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## Economic and Social Commission for Asia and the Pacific Committee on Trade, Investment, Enterprise and Business Innovation

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### Promoting regional cooperation in new and emerging technologies to achieve sustainable development

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### Note by the secretariat

#### *Summary*

New and emerging technologies, including fourth industrial revolution technologies, offer significant opportunities to achieve the Sustainable Development Goals in the Asia-Pacific region. The accelerated development, adoption and diffusion of new and emerging technologies depend on enabling ecosystems with viable policy options and tools, capacities, investment, innovative business models and partnerships. Regional cooperation plays an important role in promoting and accelerating the adoption and diffusion of such technologies.

The present document contains a discussion of the role of regional cooperation in promoting new and emerging technologies for sustainable development in the Asia-Pacific region. It also includes a discussion of the importance of capacity-building and technical support in this regard.

The Committee on Trade, Investment, Enterprise and Business Innovation may wish to share country perspectives, practical lessons and experiences, and good practices for the successful absorption and transfer of technologies. It may identify urgent policy issues that may be addressed through regional collaboration. The Committee may also wish to offer guidance on strategies to promote new and emerging technologies in the region, and specify the support for capacity-building and technical assistance that the secretariat may provide to support sustainable development and combat climate change.

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## I. Introduction

1. New and emerging technologies, including fourth industrial revolution technologies, are important for accelerating progress towards meeting the Sustainable Development Goals in the Asia-Pacific region. They have the potential to improve productivity and efficiency, raise incomes and improve quality of life.

2. Regional cooperation can play a critical role in facilitating the faster development and cross-border transfer of new and emerging technologies. Priorities at the regional level include enhanced access and know-how, stakeholders' engagement, and cross-country and cross-regional collaborations to ensure an easy and even adoption of fourth industrial revolution technologies.

3. The present document provides a brief overview of the context in the Asia-Pacific region, the potential for new and emerging technologies, along with the broad opportunities and constraints. The role of regional cooperation in the adoption and diffusion of these technologies for sustainable development and addressing climate change is discussed, as is capacity-building and technical support to promote such regional cooperation.

4. The present document also provides an overview of the capacity-building and technical support provided by the Asian and Pacific Centre for Transfer of Technology of the Economic and Social Commission for Asia and the Pacific (ESCAP) to member States between 2020 and 2022. These activities were organized with the objective of enhancing innovation and technology transfer capabilities and strengthening regional technology cooperation for sustainable development.

5. The present document concludes by highlighting a few key issues for consideration by the Committee on Trade, Investment, Enterprise and Business Innovation.

## II. Evolving context in the Asia-Pacific region

6. The Asia-Pacific region is home to 60 per cent of the world's population<sup>1</sup> and has a rich diversity of socioeconomic conditions and natural environments. The region has witnessed rapid economic development since 1990, which has lifted more than 1 billion people out of extreme poverty.<sup>2</sup> The region has already become a key engine for the global economy. Twenty-one economies in the region had a combined gross domestic product of \$72.5 trillion in 2021 – 44 per cent of world economic output.<sup>3</sup>

7. Despite the above-mentioned progress, recent data indicate slow progress in achieving the Sustainable Development Goals. Data show that the region is not on track to reach any of the 17 Goals,<sup>4</sup> and may achieve only

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<sup>1</sup> United Nations Population Fund, "Population trends". Available at <https://asiapacific.unfpa.org/en/populationtrends> (accessed in November 2022).

<sup>2</sup> ESCAP, "Why can't dynamic Asia-Pacific beat poverty?", 5 July 2019.

<sup>3</sup> World Economics, "Asia-Pacific", Regions data. Available at [www.worldeconomics.com/Regions/Asia-Pacific/](http://www.worldeconomics.com/Regions/Asia-Pacific/) (accessed on 13 December 2022).

<sup>4</sup> *Asia and the Pacific SDG Progress Report 2022: Widening Disparities Amid COVID-19* (United Nations publication, 2022).

