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Review of the implementation of the 2030 Agenda for Sustainable Development in Asia and the Pacific: information and communications technology, science, technology and innovation

Digital cooperation for an inclusive digital society

Note by the secretariat

Summary

The coronavirus disease (COVID-19) pandemic demonstrated the interlinkages between digitalization and sustainable development. Digital technologies and connectivity played critical roles in mitigating some of the impacts of COVID-19. Meanwhile, coupled with economic, social and environmental uncertainties, the pandemic exposed existing digital divides and introduced new ones that have widened and deepened development inequalities in the Asia-Pacific region.

Consequently, there is a compelling need in the region to bring meaningful digital opportunities to all, in particular to older people and youth, women and girls, as well as marginalized people, so that present and future participation in the digital society will be more inclusive. Narrowing the digital divides and creating new digital opportunities by strengthening digital connectivity infrastructure, digital technology and applications, as well as big data usage are the key common challenges.

Aligned with these challenges and pursuant to the implementation of resolution 77/1 of the Economic and Social Commission for Asia and the Pacific, in which the Commission recognized the importance of digital cooperation at the regional level, members and associate members adopted the action plan (2022–2026) of the Asia-Pacific Information Superhighway at the fifth session of the Asia-Pacific Information Superhighway Steering Committee in November 2021. The present document contains an assessment of the key trends in digital and related emerging technologies. It serves to illustrate progress and achievements in digital cooperation in the Asia-Pacific region since the seventy-seventh session of the Commission. It contains policy recommendations to address the digital divide and accelerate digital transformation towards an inclusive digital society. The Commission may wish to consider the issues highlighted in the present document and provide further guidance to the secretariat.

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I. Introduction

1. While the consequences of the coronavirus disease (COVID-19) pandemic vary within and among countries, a common feature of the regional experience is the key role of universal broadband connectivity, digital and emerging technology applications and growing digital capacity in mitigating many of the challenges of the pandemic. In fact, the pandemic accelerated the deployment of innovative digital solutions that not only helped people to cope with everyday activities but also led to new sources of economic growth and socioeconomic development opportunities.

2. However, as structural changes towards a digital economy and society gathered momentum, the COVID-19 pandemic also exposed existing digital divides [1] and introduced new ones that have widened and deepened development inequalities between genders, generations, rural/urban areas and groups of the society. Consequently, the need to bring digital opportunities to all, in particular to older people and youth, as well as to women and girls, has gained urgency as a policy issue.

3. Narrowing the digital divide by strengthening digital connectivity infrastructure and accelerating the adoption of digital technology applications emerged as key elements of a common agenda to ensure the meaningful present and future participation of all in the digital economy and society for sustainable development.

4. Against that background, the present document contains an assessment of the key trends and challenges in digital and emerging technologies and serves to highlight progress in regional cooperation. It contains policy recommendations to address the digital divide, leverage related opportunities and accelerate digital transformation towards an inclusive digital society.

II. Key trends in digital and emerging technologies

5. The Asia-Pacific region has the greatest digital divide of any region of the world. The digital divide is manifested in the region as a gap between a group of high-income economies that have pulled ahead and emerged as global leaders in the roll-out of new technologies and a group of low-income economies that have experienced little change in digital coverage, usage and diffusion in the past two decades. At the national level, the digital divide is manifested across income groups, age, gender and rural/urban area, with the most pronounced divides in income and age. Lack of connectivity infrastructure, poor quality Internet connectivity and unaffordability contribute to the digital divide as does the lack of digital literacy.

6. Consequently, although Internet penetration rates have increased in many countries, in particular in middle-income countries thanks to accelerated government efforts, Internet use still remains below Internet coverage. Those factors have made it very difficult for communities that are unconnected or underconnected to access real-time information on the evolving pandemic, secure necessities for daily life, maintain the operations of small and medium-

[1] According to the Organisation for Economic Co-operation and Development (OECD), the digital divide refers to differences between individuals, households, businesses and geographic areas at various socioeconomic levels concerning the opportunity to access information and communications technology and use the Internet for various activities. For further details, refer to OECD, “Understanding the digital divide”, OECD Digital Economy Papers, No. 49 (Paris, 2021).

sized enterprises, as well as continue the education of millions of school children through online learning opportunities. For example, evidence shows that the lack of digital technology was the most significant restriction for youth working or studying remotely.[2] Furthermore, according to the Association of Southeast Asian Nations (ASEAN) Digital Generation Report 2021, 68 per cent of surveyed small and medium-sized enterprise operators reported a decrease in income, and restaurant and tourism sectors were the most severely affected. Around 60 per cent of survey respondents reported a decrease in income and savings. Even workers in trade and logistics, sectors in which new jobs were created, reported a decrease in income.

