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Multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals

Note by the Secretariat*

The President of the Economic and Social Council has the honour to transmit to the high-level political forum on sustainable development convened under the auspices of the Council the Co-Chairs' summary of the multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals, held in person on 9 and 10 May 2024, with additional side events held on 8 May. The Co-Chairs of the forum, the Permanent Representative of Denmark to the United Nations, Christina Markus Lassen, and the Permanent Representative of Saint Vincent and the Grenadines to the United Nations, Inga Rhonda King, were appointed by the President of the Council. The summary is being circulated pursuant to paragraph 123 of the Addis Ababa Action Agenda of the Third International Conference on Financing for Development (General Assembly resolution 69/313) and paragraph 70 of the 2030 Agenda for Sustainable Development (resolution 70/1).

* The present report was submitted to the conference services for processing after the deadline for technical reasons beyond the control of the submitting office.

Co-Chairs' summary of the multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals

I. Introduction

1. The present summary represents a reflection of the broad discussions that took place during the 2024 session of the multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals. The summary brings together a diverse set of views articulated through both formal and informal statements provided by representatives of Governments, the United Nations system and diverse stakeholders. The views presented do not necessarily represent opinions held or endorsed by the Co-Chairs or the Governments that they represent.

2. Pursuant to General Assembly resolution 70/1, on 9 and 10 May 2024, the President of the Economic and Social Council, Paula Narváez, convened the ninth annual science, technology and innovation forum. As a component of the Technology Facilitation Mechanism, the forum serves as a venue to discuss cooperation in science, technology and innovation around thematic areas pertaining to the implementation of the 2030 Agenda for Sustainable Development. Its mandate is to facilitate interaction, networking and the establishment of networks and multi-stakeholder partnerships. The forum provides an opportunity to discuss technology needs and gaps; promote scientific cooperation, innovation and capacity-building; and examine the impact of rapid technological change on sustainable development perspectives.

3. The Permanent Representative of Denmark to the United Nations, Christina Markus Lassen, and the Permanent Representative of Saint Vincent and the Grenadines to the United Nations, Inga Rhonda King, co-chaired the forum. The forum was jointly organized by the United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals, coordinated by the Department of Economic and Social Affairs, the United Nations Conference on Trade and Development (UNCTAD) and the United Nations 10-Member Group to Support the Technology Facilitation Mechanism, appointed by the Secretary-General and serviced by the Department of Economic and Social Affairs. Among other things, the 10-Member Group moderated and led the thematic sessions.

4. The forum was held in person at United Nations Headquarters, under the theme "Science, technology and innovation for reinforcing the 2030 Agenda and eradicating poverty in times of multiple crises: the effective delivery of sustainable, resilient and innovative solutions".

5. The forum included high-level opening and closing sessions, a ministerial session and seven thematic sessions, which all addressed two strategic areas of focus for the Sustainable Development Goals, namely artificial intelligence and climate change, guided by a substantive background note prepared by the 10-Member-Group. Importantly, the forum discussed the specific challenges relating to science, technology and innovation faced by small island developing States, the least developed countries, landlocked developing countries and African countries.

6. The forum featured concrete solutions and innovations for supporting progress across the Sustainable Development Goals, with a focus on Goals 1, 2, 13, 16 and 17. During an evening reception hosted by the Co-Chairs, youth-led innovations in local communities and beyond were showcased. These included inflatable and lightweight flood barriers, portable solar-powered air pollution detectors, off-grid milk pasteurizers; and other affordable and accessible technologies.

7. More than 300 scientists and engineers submitted case studies and science-policy briefs aimed at drawing the attention of policymakers to the latest emerging issues in support of forum deliberations. Of those briefs, 99 had passed the peer-review stage and were made available on the forum website.

8. The forum was well attended by scientists, innovators, technology specialists, entrepreneurs and representatives of Governments, the United Nations system, academia, civil society, youth and the private sector. Eight ministers and four other high-level delegates spoke during the ministerial segment. The official programme of the forum featured more than 80 main speakers, and many more spoke over the course of 46 side events. There were 600 registered stakeholder participants, in addition to over 100 Member State representatives and a comparatively larger online audience that joined via United Nations Web TV.

II. Highlights of discussions at the science, technology and innovation forum

A. Overview and high-level segment

9. Forum participants deliberated on the role of science, technology and innovation in reinforcing progress towards the implementation of the 2030 Agenda in times of multiple crises. They focused in particular on Goal 1, on eradicating poverty, Goal 2, on zero hunger, Goal 5, on gender equality, Goal 13, on climate action, Goal 16, on peace, justice and strong institutions and Goal 17, on partnerships, which were to be reviewed at the high-level political forum on sustainable development convened under the auspices of the Council, to be held in July 2024.

10. Forum attendees highlighted the pivotal role played by science, technology and innovation in shaping the trajectory of human progress towards sustainable development, not only by influencing, but also by fundamentally transforming and propelling societies towards more equitable and sustainable futures. Science, technology and innovation play a critical role in addressing global challenges such as climate change, environmental degradation, inequality and poverty, which require comprehensive solutions that address the interlinkages between environmental, social and economic sustainability.

11. Forum participants aimed to spark inspiration and address apprehensions and challenges surrounding the use of science, technology and innovation for sustainable development. Among other things, they highlighted the need to strengthen political leadership with clear research and development plans and strategies to align technological advancements with the 2030 Agenda. Collective efforts are needed to leverage science, technology and innovation for the Sustainable Development Goals, foster action-oriented collaboration across borders and sectors to bridge divides and drive progress, inspire hope and empower women and young people to face complex challenges.

12. The opening of the forum featured statements by the President of the Economic and Social Council and by the President of the General Assembly, Dennis Francis. Two keynote speakers set the scene: the Special Adviser to the Secretary-General on Climate Action and Just Transition, Selwin Hart, and the founder and Chief Executive Officer of Defined.ai, Daniela Braga.