9 out of 104 Goal indicators by 2030.<sup>5</sup> In 2017, ESCAP estimated that the region would achieve the Goals by 2052 but, due to a series of recent crises, the region may achieve them only by 2065.<sup>6</sup>

8. The main challenges slowing socioeconomic growth in the region include the impacts of the coronavirus disease (COVID-19) pandemic, climate change, and natural and climatic disasters. The pandemic has affected lives and pushed 85 million people back into extreme poverty. The region is highly vulnerable to the impacts of climate change and is responsible for more than half of global carbon emissions. It also faces high pollution levels, with consequent mortality and morbidity effects. The region also accounts for the vast majority of global disaster-related displacements.<sup>7</sup>

9. Recent estimates by ESCAP also show that inequality has increased significantly for about 85 per cent of the region's population since 2000.<sup>8</sup> Additionally, nearly 52 per cent of the region's 4.3 billion people do not have access to the Internet. This digital divide could exacerbate inequalities and leave societies more vulnerable.<sup>9</sup>

10. There is increasing recognition that technologies play a key role in enabling countries in the Asia-Pacific region to address the triple challenges of recovering from the pandemic, preparing for climate change adaptation and mitigation, and addressing the increased intensity and frequency of natural disasters. New and emerging technologies offer significant opportunities to move towards achieving the Sustainable Development Goals in the Asia-Pacific region.

### III. Technology innovation, development and absorption in the Asia-Pacific region

11. Many of the new and emerging technologies are increasingly enabling the transformation of production, manufacturing and delivery systems in the Asia-Pacific region. For instance, enhanced reliance on renewable energy technologies, such as photovoltaic cells,<sup>10</sup> and the rapid deployment and applications of fourth industrial revolution technologies<sup>11</sup> have potential for addressing climate change. Fourth industrial revolution technologies can be used in a range of applications, such as climate monitoring, smart and

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<sup>5</sup> *Asia and the Pacific SDG Progress Report 2021* (United Nations publication, 2021).

<sup>6</sup> *Asia and the Pacific SDG Progress Report 2022*.

<sup>7</sup> Most new and repeated displacement triggered by disasters in 2021 were recorded in the Asia-Pacific region, which together accounted for about 80 per cent of the total. Internal Displacement Monitoring Centre, *Global Report on Internal Displacement 2022: Children and Youth in Internal Displacement* (Geneva, 2022).

<sup>8</sup> The income share of the top decile was found to be about 50 per cent, while the bottom decile accounted for only 0.2 per cent of the share. Between-country inequality due to climate change has also increased by 25 per cent over the past half century. *Economic and Social Survey of Asia and the Pacific 2022: Building Forward Fairer – Economic Policies for an Inclusive Recovery and Development* (United Nations publication, 2022).

<sup>9</sup> ESCAP/CICTSTI/2022/1.

<sup>10</sup> *Human Development Report 2021/2022: Uncertain Times, Unsettled Lives – Shaping Our Future in a Transforming World* (United Nations publication, 2022).

<sup>11</sup> World Economic Forum, *Unlocking Technology for the Global Goals* (Geneva, 2020).

autonomous vehicles, digital transfers during emergencies and disasters, early warning systems, and medical diagnoses and inventions.<sup>12</sup>

12. The Asia-Pacific region comprises some of the most innovative countries in the world in developing and implementing advanced technology. As reported in the *Global Innovation Index 2022*, in 2021, many countries in Asia and the Pacific showed dynamic innovation performances and advances in key innovation indicators and had a large share of innovative science and technology clusters.<sup>13</sup>

13. Despite the Asia-Pacific region fast becoming a hub of technological innovation, several intersecting factors have resulted in a slow absorption of new and emerging technologies. Some of the key factors are:

(a) *Capacity-related constraints*. There is an infrastructure deficit<sup>14</sup> and a shortage of skilled technical personnel, especially technology, media and telecommunication workers;<sup>15</sup>

(b) *Structural constraints*. The majority of enterprises in the Asia-Pacific region are micro, small or medium-sized, with a low resource base for a transition to new and emerging technologies.<sup>16</sup> There are technical, organizational, economic and system barriers to technology transfer and adoption,<sup>17</sup> as well as inadequate enabling policy and legal frameworks, especially for intellectual property.<sup>18</sup> There are weak government and private programme delivery mechanisms for technology promotion;

(c) *Institutional constraints*. Institutional support systems and mechanisms for the scaling up of technologies are inadequate, as is the facilitating role of State actors for innovation and technology transfer. There are weak interlinkages among technology stakeholders within national innovation systems for synergistic development and scaling up of technologies.