7. According to statistics from the International Telecommunication Union (ITU)[3] more than half of the population of the region remains offline. Out of the 4.6 billion inhabitants of Asia and the Pacific, only 15 per cent (712 million people) have fixed broadband subscriptions. While there has been stronger adoption of mobile broadband subscriptions at 75 per cent of the population of the region, 25 per cent (1.1 billion people) do not have mobile broadband subscriptions.

8. Although progress has been made, affordable access to broadband Internet[4] remains a challenge in many Asia-Pacific countries. On average in subregions of the Economic and Social Commission of Asia and the Pacific (ESCAP), expenditure on mobile broadband (1.5 gigabyte) services as a percentage of gross national income per capita remains unaffordable only in developing countries of the Pacific subregion (expenditure is 10 per cent of gross national income per capita), while in the remaining subregions, expenditure is less than 2 per cent of gross national income per capita, and therefore it is considered affordable. Nevertheless, the average expenditure on ultra high-speed (5 gigabyte) fixed broadband services as a percentage of gross national income per capita is considered unaffordable for most developing countries in ESCAP subregions, in particular in the Pacific (15 per cent), followed by South-East Asia (8 per cent), and South and South-West Asia (4 per cent).

9. In addition, in some countries expenditure on broadband services as a percentage of gross national income per capita increased in 2020 compared with 2019,[5] including in India (90 percentage points), Indonesia (77 percentage points), Australia (65 percentage points), Tonga (64 percentage points), Tajikistan (64 percentage points) and Vanuatu (38 percentage points). The increase was due to the need during the pandemic to maintain a higher level of digital activities and digital life, including production, delivery and consumption.

[2] Michael Wan, Bradford Loh and Brian Tan, “A closer look at the digital divide”, Medium, 17 March 2021.

[3] ITU, *World Telecommunication/ICT Indicators Database*, 25th ed. (2021). Available at www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 28 October 2021).

[4] Monthly broadband expenditure as a percentage of gross national income per capita of less than 2 per cent is considered affordable. For further details, refer to Broadband Commission for Sustainable Development, “2025 targets: connecting the other half” (ITU and United Nations Educational, Scientific and Cultural Organization, 2018).

[5] ITU, *World Telecommunication/ICT Indicators Database*, 25th ed.

10. In terms of Internet capacity, the supply and availability of international bandwidth is an important policy and investment area. Greater international bandwidth per Internet user and consequently higher Internet reliability and speed reflect higher investment in and development of digital connectivity infrastructure.

11. Despite significant growth in total international bandwidth for the Asia-Pacific region, which approximately tripled from 118 terabits per second in 2017 to 301 terabits per second in 2020, the bandwidth capacity in countries with special needs in the Asia-Pacific region is below the regional average of 38 kilobits per second. Bandwidth capacity in landlocked developing countries is 12 kilobits per second, in least developed countries it is14 kilobits per second and in small island developing States it is 32 kilobits per second. Investment in digital connectivity infrastructure in countries with special needs has not kept up with regional trends.

12. The digital divide by gender continues to be a challenge for the Asia-Pacific region compared to the world average. In developing and least developed countries the gender gap in Internet users increased between 2013 and 2019, whereas in developed countries worldwide the gender gap decreased. According to ITU statistics, in Asia and the Pacific in 2019 only 41.3 per cent of women used the Internet compared to 54.6 per cent of men. The statistics also show that more men than women were using the Internet in 11 of the 13 Asia-Pacific countries with available data in 2019. Of the countries with available data, only three are near parity (a difference less than or equal to two percentage points), namely Australia, Cambodia and the Republic of Korea.[6]

III. Progress on digital cooperation in Asia and the Pacific

13. In the Asia-Pacific region, the Asia-Pacific Information Superhighway initiative of ESCAP has promoted regional cooperation to bridge the digital divide and accelerate digital transformation. Through the initiative, ESCAP has assisted member States to identify emerging challenges and opportunities, facilitated collective and coordinated actions, and promoted the sharing of information and good practices among government officials, regulators, business sectors, academia, regional organizations and many stakeholders in the region. Through this regional cooperative framework, the secretariat, in collaboration with regional partner organizations, promoted regional policy dialogues on digital-related agendas and implemented intergovernmental policy dialogues, analytical studies, capacity-building programmes and study tours.