13. Selected messages and highlights of the forum are presented in the remainder of the summary.

Ministerial session on harnessing science and technology for the effective delivery of sustainable, resilient and innovative solutions

14. A ministerial session was held under the overall theme, “Harnessing science and technology for the effective delivery of sustainable, resilient, and innovative solutions”. The following Member States and political groups examined potential opportunities for accelerating progress towards achieving the Sustainable Development Goals to be reviewed during the high-level political forum on sustainable development, to be held in July 2024, and ways to support the effective delivery of sustainable, resilient and innovative solutions: Armenia, Belize (also on behalf of the Caribbean Community), Georgia, Philippines, Poland, Serbia, Tajikistan, Türkiye, Uganda (on behalf of the Group of 77 and China), United States of America and the European Union. Forum attendees also heard remarks from the Under-Secretary-General for Economic and Social Affairs, Li Junhua, and a report on the twenty-seventh session of the Commission on Science and Technology for Development by the Chair of the Commission, Muhammadou M.O. Kah. Some of the issues, challenges and recommendations raised at the forum are presented in the paragraphs below.

15. Given its focus on artificial intelligence, climate action and the Sustainable Development Goals, the forum provided an opportunity to look towards the future and redirect global efforts towards achieving the Goals. It is undeniable that the path forward requires collaborative, inclusive and innovative approaches that ensure that the benefits of technological advancements are shared by all, in particular the most vulnerable, for a resilient, equitable and prosperous future for all nations and communities.

16. The convergence of accelerating climate change and rapid progress in artificial intelligence presents both formidable challenges and unprecedented opportunities for achieving the Sustainable Development Goals. The transformative power of science, science advice and a wide range of technology solutions can accelerate progress across all the Goals.

17. Small island developing States, African countries, the least developed countries and landlocked developing countries face distinct challenges that necessitate tailored science, technology and innovation policy support. Small island developing States are particularly vulnerable to climate change, and their economic losses from climate-related disasters average 2–3 per cent of their gross domestic product (GDP), which constrains funds for technological development. African countries urgently need to invest in education and innovation ecosystems and bridge digital divides, given that only 37 per cent of their populations had access to the Internet in 2023, well below the global average. The least developed countries need focused support to tackle structural obstacles using science, technology and innovation, including through the promotion of technological entrepreneurship and infrastructure investment. Landlocked developing countries face trade costs that are 1.4 times higher than those paid by their coastal counterparts, which limits their access to global markets.

18. Science, technology and innovation play a critical role in addressing national and international challenges, including climate change, health care and education. If used correctly, advanced technologies such as smart automation and artificial intelligence could reduce poverty and hunger and promote good health and well-being, in line with the aspirations of the Sustainable Development Goals. In many countries, however, the potential of those technologies is limited by inadequate funding.

19. Concrete actions, partnerships and fresh ideas are needed for the upcoming high-level political forum on sustainable development and the Summit of the Future, scheduled to be held in September 2024. Empowering women and young scientists and fostering international networks are crucial. Multi-stakeholder cooperation

involving scientists, national Governments, universities, communities, civil society and the private sector is fundamental for scientific breakthroughs and the achievement of the Sustainable Development Goals.

B. Thematic discussions

20. A large part of the forum consisted of "deep-dive" discussions on seven themes and two cross-cutting areas, key elements of which are summarized in this section.

Artificial intelligence and climate change: cross-cutting focus areas

21. Artificial intelligence is reshaping the landscape of possibility across all sectors. From agriculture, where precision farming driven by artificial intelligence could increase yields by up to 70 per cent by 2050, to health care, where artificial intelligence algorithms improve diagnosis and treatment, the potential is enormous. Economically, the value of contributions by artificial intelligence is predicted to reach up to 7 per cent of global GDP by 2030.

22. However, that rapid ascendancy brings significant challenges. For instance, artificial intelligence is expected to lead not only to the automation and potential elimination of up to 400 million jobs by 2030, but also to the creation of new ones, altering the very structure of the global workforce.

23. The race for data stands to broaden cultural, language and gender imbalances, generating bias and misinformation, while also creating conditions for the digital exploitation of labour, in particular in developing countries.

24. The environmental footprint of artificial intelligence is significant. Data centres alone account for about 1 per cent of global electricity demand. That consumption exacerbates demand on energy grids, which are too often powered by non-renewable sources. Artificial intelligence already causes more greenhouse gas emissions than the global airline industry. Artificial intelligence also uses considerable fresh water for the on-site cooling of its servers and for electricity generation. It also leads to enormous amounts of electronic waste.

25. On the other hand, artificial intelligence promises higher system efficiencies. It can be used to improve climate and energy planning, optimize resource use and monitor deforestation and biodiversity loss. If focused on efficiency improvements, artificial intelligence could potentially lead to a 4 per cent reduction in global greenhouse gas emissions by 2030, instead of an increase. It is therefore important to adopt and ratchet up energy and water efficiency standards for artificial intelligence systems and hardware.

26. The urgency of climate action can hardly be overstated. With global temperatures rising, sea levels increasing and extreme weather events becoming more frequent, immediate and coordinated action is critical. In January 2024, atmospheric carbon dioxide concentrations reached a record 423 parts per million by volume, higher than it has been in millions of years. Immediate global action is needed to reduce those emissions by 45 per cent by 2030 compared with 2010 levels – and to net zero by 2050 – an enormous challenge.

27. Tackling climate change is hard, as it is inextricably linked to all economic activities and many environmental and Earth system processes. Targets across the Sustainable Development Goals highlight ambitious objectives for all climate-relevant economic activities. Further scientific exploration has been conducted on thresholds for key domains, such as aerosols, climate, water, biodiversity and nutrients, beyond which those biogeophysical systems could collapse, leading to significant harm to both humans and nature.