<sup>12</sup> See [www.unescap.org/events/2022/inception-meeting-digital-and-transport-connectivity-socioeconomic-resilience-rural#](http://www.unescap.org/events/2022/inception-meeting-digital-and-transport-connectivity-socioeconomic-resilience-rural#).

<sup>13</sup> World Intellectual Property Organization, *Global Innovation Index 2022: What is the Future of Innovation-Driven Growth?* (Geneva, 2022).

<sup>14</sup> ADB, *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific* (Manila, 2018), p. 7.

<sup>15</sup> Korn Ferry, “Future of work: the global talent crunch” (n.p., 2018).

<sup>16</sup> Association of Southeast Asian Nations – 95 to 99 per cent; Philippines – 99.5 per cent; Indonesia – 99.99 per cent; India – 80 per cent. Maria Vasquez Callo-Müller, “Micro, small and medium enterprises (MSMEs) and the digital economy”, background paper prepared for the first meeting of the Asia-Pacific MSME policymakers network, March 2021, available at [www.unescap.org/sites/default/files/event-documents/MSMEs%20and%20the%20Digital%20Economy.pdf](http://www.unescap.org/sites/default/files/event-documents/MSMEs%20and%20the%20Digital%20Economy.pdf); and “MSMEs are the growth engine of India, contribute 30% to the GDP”, *Mint*, 16 September 2022, available at [www.livemint.com/news/india/msmes-are-the-growth-engine-of-india-contribute-30-to-the-gdp-11663347449050.html](http://www.livemint.com/news/india/msmes-are-the-growth-engine-of-india-contribute-30-to-the-gdp-11663347449050.html) (both accessed on 13 December 2022).

<sup>17</sup> A. Mazurkiewicz and B. Poteralska, “Barriers to technology transfer at R&D organisations”, in *Proceedings of the 10th European Conference on Innovation and Entrepreneurship*, R.P. Dameri and L. Beltrametti, eds. (Reading, United Kingdom of Great Britain and Northern Ireland, Academic Conferences and Publishing International, 2015).

<sup>18</sup> *Intellectual Property Management and Technology Licensing: Guide for Policymakers and Managers of Research and Development Institutes* (ST/ESCAP/2912).

14. To harness the potential of emerging technologies for sustainable development effectively, it is important to have enabling ecosystems with viable policy options and tools, capacities, investment, innovative business models and partnerships. Also important are adequate capacities and skills to absorb, deploy and adapt technologies; adequate technical know-how and access; adequate finance and investments; and cooperation at all levels.

#### IV. Role of regional cooperation

15. The role of regional cooperation is critical for faster development, adoption and transfer of new and emerging technologies for sustainable development.

16. The COVID-19 pandemic has demonstrated the importance of technological cooperation among countries in the Asia-Pacific region for resolving urgent issues. Countries in the region have come together in response to the pandemic, maintained health services, monitored and controlled the infection, maintained the flow of critical supplies across borders, safeguarded the welfare of their citizens and ensured fiscal stability. For all the above, countries in the region employed digital technologies widely.<sup>19</sup>

17. By boosting productivity, cutting expenses and improving efficiency, technology and innovation can promote economic growth. In addition to addressing and resolving societal issues, technology and innovation can assist countries in looking for practical solutions to address environmental issues. In other words, it contributes to the economic, environmental and social pillars of sustainability.

18. The World Economic Forum estimates that the achievement of all 17 Sustainable Development Goals and 70 per cent of Goal targets can be enabled through existing fourth industrial revolution technologies. Five Goals for which novel technologies have special relevance are Goal 3 (Good health and well-being), Goal 8 (Decent work and economic growth), Goal 11 (Sustainable cities and communities), Goal 12 (Responsible consumption and production) and Goal 13 (Climate action).