14. The Committee on Information and Communications Technology, Science, Technology and Innovation at its third session held on 19 and 20 August 2020 recommended that the secretariat set up a drafting group as part of the Asia-Pacific Information Superhighway Steering Committee to develop an action plan for its next phase of implementation for 2022–2026, to be considered and adopted by the Committee on Information and Communications Technology, Science, Technology and Innovation at its fourth session in 2022.

[6] ESCAP, “Towards meaningful connectivity: insights from Asia-Pacific case studies” (Bangkok, 2021).

15. The secretariat held two drafting group meetings on 25 May and 29 September 2021. Subsequently, the Asia-Pacific Information Superhighway Steering Committee at its fifth session reviewed and adopted the action plan (2022–2026) on 25 November 2021 and agreed to submit it to the Committee on Information and Communications Technology, Science, Technology and Innovation at its fourth session in 2022.

16. Subject to endorsement by the Committee, it is expected that the action plan will be presented to the Asia-Pacific ministerial conference on the theme of shaping our digital future which will be co-organized by the Government of the Republic of Korea and the secretariat in November 2022.

17. The action plan incorporates emerging needs and prioritized actions to address the digital divide, connectivity and transformation under three pillars, namely connectivity for all, digital technologies and applications, and digital data. The action plan is expected to serve as a regional blueprint for cooperative actions among Asia-Pacific countries. Furthermore, it will accelerate regional policy dialogues and cooperation among Asia-Pacific countries while contributing to the regional implementation of global development agendas and initiatives, including the Sustainable Development Goals, the World Summit on the Information Society action lines, and the Secretary-General's Road Map for Digital Cooperation. In addition, the action plan complements subregional digital cooperation initiatives such as the ASEAN Digital Masterplan 2025, the Trans-Eurasian Information Superhighway and the Information and Communication Technology Working Group of the Council of Regional Organizations of the Pacific, among others.

18. Over the past year, under the framework of the Asia-Pacific Information Superhighway initiative and supported by in-depth technical studies, a working group of representatives of Pacific island countries was established to advance the establishment of a Pacific Internet exchange point. The studies provided clear evidence that such an exchange point could serve as a practical and cost-effective solution to strengthen efficiencies in Internet traffic flows with commensurate decreases in delays and costs of Internet access. The secretariat also conducted technical studies to explore good models of establishing a subregional Internet exchange point in the Greater Mekong subregion involving Cambodia, the Lao People's Democratic Republic, Viet Nam and Thailand.

19. In North and Central Asia, the Asia-Pacific Information Superhighway initiative supported Kazakhstan, Kyrgyzstan and Mongolia to quantify the net cost savings from the co-deployment of information and communications technology infrastructure with energy and transport infrastructure, through cost-benefit analytical tools that help to find the best route and financing scenarios. The Asia-Pacific Information Superhighway initiative supported the draft concept and modality to establish a digital solutions centre for sustainable development in Kazakhstan, based on the request of its Government, to provide digital solutions and accelerate digital transformation towards an inclusive digital society.

20. In South and South-West Asia, the secretariat in partnership with the Department of Economic and Social Affairs of the Secretariat, has supported Bangladesh, Kazakhstan and Maldives in setting up regulatory sandboxes that allow policy experimentation in support of new technology applications in selected sectors. In Bangladesh, the initiative focused on the establishment of a cottage industry and micro-, small and medium-sized enterprise hub for digital acceleration and broadband equity. In Kazakhstan, the initiative is contributing to national policy experience on the introduction of autonomous

vehicles, as well as digitalization and decarbonization in the energy sector. In Maldives, the focus was on central bank digital currency and mobile wallets as sectors of significance for national development.

21. Digital innovations and geospatial information applications have significantly contributed to addressing sustainable development. The potential to leverage digital innovations will help to further stimulate the achievement of the Sustainable Development Goals in the region. In this regard, the implementation of the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018–2030)[7] continued apace with a focus on harnessing space applications and digital innovations through technical cooperation between advanced and low-capacity countries in Asia and the Pacific. The fourth Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific will be held in Indonesia in October 2022 on the theme "Space+". The Conference is expected to agree on actions that seize the opportunity provided by digital innovations to speed up and augment traditional applications of space technologies. By integrating data from ground, space and diverse sources, countries will strengthen their evidence base for planning, decision-making and monitoring the achievement of the Sustainable Development Goals.