28. According to the Earth Commission, seven out of eight global thresholds have been crossed, concerning 52 per cent of the world's land area, where 86 per cent of people live. If not addressed today, that threat could undo decades of development progress. Those thresholds have been breached even as decent living needs are not being met for billions of people. To achieve a safe and just pathway for all on planet Earth, it is necessary to eradicate poverty and hunger and reduce the damage to the Earth systems upon which everyone's well-being ultimately rests.

29. The 2030 Agenda is all about leaving no one behind. To ensure that emerging technologies contribute to the advancement of that promise, a human rights-based approach must be incorporated. The needs of the poorest must be met, not with just any technology, but with the best available high-performing technologies. Such an approach could ensure access to food, water, energy and infrastructure, while maintaining a healthy environment.

Increased and more effective funding and capacity for Sustainable Development Goal-related research and innovation in all regions (Goal 17)

30. Forum participants explored global research cooperation and funding to achieve the Sustainable Development Goals, with special attention paid to the needs of developing countries. They underscored the critical role of international research collaboration in addressing complex global challenges, such as poverty, inequality, climate change, artificial intelligence and health crises.

31. Policies are needed that facilitate increased and more effective funding allocations to Sustainable Development Goal-related research, especially in underfunded regions. This includes innovative funding mechanisms that support international consortiums and collaborative research projects and increased funding for bridging divides in science, technology and innovation capacity. The public and private sectors need to be incentivized to invest in both fundamental and applied research that supports the achievement of the Goals.

32. The worldwide distribution of research and development resources remains highly inequitable across both countries and population groups. Despite increasing volumes of global research and development, there is a significant concentration of investment in developed countries and China. Moreover, women-founded startups account for only 2 per cent or less of venture capital funding invested in Europe and the United States in 2023. This means that the brain power of many aspiring scientists is not being used for human progress.

33. Capability gaps and disparate research costs lead to global challenges for effective international collaboration in Sustainable Development Goal-related research. Despite those hurdles, progress has been seen in capacity-building initiatives in recent decades; by 2023, 57 per cent of all research publications globally featured authors from low- and middle-income countries, indicating a more distributed research landscape.

34. Collaborations between Governments, international organizations, civil society, the private sector and research funding organizations need to be strengthened at various levels to enhance funding effectiveness. The involvement of national practitioners and the creation of multi-stakeholder networks are crucial for successful technology transfer and capacity-building. Improved communication and mutual learning between and among United Nations entities, research funding organizations and other stakeholders are essential, in order to align global research initiatives with the Sustainable Development Goals and optimize investment impacts.

35. Research funding organizations play a crucial role in structuring and supporting research that contributes to achieving the Sustainable Development Goals. Examples

include significant initiatives by such organizations in Brazil, China and South Africa, which are focused on collaborative and thematic research aimed at specific Goals.

36. Advancements in data analytics and tagging in bibliometric databases can help in measuring and evaluating the impact of research funding on progress achieving the Sustainable Development Goals. They can also help in designing policies and determining the effectiveness of research collaborations.

37. Open science and accessibility initiatives need to be promoted, in order to ensure that research findings are accessible to all and to foster a truly global exchange of knowledge and innovations. This approach is vital for shared scientific advancement and the global achievement of the Sustainable Development Goals.

Strengthening scientific cooperation, technology and knowledge-sharing and accelerating innovation for integrated climate action (Goal 13)

38. Forum participants explored how science, technology and innovation can help in responding to climate change and its interconnected crises while accelerating the achievement of the Sustainable Development Goals, including by supporting the transformation of key sectors and by building on open knowledge to create localized and inclusive solutions.

39. Science, technology and innovation can serve to address unique climate challenges and support sustainable initiatives in such sectors as construction and energy, as well as through academia-industry partnerships. Effective solutions for a net-zero emissions future require cross-disciplinary and international collaboration, alongside increased funding, capacity-building and multi-stakeholder investment.

40. Science, technology and innovation is crucial for climate adaptation, mitigation and resilience, necessitating global support, investment and multi-sector collaboration. Open science, data democratization and accessibility are vital for inclusivity and public benefit. International knowledge-sharing and technology transfer are essential to empowering developing nations through science, technology and innovation and digitalization. Incorporating sustainability into education and academia is key to advancing climate action research. New technologies must disrupt outdated systems while focusing on social justice and inclusivity, thereby amplifying diverse and underrepresented voices.

41. Digital divides pose significant challenges, as disparities in capacity, skills and infrastructure can impede innovation, in particular in climate change mitigation. International partnerships for knowledge and technology transfer are vital, aligning industrial progress in developing countries with climate strategies and opening new markets for carbon offsets.

42. Open and equitable access to data, especially climate and weather data, is crucial for crafting effective and region-specific strategies. It enables emerging researchers in developing countries with limited infrastructure to develop robust strategies. Prioritizing informed consent and ownership is vital to mitigating risks associated with artificial intelligence that could exacerbate divides and inequities.

43. It is necessary to adopt a holistic and multidisciplinary approach that integrates sustainable development and climate action across all sectors. Such an approach requires partnerships between Governments, industry and academia and inclusive co-creation involving young people, women, Indigenous Peoples and marginalized groups.

44. Strong international partnerships focused on infrastructure, capacity and skill-building are essential to supporting open access to data and technology. Investments in capacity-building and innovations tailored to meet real needs are crucial for achieving a net-zero future.

Bridging the science, technology and innovation divides to eradicate poverty and end hunger (Goals 1 and 2)

45. When exploring the potential of science, technology and innovation in bridging the divides to eradicate poverty and end hunger, forum participants acknowledged that, despite all efforts made, insufficient progress has been seen towards achieving Sustainable Development Goals 1 and 2.

46. That situation has significantly worsened since 2020, through uneven recovery from the pandemic. The world is back at hunger levels not seen since 2005, and food prices remain higher in more countries than in the period 2015–2019. Science, technology and innovation can help in reversing those trends and accelerating progress.

47. Questions of poverty, food security and nutrition are especially intertwined in the lives of rural people, Indigenous Peoples and local communities, including small-scale producers and family farmers, forest-dependent people and fishers. By fostering international collaboration and knowledge-sharing, the ability to fully benefit from science, technology and innovation can be particularly transformative for them in addressing imminent challenges, such as climate change and food insecurity.

