer, Office of the National Digital Economy and Society Commission, Bangkok.

Mr. Wanchalearm Petsuwan, Computer Technical Officer, Thai Meteorological Department, Ministry of Digital Economy and Society, Bangkok.

Mr. Yootthapoom Potiracha, Geo informatic scientist, GISTDA, Ministry of Higher Education, Science, Research and Innovation, Bangkok.

Mr. Taran Osiri, Bangkok.

Tonga

Mr. Anitelu Toimoana, Director of Information and Technology, Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications, Nuku‘alofa.

Tuvalu

Mr. Opetaia Simati, Director of ICT, Ministry of Communication & Transport, Funafuti.

Uzbekistan

Mr. Otabek Ismailov, Head of the Department of Development of Information Technologies and Communications, Ministry of Foreign Affairs, Tashkent.

Vanuatu

Mr. John Jack, Office of the Government CIO, Prime Minister's Office, Port Vila.

Viet Nam

Ms. Nguyen Hong Van, PhD. Computer and Systems Sciences, Director, National Database Center for Science and Technology Information, National Agency for Science and Technology Information (NASATI), Ministry of Science and Technology (MOST), Hanoi.

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UNITED NATIONS

United Nations Development Programme (UNDP)

Mr. David Galipeau, Chief, Frontier Technology for Sustainable Development Goals, Bangkok, Thailand.

Mr. John Garrity, Chief Technical Advisor, DICT-UNDP Pipol Konek Project, Philippines.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

Ms. Jongwi Park, Programme Specialist, Bangkok, Thailand.

Ms. Misako Ito, Adviser in Communication and Information, Bangkok, Thailand.

United Nations Office on Drugs and Crime (UNODC)

Mr. Himal Ojha, Cybercrime and Digital Forensics Consultant, Bangkok, Thailand.

United Nations Project Office on Governance (UNPOG)

Mr. Heon-jun Kim, Senior Program Management Expert, Incheon, Republic of Korea, Incheon, Republic of Korea.

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Mr. Masanori Kondo, Deputy Secretary General, Bangkok, Thailand.

Mr. Jongbong Park, Director, Project Development, Bangkok, Thailand.

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Asian Infrastructure Investment Bank

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Association for Progressive Communications (APC)

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Mr. Carlos Rey Moreno, Regulatory and policy coordinator, South Africa.

CVISNET Foundation

Mr. Jeffrey Llanto, Executive Director, Cebu City, Philippines.

Digital Empowerment Foundation

Mr. Osama Manzar, Founder and Director, New Delhi, India.

Global Energy Interconnection Development and Cooperation Organization

Mr. Longfei Li, Consulting Engineer, Senior Manager, Southeast Asia Office, Beijing.

Mr. Nan Quan, Beijing, China.

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Mr. Rajnesh Singh, Managing Director, Internet Society Asia-Pacific, Singapore.

Mr. Frédéric Donck, Director, European Regional Bureau, Internet Society, Brussels, Belgium.

Mr. Naveed Haq, Regional Development Manager, Asia-Pacific, Pakistan.

Mr. Waqas Hassan, Internet Society Islamabad Chapter, Pakistan.

Mr. Parvez Iftikhar, Consultant, Internet Society, Pakistan.

Mr. Angelo Nino Gutierrez, Resource Person, Internet Society - Asia-Pacific Region, Manila, Philippines.

Mr. Babu Ram Aryal, Past President, Kathmandu, Nepal.

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EXPERTS

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ACADEMIA

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Mr. Kaveh Zahedi	Deputy Executive Secretary, Sustainable Development
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Ms. Li Shien	Intern, ICT and Development Section, ICT and Disaster Risk Reduction Division
Mr. Julian Buschmaas	Intern, ICT and Development Section, ICT and Disaster Risk Reduction Division

Annex 2: Agenda

Time	Monday 26 Aug 2019
08:30-09:00	Registration
09:00-09:30	**Opening Session of Disaster Resilience Week** Venue: UNCC, Conference Room 2 (CR2), 2nd floor Opening Remarks, Mr. Kaveh Zahedi, Deputy Executive-Secretary, ESCAP