IV. Policy pathways to address the digital divide and accelerate digital transformation for an inclusive digital society

A. Promoting investment in digital infrastructure

22. The promotion of investment in digital infrastructure for connectivity is the underlying foundation for bridging the digital divide and moving towards an inclusive society. While the pandemic accelerated the growth and deployment of soft and hard digital connectivity infrastructures in some countries to sustain the socioeconomic activities of citizens, businesses and government, more remains to be done. The region has a window of opportunity to scale up investment in digital connectivity infrastructure and digital technologies without which transformation towards an inclusive digital society and sustainable development will not be possible.

23. In terms of hard infrastructure, investment in Internet exchange points to better coordinate and link all Internet traffic locally within a country or a group of countries can reduce Internet transit costs, as well as the Internet traffic tromboning effect through more direct connections to local and cached content. By improving the efficiency of Internet traffic, Internet exchange points significantly improve quality for domestic users. However, establishing Internet exchange points requires complex coordinating tasks, especially when multiple Internet service providers across different countries are involved. The success of Internet exchange points relies on the commitment and willingness of competing Internet service providers and governments to cooperate and connect Internet traffic to support the availability of universal, affordable and reliable Internet access as a public good.

24. Co-deployment, defined as the deployment of ducts and/or fibre-optic cables during the construction of other infrastructure, such as new roads, highways, railways, power transmission lines and oil/gas pipelines, is a cost-effective way of deploying hard digital infrastructure. At the national level, it

[7] ESCAP/75/10/Add.2.

is increasingly being used as an efficient and cost-effective way to accelerate investment in digital infrastructure. This is because it is not economically viable to lay fibre-optic cables in sparsely populated regions, and the copper line telephone network in several Asia-Pacific developing countries cannot provide broadband access to vulnerable groups and rural communities. At the regional level, a number of examples involve multiple countries but region-wide scale up has proven more difficult given the need for commitment and willingness of multiple sectors across all countries.

25. In terms of soft infrastructure, providing free access to the Internet, such as access to free public Wi-Fi in public offices, schools and hotspot areas, has proven to be a feasible solution to connect groups that cannot afford regular Internet use. As the availability of smart devices continues to increase for all age groups, the provision of free public high-speed Wi-Fi is an effective and low-cost solution, especially for the large data consumption needs of the population in developing countries.

26. Free public Wi-Fi promotes the emergence of community networks. Such networks can connect people in a way that promotes low-cost community-driven solutions in underserved locations. The networks are typically self-managed, providing Internet access where commercial networks generally do not find it economically viable to operate. They support universal access goals and enhance digital empowerment among rural communities and vulnerable groups. They can improve the delivery of digital government services, notably online education, and they inspire the creation of local content. However, these community-led solutions also face several challenges, but policymakers and regulators can implement policies such as tax exemptions or subsidies that nurture their diffusion and scale up.

B. Leveraging digital-driven emerging technologies and big data

27. During the pandemic, digital technologies and digital platforms clearly showed their ability to mitigate the worst impacts resulting from unexpected crises. Besides providing updated vital information and supporting the supply chain and consumption, digitally enabled functions have extended to an ever-wider range of applications. Among the fastest growing applications are those related to big data and their contribution to the achievement of the Sustainable Development Goals and the identification of gaps.

28. To this end, COVID-19 experiences emerging from India, for example, show that during the crisis, a universal digital identity can help to address the digital divide by providing a new national digital database that leaves no one behind. Digital identity-centred data can also support policy development and planning. However, while digital identity-centred data can be secured through mobile devices such as fingerprint-enabled smartphones, such devices remain unaffordable for millions of poor people. A further challenge is the lack of policy and regulatory frameworks that protect data online.

29. Similarly, for example, the Government of the Philippines, through the Department of Information and Communications Technology and the Department of Health, collaborated with a start-up company to develop the mobile application WeTrace[8] as a community tracker for COVID-19 contact tracing. The information collected by the mobile application has greatly assisted the Ministry of Health and other government agencies on timely and

[8] www.wetrace.ph/.

efficient tracking and monitoring of COVID-19 cases in the Central Visayas region of the Philippines.[9]

30. Another promising area is Earth data, or geospatial data, given the contribution that such data make to gaining a better understanding of the dynamics of disaster management and crisis risk reduction. Consequently, geospatial data should be accessible, available, actionable and affordable to benefit people and inform practices, processes and policies. With the support of space-faring members of the Regional Space Applications Programme for Sustainable Development who continue to generously share technical expertise, the secretariat is promoting the sharing of geospatial good practices across countries to demonstrate the diverse use of geospatial data and applications and their vital role in implementing the 2030 Agenda for Sustainable Development in the region. For example, in 2021, the secretariat held a series of hybrid training sessions on strengthening multisectoral institutional capacities to integrate geospatial data for monitoring the local achievement of the Sustainable Development Goals. The key objective was to support evidence-based decision-making in tackling critical issues, such as disaster risk management, sustainable urbanization and clean water, in the pilot cities of Makassar and Bandung in Indonesia.