19. As 2030 draws close, regional cooperation needs to be driven towards helping all countries in the region meet the Sustainable Development Goals by appropriately gaining access to and absorbing critical technologies to help in meeting the Goals. Capacity-building and technical support will play a key role in this. There are many areas where member States will need to take urgent actions in this regard, including:<sup>20</sup>

(a) Planning and coordination through a well-formulated strategy for increased usage of new and emerging technologies for sustainable development;

(b) Strengthening institutional and digital infrastructure through support for building synergies across countries' respective policy regimes with respect to new and emerging technologies, such as the digital policy, artificial intelligence strategy, e-commerce policy and data privacy policy;

<sup>19</sup> ADB, *Regional Cooperation and Integration in Asia and the Pacific: Responding to the COVID-19 Pandemic and "Building Back Better"* (Manila, 2022).

<sup>20</sup> ESCAP/CICTSTI/2022/3; and World Economic Forum, *Unlocking Technology for the Global Goals* (Geneva, 2020).

(c) Strengthening innovation, research and development through support for riskier, early-stage innovative technology solutions from ideation to basic and applied research and development, and demonstration;

(d) Augmenting financing for the scaling up of innovations and commercialization. There is a need to explore sources other than public funds, such as private sector funding and foreign direct investments, and innovative financing tools, such as private venture capital and start-up funds, for micro-, small and medium-sized enterprises;

(e) Supporting the workforce transition through capacity-building, targeted training, exchange programmes and labour policy interventions;

(f) Establishing multi-stakeholder partnerships and encouraging collective action and collaborations to deliver jointly and exchange resources.

20. The key considerations for countries of the region will be how to jointly enhance understanding and harness the benefits of new and emerging technologies, work together to address common concerns and build an enabling environment, learn from one another's good practices and utilize the platforms of South-South cooperation and triangular cooperation to accelerate the adoption of technologies.

## **V. Work of the secretariat on promoting innovative technologies to meet the Sustainable Development Goals**

21. Recognizing the critical importance of technologies for sustainable development, ESCAP, through its divisions and the Asian and Pacific Centre for Transfer of Technology, has been engaged in activities to promote the development, absorption, scaling up and transfer of technologies.

22. The Centre supports member States in the creation of an enabling environment for innovation and technology transfer in the Asia-Pacific region for the achievement of the Sustainable Development Goals. It has been fostering inclusive partnerships between Governments, research and development institutions, academia, international organizations, the private sector and civil society for the transfer and diffusion of technologies for the achievement of the Goals in the region.

23. The primary focus areas of the Centre in 2021 and 2022 were organized around three key outcome areas, namely:

(a) *Regional technology cooperation strengthened.* The Centre facilitated five consultative meetings to strengthen technology cooperation among member States in health-care biotechnology and biomedical technologies, technologies to address the COVID-19 pandemic, emerging energy technologies for climate change mitigation, collaborative strategies for regional cooperation and industry-academia-government collaboration. At these meetings, member States identified needs, availability of resources, opportunities for collaboration in health-care biotechnology research and testing facilities, climate change mitigation technologies, and cross-border collaboration to accelerate the transfer and adoption of emerging energy technologies;

(b) *Innovation and technology transfer capacity enhanced.* The Centre organized 13 demand-driven capacity-building activities on various subjects as requested by member States in the areas of innovation, transfer and diffusion of fourth industrial revolution technologies, decentralized power plants and smart grid integration, green innovation, emerging technologies to

address climate change and the COVID-19 pandemic, inclusive innovations and technologies, air pollution control technologies, intellectual property management and technology transfer, renewable energy technologies and the circular economy. The Centre also facilitated meetings to promote inclusive technologies and innovations. In cooperation with partner organizations, the Centre made substantive contributions to four regional capacity-building events, which were focused on new energy, innovation policymaking, low-emission transportation and advanced water technologies;

(c) *Technology intelligence enhanced through analytical work and knowledge products.* The Centre developed and disseminated knowledge products, including periodicals, study reports and publications. The Centre's online periodical *Asia-Pacific Tech Monitor*, publications (including a guidebook on intellectual property management) and three theme papers related to innovation in, and transfer and propagation of, fourth industrial revolution technologies (for sustainable development, health care and climate change mitigation) have provided the latest information on technology trends and developments and have enhanced the awareness and capacities of stakeholders on emerging technologies relevant to the region.