48. Accessible and affordable technology tailored to individual needs is necessary. Collaboration between the public and private sectors provides a crucial opportunity to invest in research, innovation and infrastructure development, while leveraging locally nurtured science, technology and innovation solutions and Indigenous knowledge. Integrated agricultural research, vocational training for young farmers and the development of digital infrastructures remains key.

49. However, major challenges such as the accessibility and affordability of science, technology and innovation solutions, in particular in developing countries, alongside digital literacy and connectivity issues, especially in rural and marginalized areas, remain to be tackled through transformative and inclusive policymaking.

50. In concrete ways, the involvement of the private sector can be a key enabler in promoting digital literacy programmes and educational content. Through entrepreneurship and digital skills initiatives, in particularly rural and impoverished areas, youth empowerment can bridge the digital divide and ensure inclusivity.

51. Affordable and open-source technologies and innovations can be employed to rapidly reverse increases in poverty and hunger and to address synergies and trade-offs with other Sustainable Development Goals.

Building ecosystems for science, technology and innovation to drive economic growth and sustainable development in small island developing States

52. Forum participants aimed to explore the potential of science, technology and innovation in driving economic growth and sustainable development in small island developing States, while focusing on evaluating the current state of science, technology and innovation, identifying the unique challenges faced by those States and uncovering opportunities for leveraging science, technology and innovation to overcome those challenges and achieve resilient prosperity, including in disaster risk reduction, renewable energy, agriculture, health, marine science and fisheries and governance-related technology.

53. Characterized by a number of common challenges, including their relatively small size, undiversified economies, distance from large markets and trade routes and extreme vulnerability to exogenous shocks, especially natural disasters and climate change, the 39 small island developing States share common obstacles to the growth and development of their science, technology and innovation ecosystems.

54. Science, technology and innovation can be a crucial tool for overcoming specific challenges for small island developing States and for promoting prosperity and wider sustainable development. Higher investments in research and development can support youth employment, improve the availability of high-quality, disaggregated data and, in the longer run, improve access to financing and budgetary resources for education.

55. The Sustainable Development Goals will not be achieved without safe, affordable, inclusive and meaningful global connectivity for all. Groups that are already economically and socially disadvantaged should not also be excluded in terms of technology.

56. The realities for many small island developing States are that offline inequalities are also reflected online and that part of the population remains unconnected to the Internet. Many small island developing States struggle with underdeveloped science, technology and innovation infrastructure, in terms of telecommunications systems, institutions and innovation governance.

57. Artificial intelligence applications can serve to advance sustainable development, but can also pose challenges. In climate-vulnerable countries, artificial intelligence can be used to analyse satellite imagery before and after disasters to pinpoint affected areas and can aid in developing resilience programmes. However, emerging technologies carry risks, such as the lack of local data, leaving the door open to potential bias in global artificial intelligence models.

58. Strengthening North-South and South-South partnerships and those between and among small island developing States is crucial for enhancing science, technology and innovation ecosystems in such States and ensuring that global digitalization promotes inclusive growth and innovation. Notable initiatives include the announcement of a programme by the International Research Center of Big Data for Sustainable Development Goals in China, which offers big Earth data utilization training to all 39 small island developing States.

Harnessing the power of digital innovation for sustainable peace and resilience in the context of climate change (Goal 16)

59. Forum attendees discussed the novel potential of digital innovation and frontier technologies to respond to the interconnected issues of peaceful and inclusive societies, resilience and climate change. Although Sustainable Development Goal 16 holds the promise of achieving more inclusive, just and peaceful societies and serves as a great enabler for all the other Goals, efforts made towards preventing and reducing violence, ensuring access to justice for all, promoting inclusive governance and fostering peaceful societies show signs of stagnation or regression.

60. Climate change can multiply and amplify existing risks to peace and development. Disruptions linked to climate change, such as reduced agricultural production, changes to water availability, food insecurity, negative health impacts and loss of housing, can lead to increased competition over resources and instability. In 2022, 84 per cent of refugees and asylum-seekers had fled from highly climate-vulnerable countries, an increase from 61 per cent in 2010.

61. Digital innovations are crucial for building resilience and fostering sustainable peace, especially in the face of climate change. They support climate mitigation and adaptation efforts globally. International data-sharing plays a key role in sustainable development and supports national capacity-building and policymaking. However, the benefits of digital technologies are currently limited to a few, leading to frustration and mistrust. Although technology offers significant potential for addressing

challenges such as climate change, food insecurity and environmental degradation, effective regulations are necessary to ensure that its benefits outweigh its risks.

62. The rapid adoption of artificial intelligence applications, most recently including generative artificial intelligence, highlights their usefulness. Policymakers need to anticipate such changes and be explicit about addressing the inequalities and exclusion that may be caused by them.

63. Artificial intelligence can enhance cost-efficient sensing and data collection for early warning systems in regions with inadequate infrastructure, in particular by helping Governments and organizations in humanitarian, development and climate adaptation efforts to utilize remote sensing and satellite imagery effectively. However, policymakers and stakeholders must be responsible in addressing the potential downsides of those technologies, such as unsustainable energy use, misinformation, bias and growing public distrust.

64. Integrated, science-informed and proactive policies are essential to developing transformative digital and frontier technologies that are aligned with the Sustainable Development Goals. To maximize the potential of such policies, equitable access to data, technology, information, infrastructure and resources is crucial for international support and cooperation.

65. Science, technology and innovation plays a critical role in ensuring peace and security by serving to address issues that contribute to social unrest, political crises and unsustainable migration. The contributions of the social sciences should be recognized in national and multilateral policies, in which science engagement to promote social cohesion should also be targeted.