09:30-09:45	*Coffee/Tea Break (Venue: Outside Conference Room 3, 1st floor)*
09:45-10:30	**Session 1: Opening of the Asia-Pacific Information Superhighway Steering Committee and WSIS Regional Review, Third Session** Venue: UNCC, Conference Room 3 (CR3), 1st floor • Opening Remarks, Mr. Kaveh Zahedi, Deputy Executive-Secretary, ESCAP • Statement, Mr. Malcolm Johnson, Deputy Secretary-General, ITU • Statement, Mr. Mohamed Shareef, Permanent Secretary, Ministry of Communication, Science and Technology, Maldives • Statement, Prof. Rohan Samarajiva, Chair, 2nd Session, AP-IS Steering Committee & Chair, ICT Agency of Sri Lanka. • Election of Bureau and Adoption of Agenda
10:30:12:00	**Session 2: Asia-Pacific Information Superhighway (AP-IS) Update** • Update to the AP-IS Master Plan 2019-2022, Ms. Atsuko Okuda, ESCAP • Broadband connectivity trends: Asia and the Pacific, Mr. Siope Vakataki Ofa, ESCAP • Digital Development in East Asia & Pacific World Bank Engagement, Ms. Natasha Beschorner, World Bank • Investing in digital infrastructure and digitalization of infrastructure, Mr. Paul Lam, Asian Infrastructure Investment Bank • Country updates and discussion
12:00-13:00	*Luncheon sponsored by NTT-AT*
13:00-14:30	**Session 3: Infrastructure Connectivity** • Experience of co-deployment in India, Mr. Suresh Kumar, RailTel India • 5G+ Strategy in the Republic of Korea, Mr Chung Won Lee, MIST, RoK • Community Networks, Mr. Rajnesh Singh, Internet Society • ITU-Standardized Affordable Optical-Cable Rural Connectivity, Dr. Haruo Okamura, Global Plan Inc. • Country updates and discussion
14:30-14:45	*Coffee/Tea Break*
14:45-16:30	**Session 3: Continued** • Digital inclusion initiatives in Asia, Ms. Manisha Dogra, Telenor • Redefining Inclusion, Mr. Michael McDonald, Huawei Southeast Asia • Powering Internet infrastructure, Mr. Duncan Macintosh, APNIC Foundation • Investing in connectivity solutions, Mr. John Garrity, Connectivity Capital. • Country updates and discussion • Summary of the day
Time	**Tuesday 27 Aug 2019**
08:30-09:30	**Session 4: Internet Traffic & Network Management** • Operation model for cross-border broadband initiative, Mr. Hui Chen, China Academy of Information and Communication Technology, China • Internet traffic management for CLMV countries, Mr. Yeong Roo Lee, National Information Society Agency, Republic of Korea • Country updates & discussion
09:30-09:45	*Coffee/Tea Break*
09:45-12:00	**Session 5: E-resilience** • AI-enabled emergency communication, Mr. Abdo Shabah, Humanitas • APT's activities towards e-resilience, Mr. Masanori Kondo, APT • Connecting the unconnected for resilience, Mr. Hung Tran, SES Networks

	• Digital Forensics and Cryptocurrencies, Himal Ojha, UNODC • E-resilience best practices, Nuwan Waidyanatha, LIRNEasia • Connectivity & Disaster Resilience, Ms. Davina Egbuna, Airbus • 3D Digital Map, Mr. Hideo Imanaka, NTT AT • ESCAP-ITU Transmission Map, Mr. Sameer Sharma, ITU • Findings of the Asia-Pacific Disaster Report 2019, Mr. Sanjay Srivastava, DRS, ESCAP • Country updates and discussion
12:00-13:00	*Luncheon sponsored by NIA*
13:00-14:45	**Session 6: Broadband for inclusive development** • How to apply blockchain on top of the AP-IS initiative to achieve SDGs, Mr. Ryotaro Sekine, IBM Japan • Gender and ICT, Ms. Cai Cai, ESCAP • Integrated Rural Development through Agriculture Transformation, Dr. Salma Abbasi, Saleem Akhtar Memorial Foundation • Internet Assessment Framework – Internet Universality Indicators, Ms. Misako Ito, UNESCO • Country updates and discussion
14:45-15:00	*Coffee/Tea Break*
15:00–16:15	**Session 7: AP-IS Academia Network** • Overview and proposal, Mr. Baharul Islam, Indian Institute of Advanced Studies • UNU's research initiative, Dr. Mamello Thinyane, UNU-Macao • Research in support of AP-IS in Thailand, Mr. Daniel McFarlane, Thammasat University • Digital divide: A case of South Korean older adults, Ms. Hyunsun (Catherine) Yoon, University of Greenwich • Connecting underserved communities, Professor Christopher Yoo, University of Pennsylvania • Professor Viktor Fersht, Russian Academy of Sciences • Measuring the digital divide for the AP-IS initiative, London School of Economics • Q&A
16:15-16:30	**Session 8: Conclusion** • The way forward • Concluding remarks