31. In this regard, better monitoring of air pollution through the digital integration of satellite-derived and ground-based data has emerged as another promising area of intervention. Since early 2021, the secretariat has provided a series of training programmes to build capacity for South-East Asian countries to effectively use innovative satellite-derived data and ground air quality sensors for air pollution monitoring. The training programmes cover digital innovations such as big data, data fusion, artificial intelligence and hyperspectral data.

C. Capacity-building on digital and emerging technology skills

32. Capacity-building has taken on a new urgency, as the COVID-19 pandemic pushes Governments to embrace and accelerate digital transformation across all sectors. In collaboration with regional and national partners, the secretariat and the Asian and Pacific Training Centre for Information and Communication Technology for Development conducted training programmes for government officials on the following themes: information and communications technology connectivity infrastructure; the efficiency of Internet network traffic management; e-resilience monitoring; information and communications technology for disaster risk management; e-government; data-driven governance; social media for development; information security; data privacy; and data protection.

33. The Centre also provided capacity-building opportunities for women-owned micro-enterprises and small enterprises which have been severely affected by the pandemic. It assisted women entrepreneurs in using e-commerce and online marketing, digital solutions that became indispensable during the pandemic lockdowns. It partnered with government agencies and local training providers in providing training-of-trainer activities and workshops for women entrepreneurs.

[9] C*ompendium of Digital Government Initiatives in response to the COVID-19 Pandemic* (United Nations publication, 2020).

34. In line with the increased understanding of the linkages the pandemic exposed between a healthy environment, resilient human societies and sustainable economies, the secretariat collaborated with the ASEAN Research and Training Centre for Space Technology and Applications as well as community of space agencies in the region to strengthen the integration of digital innovations with space technology applications and build greater disaster and crisis resiliency among communities. A series of training workshops were held on the use of geospatial information integrated from multiple sources for dynamic mapping of hotspots of the COVID-19 pandemic in South-East Asia. In addition, a tailored platform was developed for Cambodia, Sri Lanka and Thailand to enhance the evidence-based decision-making capacity of multi-stakeholders in mapping and monitoring health risk hotspots and vaccination roll-outs to mitigate potential risks.

35. The secretariat built the policymaking capacity of government officials on monitoring drought, forest fire hotspots and land use management through the application of geospatial information, space-derived data and analytical tools, including Quantum Geographic Information System, RStudio and the Software Non-functional Assessment Process. Moreover, the secretariat explored innovative ways of engaging experts and coordinating efforts with a wide range of national stakeholders.

D. Regional cooperation and partnerships

36. To ensure that technological breakthroughs work for the economy, society and environment in an inclusive and sustainable manner, strengthened cooperative frameworks and platforms are essential.

37. The secretariat services the Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific, and in this role it supported member States and members of the United Nations Geospatial Network to implement the Integrated Geospatial Information Framework and the Global Statistical Geospatial Framework, which provide guidance on how to integrate statistical, geospatial and other information to inform and facilitate data-driven and evidence-based decision-making to achieve the Sustainable Development Goals.

38. Furthermore, the secretariat has promoted regional cooperation and partnerships through the development of the Asia-Pacific Information Superhighway action plan (2022–2026). The plan identifies 25 priority actions under the three pillars of connectivity for all, digital technologies and applications, and digital data. The action plan will serve as a blueprint for regional cooperative actions to be implemented by members and associate members supported by the secretariat and United Nations agencies, funds and programmes.

V. Issues for consideration by the Commission

39. It is critical to invest in digital infrastructure as an underlying foundation for bridging the digital divide. However, two years into the pandemic, amid constrained fiscal space due to extraordinary pandemic-related expenditures, policies on strategic and cost-effective investments are needed.

40. The Commission may wish to provide guidance to the secretariat on its future work, including the implementation of the Asia-Pacific Information Superhighway action plan (2022–2026), the regional implementation of the

Road Map for Digital Cooperation, the theme study of the Commission entitled *Reclaiming Our Future: A Common Agenda for Advancing Sustainable Development in Asia and the Pacific* and the Asia-Pacific ministerial conference to be held in November 2022 on the theme of shaping our digital future, to accelerate regional digital cooperation and leverage digital technologies.