Advancing sustainable development with women-centred science and technology solutions

66. Forum participants explored the intersection of gender equality and science, technology and innovation solutions for sustainable development. They showcased the successes and challenges of diverse initiatives of Governments, international organizations, businesses and civil society in forging innovative women-centred solutions in science and technology, with a view to advancing sustainable development. Those include women-led initiatives for sustainable development, as well as solutions that specifically target women's needs.

67. Although gender equality and the empowerment of women and girls are fundamental human rights and form a foundation for a peaceful and prosperous future, the world is currently not on track to achieving either by 2030, and science, technology and innovation solutions are rarely designed with women's perspectives in mind.

68. There is great need for concrete strategies to empower women throughout all stages of science, technology and innovation development, from design to implementation. By improving women's literacy and skills in science, Member States have the chance to create inclusive education ecosystems and promote knowledge-sharing to eliminate gender bias. Policymakers must engage with the communities most likely to be affected by artificial intelligence to develop ethical frameworks, while prioritizing fairness and accountability and establishing monitoring processes for artificial intelligence systems. Ongoing commitment and vigilance to ensure equitable participation in science, technology and innovation are necessary.

69. Challenges such as a lack of awareness, infrastructure and funding, along with the disengagement of girls from science, technology, engineering, mathematics and entrepreneurship, need to be addressed. Investment in science, technology and innovation solutions is seldom directed towards addressing the challenges faced by or opportunities open to women and girls the world over. Digital literacy among

women and girls, with the aim of equipping them with the skills necessary for the digital era, must be promoted in order to achieve digital equity.

70. In addition to the gender digital divide, the unjust treatment of women in health care is yet another challenge faced by women and girls. There is an urgent need for gender-equitable solutions in health care to address disparities and advance the well-being of women. The trillion-dollar worldwide impact of women's loss of health – and the residual effects of that loss on households – underscores the economic imperative of rectifying those disparities.

71. The significance of global partnerships and financial investments in closing the gender gap in science, technology and innovation cannot be understated. Collaborative efforts to empower women and girls through science, technology and innovation are key to reinforcing the 2030 Agenda.

Science, technology and innovation partnerships for accelerating structural transformation in African countries, the least developed countries and landlocked developing countries

72. Forum participants emphasized the necessity of partnerships in science, technology and innovation to drive structural transformation, leading to economic diversification and more sophisticated productive capacities and technological capabilities in African countries, the least developed countries and landlocked developing countries.

73. Structural transformation is essential for the economic diversification and sophisticated technological capabilities and development required to help the least developed countries to escape commodity dependence. Because that transformation relies on technological learning and innovation, it is vital to enhance technological capabilities. This includes not only pioneering new technologies, but also adopting and adapting existing solutions to boost productivity within local contexts.

74. Special efforts are needed to build robust science, technology and innovation ecosystems in the least developed countries, landlocked developing countries and many African countries. Significant disparities in science, technology and innovation capabilities exist between countries. Those gaps are manifested in research and development investment, scientific output and policy environments, with developed countries outspending lower-income nations by 65 times in research and development and dominating frontier technology markets, led primarily by the United States and China.

75. Technological and industrial imbalances slow technology diffusion, making it hard for latecomers to catch up as technologies grow more complex. The frontier technology readiness index developed by UNCTAD shows that the least developed countries and some landlocked developing countries and African countries are the least prepared to harness those technologies and risk missing out on current opportunities.

76. Beyond the digital divide, bridging the increasing gender, age and minority gaps requires a balanced science, technology and innovation policy approach that involves active participation by young people, women and members of vulnerable groups and a pluralistic scientific approach to addressing the social costs of digitalization.

77. Including women, young people and members of vulnerable groups in the formation of science policies and promoting education in science, technology, engineering and mathematics are crucial for leveraging the transformative power of technology in fostering empowerment, entrepreneurship and economic growth. Investing in education and training that equips those groups to utilize science, technology and innovation for sustainable development is essential.

78. Pursuing science, technology and innovation solutions requires careful consideration of sector-specific needs, potential trade-offs and the risk of increased inequality. Addressing uneven technology adoption and the potential for science, technology and innovation to exacerbate disparities requires a comprehensive approach that includes an assessment of its impact on various sectors and populations to ensure inclusive and equitable development.

79. Effective North-South partnerships and initiatives that curb brain drain and foster practitioner-academic careers, such as the Africa Higher Education Centres of Excellence Project, are vital. Such efforts should enhance digital infrastructure, research funding and knowledge transfer to tackle shared challenges and encourage regional specialization. In addition, collaboration among members of academia, development institutions and civil society is essential for evidence-based policymaking and innovative solutions.

C. Side events, young innovators and written contributions to the forum

Side events

80. Side events provided an additional significant opportunity for Governments and other stakeholders to participate in the forum. In all, 46 side events were organized by partners of the Technology Facilitation Mechanism: 17 in-person events held at Headquarters, one in-person event held off-site in New York City and 28 online events. Organizers included Member States, United Nations system entities, intergovernmental organizations, members of academia, organized science and engineering communities and a range of civil society and private sector stakeholders. [1]