24. The Centre has organized several international capacity-building events to facilitate discussion of the opportunities and challenges related to technology absorption and to identify priorities and the potential for regional cooperation. Some of the key events with a focus on new and emerging technologies included the following:

(a) Regional workshop on emerging technologies to respond to climate change, held in Kunming, China, on 14 September 2021;

(b) International conference on fourth industrial revolution technologies for sustainable development, held in New Delhi on 30 November 2021;

(c) Expert group meeting on strengthening regional cooperation in the health-care biotechnology and biomedical sector, held online on 22 March 2022;

(d) Side event entitled "Strategic priorities for adoption of emerging technologies in the energy sector for climate change mitigation", held in Bangkok on 24 May 2022 during the seventy-eighth session of ESCAP;

(e) International conference on innovation, transfer and diffusion of fourth industrial revolution technologies, held in Guangzhou, China, on 30 June 2022;

(f) Industry-academia-government consultative meeting to address the challenges of the energy sector (conventional and non-conventional) and energy devices, held online on 17 October 2022.

25. Deliberations at the above-mentioned events resulted in several observations and recommendations for promoting new and emerging technologies for sustainable development. They include the following:

(a) Strengthening capacities of relevant stakeholders is critical to develop and effectively utilize new and emerging technologies to meet the Sustainable Development Goals. These technologies are considered part of the open systems of innovation framework;

(b) It is crucial to redesign the educational curriculum (starting at the primary level) in the light of the skills needed for innovative technologies. Academia should be involved in the initiative, which should also include reskilling and upskilling the workforce in preparation for the adoption of new and emerging technologies;

(c) Academia and the private sector require support to forge strategic partnerships for collaborative research and development and accelerated commercialization of new and emerging technologies;

(d) To promote the adoption and expansion of emerging technologies, incubators play a crucial role in fostering innovation and establishing connections between innovators and the market;

(e) The private sector can play a significant role in regional cooperation by investigating and promoting cross-border public-private partnership models to boost the adoption and use of new and emerging technologies, as well as by giving small and medium-sized businesses, innovators and start-ups in Asia-Pacific countries opportunities for collaboration and partnership to scale up and commercialize their technological innovations across national boundaries;

(f) The sector-specific conditions and requirements, as well as the socioeconomic conditions, of the countries in which new and emerging technologies are adopted and to which they are transferred should be taken into account;

(g) Improved access to and development of technologies may be made possible through new forms of intellectual property management and regulations;

(h) It might be beneficial to investigate the creation of regional technology banks for advancements related to new and emerging technologies;

(i) Regional organizations and institutions such as the Centre could work to promote agreements between Governments to encourage the sharing of innovative technologies and related knowledge;

(j) Through the Centre, collaborative platforms for innovation and the transfer and scaling up of new technologies could be established, and innovators and incubators could be encouraged to share innovative applications of these technologies.

## **VI. Issues for consideration by the Committee**

26. In its resolution 78/1 of 27 May 2022 entitled “Bangkok Declaration Commemorating the Seventy-fifth Anniversary of the Economic and Social Commission for Asia and the Pacific: a Common Agenda to Advance Sustainable Development in Asia and the Pacific”, ESCAP acknowledged that technology and innovation were essential to the pursuit of sustainable development and were among the main forces behind the implementation of the 2030 Agenda for Sustainable Development. Innovative technologies (driven by various societal changes and the growth of digital technology, data processing and artificial intelligence) present previously unimaginable opportunities but also new challenges, and they have the potential to significantly speed up the implementation of the 2030 Agenda.

27. In the light of the opportunities and challenges related to new and emerging technologies for sustainable development, the Committee may wish to share country perspectives, experiences and good practices, partnerships and lessons learned.



28. The Committee may wish to take the following actions:

(a) Identify the types of secretariat support that may be needed to advance the promotion of innovative technologies for sustainable development in the region;

(b) Make recommendations to advance the promotion of these technologies for sustainable development in the region;

(c) Identify new and priority policy issues related to innovative technologies and support member States in the promotion of such policies for the rapid absorption of the same.

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