[1] Side event organizers included the Governments of Armenia, Austria, Bahrain, China, Colombia, the Dominican Republic, Egypt, Ethiopia, Finland, Ghana, India, Indonesia, Libya, Luxembourg, Morocco, Nepal, the Philippines, Poland, the Republic of Korea, Saint Lucia, Serbia, South Africa, Tajikistan and Uzbekistan, the European Union and the following entities and organizations: Dag Hammarskjöld Library; Department of Economic and Social Affairs; Department of Global Communications; Economic Commission for Africa; Food and Agriculture Organization of the United Nations; International Telecommunication Union; Office of Information and Communications Technology; Office of the Envoy of the Secretary-General on Technology; Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States; United Nations Conference on Trade and Development; United Nations Development Programme; United Nations Educational, Scientific and Cultural Organization (UNESCO); UNESCO Regional Office for East Asia; United Nations Environment Programme; United Nations Geospatial Network; United Nations Global Pulse; United Nations Human Settlements Programme (UN-Habitat); UN-Habitat youth programme; United Nations Industrial Development Organization; United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals; World Food Programme; World Health Organization; World Intellectual Property Organization; African Center for Equitable Development; African Centre for Cities; AFS Intercultural Programs; All European Academies (European Federation of National Academies of Sciences and Humanities); American Academy of Pediatrics; Beijing International Exchange Association; Belt and Road Initiative for Sustainable Development; Blockchain Alliance International; Business and Industry Major Group; Carbovate Development; Catalyst 2030 Latin America; Centre for Training and Integrated Research in ASAL Development (a bilateral institution between the Governments of Kenya and Switzerland); Children and Youth International; Children's Hospital Los Angeles; China Association for International Science and Technology Cooperation; China Association for Science and Technology-United Nations Consultative Committee on Disaster Risk Reduction; China Association for Science and Technology-United Nations Consultative Committee on Open Science and Global Partnership; China Women's Association for Science and Technology; Chinese Academy of Sciences-The World Academy of Sciences Center of Excellence for Climate and Environment Sciences; Coalition for the Advancement of Research Assessment Working

Young innovators featured at the forum

81. Young innovators shape the future world, and they must be supported and empowered, as innovation is critical to achieving the Sustainable Development Goals. Technological innovations can help to reduce disparities and ensure benefits for all. They can also accelerate sustainability and learning.

82. Systematic efforts are needed around the world to encourage and enable young people to innovate and to bring those innovations to the market. Scientific solutions need to be sustainable and must integrate local and Indigenous knowledge.

83. Concrete solutions need to be identified for overcoming technology deployment challenges. Local governments need to be empowered, and community-led initiatives are critical to help in reducing disparities and providing context specific solutions. Technologies and institutions evolve together, with progress made in one area limiting progress in the other. As users, communities tend to know best what types of institution are needed.

84. Below is a brief account of the presentations of solutions by young innovators featured at the forum.

85. A Tu Servicio Bogotá is a digital platform for municipal services created by Wingu, a non-profit that collaborates with marginalized communities to develop inclusive digital tools and enhance the crisis management capabilities of social organizations.

86. Bboxx is a data-driven super platform that provides innovative solutions to democratize access to vehicle ownership and electric mobility in Africa and beyond.

Group on Ethics and Research Integrity Policy in Responsible Research Assessment for Data and Artificial Intelligence; Commission on Science and Technology for Sustainable Development in the South; Confederation of Indian Industry; Ecotece; Elsevier; Engineering for Change; European Commission Joint Research Centre; European Council of Doctoral Candidates and Junior Researchers; European Open Science Cloud – Future; European Research Council; European Research Council Research Information System of the European Commission Directorate-General for Research and Innovation; Extreme Tech Challenge; Federation of Finnish Learned Societies; Future Earth; German Center for Research and Innovation; Global Challenges (GloCha) Foundation New York; Global Initiative for Digital Rights; Good Clinical Practice Alliance – Europe; Great Green Wall for the Sahara and the Sahel Initiative; Hecho por Nosotros; Industrial Technology Institute; Institute of Electrical and Electronics Engineers; Integrated Research on Disaster Risk; Inter-Parliamentary Union Working Group on Science and Technology; International Association for the Advancement of Innovative Approaches to Global Challenges; International Centre for Physics; International Organization of Employers; International Science Council; International Science Council Committee on Data for Science and Technology (CODATA); International Society for Digital Earth; International Youth Conference; Internet Governance Forum, Dynamic Teen Coalition; Major Group for Children and Youth; New South Institute; On Think Tanks; Organization of African, Caribbean and Pacific States; Quantum Ecosystems Technology Council of India; Red Dot Foundation; Research Data Alliance Europe; Research Data Alliance International; Samahi Research; Science, Technology, Engineering & Innovation Policy Asia and the Pacific Network; Sistema B; Slalom Element Lab; Spanish National Research Council; Springer Nature; Stanford Angels & Entrepreneurs; Strategic Initiative for Developing Capacity in Ethical Review; Sustainable Development Solutions Network – Youth; Technology Bank for the Least Developed Countries; Tecnológico de Monterrey; Tianjin Institute of Industrial Biotechnology; UNESCO-CODATA Working Group on Data Policy for Times of Crisis Facilitated by Open Science; United Nations Youth Delegate Programme of Italy; United States Council for International Business; VigyanShaala International; Web Advanced Space Developer Interface; Women Leaders for Planetary Health; Women's Health and Education Center; World Academy of Sciences; World Federation of Engineering Organizations; World Food Forum; World Student Platform for Engineering Education Development; Young Women Leaders for Planetary Health; and Zhejiang Lab.

87. The spiral water wheel pump designed in Uganda is a hydraulic machine that uses the kinetic energy from flowing water sources such as rivers to pump water without electricity or fuel, offering a sustainable and cost-effective irrigation solution.

88. The Solar Ice Block Machine, developed by JK Engineering for sub-Saharan Africa, harnesses abundant solar energy to produce ice, providing sustainable cooling for agricultural produce and beverages, reducing food waste and generating income. It is designed for local manufacturing and maintenance, promoting job creation and economic growth.

89. Safi has developed the world's first off-the-grid pasteurization control unit, enabling rural dairy farmers in East Africa to pasteurize milk without conventional electricity. Featuring a digital tracking system, it enhances milk safety, boosts farmer income and aids in regulatory transparency.

90. Ampersand, a pioneering African electric transport energy company, operates a sizeable e-motorcycle fleet and battery swapping network, revolutionizing motorcycle transport by making it cleaner and more profitable, thereby accelerating the shift to a zero-carbon future for the continent.

91. The Union Island Environmental Alliance developed a grass-roots approach to environmental conservation and community resilience. The Alliance collaborates with local communities to devise homegrown solutions for climate adaptation, biodiversity protection and sustainable tourism.

92. Open Seneca deployed low-cost mobile air quality sensor networks to provide detailed city maps of air pollution, driven primarily by citizen science. This innovation aids in identifying hotspots, raising awareness and motivating community action to mitigate the effects of air pollution.

93. Information Ghana developed an interactive tool to enhance local access to critical health, education and other social services information for local communities and vulnerable populations.

94. No Taka Tanzania developed geospatial technology to collect climate data and predict human mobility. It develops digital climate adaptation solutions for food security and land planning and restoration for migrant, host and refugee communities, supporting policy planning and agricultural capacity-building.

95. The Unnati solar-powered silk reeling machine was designed by Resham Sutra for reeling tassar silk yarn in the forested areas of East India, enhancing efficiency and quality of life, in particular for rural women. This innovation, developed in collaboration with local artisans, significantly increases productivity and energy efficiency.

96. Burn Design Lab, in partnership with SAYeTECH in Ghana, developed an improved shea kernel roaster, which reduces firewood use by up to 90 per cent and lowers emissions significantly. This innovation, designed with user feedback, has garnered recognition from the United States Agency for International Development and won several awards in 2023.

Science-policy briefs and case studies

97. In 2024, more than 250 authors – scientists and engineers from academia, non-governmental organizations, the private sector and the United Nations system – submitted science-policy briefs and case studies in response to a call for inputs in English and French. In all, 99 briefs successfully passed the peer-review process organized by the United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals and its partners.

Case studies

98. Case studies submitted to the forum spanned a variety of topics. They were focused primarily on the integration of science, technology and innovation into efforts to advance the Sustainable Development Goals and address key issues in agriculture, environment, energy and health.

99. Several studies emphasized the transformation of agriculture through technology. For example, methods for integrating crop monitoring and forecasting into agriculture in the Philippines were aimed at modernizing the field. Other studies featured explorations of sustainable practices, such as using solar irrigation to support small-scale farmers in the Philippines and converting animal waste into valuable products using black soldier fly technology.

100. Innovative solutions to environmental challenges were also a common theme. These included projects such as the digital transformation strategy for Africa, which could have benefits for telecommunications, and approaches to carbon capture and storage technologies aimed at generating zero emissions. In addition, methods for mitigating environmental impact were highlighted through such initiatives as decentralized wastewater treatment models and industrial waste valorization in Brazil.

101. Health and climate change intersected in several studies featuring examinations of the effects of climate change on public health in Brazil and innovative technologies to mitigate climate impacts, such as renewable energy solutions and integrated energy systems critical for combating climate change in developing regions.

102. Smart technology applications are evident in the improvement of infrastructure and public services. Case studies included the development of smart villages, applications of geographic information systems in public transport and the employment of Internet of things technology in adapting to sea level rise in small island States.

103. A significant number of case studies were focused on the policy and institutional frameworks necessary for leveraging science, technology and innovation in sustainable development. This included enhancing research relating to artificial intelligence in the Philippines, implementing science and innovation policy instruments and strengthening governmental institutions through digital transformation.

104. Lastly, in several case studies, the need for community and grass-roots involvement in innovation and in the application of technology was highlighted, showcasing the mapping of food security technologies, exploring contributions by grass-roots innovators towards achieving the Sustainable Development Goals and emphasizing the importance of engaging the public continuously in technological and environmental adaptations.

Science-policy briefs

105. Science-policy briefs submitted to the forum covered a wide range of critical and timely topics, each designed to integrate scientific innovation with the Sustainable Development Goals, while also addressing key societal and environmental issues.

106. Several briefs were focused on sustainable biomanufacturing and medicine supply, such as using plant molecular farming to boost regional biomanufacturing capacities, which could offer fast, resilient and cost-efficient medical supplies globally. The local production of essential drugs also featured prominently, with a view to ensuring sustainable health in low- and middle-income countries.

107. In the realm of education and capacity-building, briefs contained proposals on ways to empower young science leaders and revisit engineering education to be better aligned with Sustainable Development Goals. This included cultivating an understanding among young professionals that they are agents of change within their regions.

108. Environmental sustainability was a key theme, with numerous submissions featuring discussions on the transition to a circular economy through waste valorization and explorations of the synergy between climate action and biodiversity. There was a distinct focus on sustainable energy transitions influenced by new societal trends and technology in Europe, as well as on the creation of nature-based industrial solutions for inclusive sustainable development.

109. Technology and innovation were also central, with briefs featuring discussions on the implications of artificial intelligence in various fields such as scientific research and health surveillance, as well as ethical considerations in neurotechnology. The potential for and challenges involved in implementing artificial intelligence and other emerging technologies in global settings were considered, in particular in terms of their environmental impacts, such as excessive water use by artificial intelligence systems.

110. Public health and food security were explored through discussions on maximizing the functionality of ocean observing systems to manage marine ecosystems and on using nano fertilizers for food security in sub-Saharan Africa. In addition, science diplomacy and discussions around macroalgae culturing were aimed at addressing global food security challenges.

111. Inclusion and equity formed another critical aspect, with policies suggested to improve gender sensitivity in the fields of science, technology, engineering and mathematics and address disparities in maternal mortality. The promotion of female participation in those fields overall, and in engineering specifically, was highlighted as crucial for future development.

112. Collectively, the briefs served to underscore a multidisciplinary approach to policymaking, where science and technology intersect with sustainability, education, public health and inclusive economic growth to tackle global challenges effectively. All parts of the world are affected by the most recent and extremely fast progress made in, and applications of, frontier technologies in multiple areas, which highlights not only the importance of rapid skills-building, but also the need to use the most up-to-date digital and artificial intelligence technologies to monitor and understand those rapid changes in real time. Developments build on increasingly interdependent infrastructures, continuously leading to new technological divides, even as poorer countries catch up on basic connectivity. Moreover, the next high-tech waves emerging from basic research labs are rapidly remaking development models. Significantly more funding will be needed for basic research, for university-industry collaboration and for mission-driven innovation.

III. Recommendations for consideration

113. Many practical examples were highlighted at the forum, and recommendations for action were proposed by Governments, the United Nations system, scientists, academia, civil society and the private sector. In addition to the wider range of issues outlined in section II, the recommendations set out below may be considered.

A. General and thematic recommendations

114. Science, technology and innovation, and in particular digitalization and artificial intelligence, hold great potential to facilitate key transitions across sectors such as agriculture, energy, health care and education. To achieve the Sustainable Development Goals in those areas, the training of artificial intelligence models must be refined, the acquisition and utilization of data must be improved and respect for human rights and privacy must be upheld. Robust oversight for multinational companies that develop those technologies is necessary, in order to ensure an equitable digital transformation. To remain timely, discussions on how digitalization and artificial intelligence could expedite progress on Sustainable Development Goal achievement and help to manage trade-offs should continue at the United Nations throughout the year.

Funding and capacity for Sustainable Development Goal-related research and innovation

115. Enhanced funding is crucial for Sustainable Development Goal-focused research and innovation, through both reallocating existing finances and attracting new investments from partners such as the private sector. Public research funders worldwide should improve coordination and consider close collaboration with the United Nations system to generate a significant impact beyond 2030.

116. International cooperation in science, technology and innovation, multi-stakeholder partnerships and community engagement are vital. Networks for research relating to the Sustainable Development Goals can facilitate collaboration and boost funding. The early involvement of national practitioners enhances technology adoption and builds research and development and innovation ecosystems, especially in developing nations.

117. Governments are encouraged to increase spending on basic or applied research with a focus on the Sustainable Development Goals by an additional 3.7 per cent annually between 2025 and 2029.[2] Funding selections should prioritize international collaborations, encouraging funders to jointly issue open calls for proposals and to select and finance research projects. Public funders should also seek matching funds from the business sector.

Cooperation on climate change among actors in science, technology and innovation

118. Climate change and other interconnected crises require integrated approaches that promote cooperation, facilitate the sharing and exchange of knowledge and data and break down silos between disciplines, Governments, academia, civil society and the private sector.

119. Digital divides threaten to undercut innovation efforts to address climate change. To address that requires international partnerships to implement knowledge-sharing and technology transfer in a way that prioritizes infrastructure, capacity and skill-building.

[2] This would increase public funding for research and development by 20 per cent from 2025 to 2029 and would, ideally, be measured against the average yearly expenditure executed for the pre-pandemic period of 2016–2020.

Bridging science, technology and innovation divides to end poverty and hunger

120. Accessible technology, infrastructure and youth empowerment are needed for reducing poverty and enhancing food security.

121. Youth empowerment programmes need to be expanded, with a focus on entrepreneurship and digital skills training. They should be designed to specifically target rural and impoverished areas to equip young people with the knowledge and resources needed to harness science, technology and innovation for socioeconomic development.

Science, technology and innovation in small island developing States

122. International cooperation and support are needed for small island developing States, which face special challenges in developing their science, technology and innovation ecosystems, including low levels of investment in research and development, inadequate access to financing, a lack of high-quality disaggregated data and limited budgetary resources for education.

123. Science, technology and innovation solutions must be demand-driven, growing out of local lived experience and priorities and capitalizing on community, national and regional capacities, while encouraging partnerships of all shapes and sizes. Small island developing States are prioritizing a whole-of-society transformational approach and can bring their "know-how" and "show-how" to the table to enhance science, technology and innovation applications across regions.

124. Systematic efforts need to be made to transform small island developing States into "small island digital States".

Digital innovation for sustainable peace and resilience in the context of climate change

125. Numerous digital tools leverage innovation for sustainable peace and resilience in the face of climate change, which is essential for long-term planning and development milestones. Artificial intelligence serves to improve understanding of climate hazards, enhance scenario modelling and strengthen social resilience. Governments should adopt standard software solutions to expedite digitalization and incorporate best practices.

126. There is a need for higher artificial intelligence system efficiency and safety standards to minimize the use of electricity, water and materials by such systems, while ensuring human rights protections and reducing bias.

127. The multilateral system should establish norms and guidelines for technology and innovation that are aligned with human rights standards. Engaging all stakeholders is crucial in developing international standards for cybersecurity, genetic material usage, artificial intelligence applications and data governance, to ensure equitable participation in these critical discussions.

Women-centred science and technology solutions

128. Science, technology and innovation solutions should be aimed at addressing the challenges faced by and opportunities open to all women and girls.

129. Gender-responsive education and training helps to enhance digital literacy among women and girls, in turn protecting their rights, promoting their economic and social empowerment and ensuring safe environments, while breaking down harmful gender-based norms and bias.

Science, technology and innovation partnerships in African countries, the least developed countries and landlocked developing countries

130. There is an urgent need for additional support for countries in special situations, such as African countries, the least developed countries and landlocked developing countries.

131. As technology and innovation grow increasingly complex, more human and physical capital is needed to keep up with rapid technological advancements in leading economies. It is crucial to ensure that the gap between those benefiting from science, technology and innovation and those left behind begins to narrow.

B. Recommendations by the 10-Member Group

132. The newly appointed 10-Member Group led the thematic sessions and, among other things, suggested a number of proposals and recommendations for impactful policies and initiatives, to be refined in the coming months, including in the following areas:

(a) Document best practices and develop reliable and fine-grained data on advancing gender equality in science, technology and innovation;

(b) Develop innovative ideas and practical partnerships for cooperation on funding research and development for the Sustainable Development Goals;

(c) Build a United Nations collaboration hub or centre for a sustainable and safe built environment to support decent living standards. The hub could be focused on decarbonizing building materials, provide strategic foresight or road maps on infrastructure transformations and materials, provide information on technology options, social and institutional innovations and help in understanding synergies and trade-offs and in monitoring progress;

(d) Produce synthetic (technology-enabled) data to monitor Sustainable Development Goal-related progress in agriculture, the built environment, oceans and poverty and socioeconomic development, by leveraging artificial intelligence, satellite and remote sensing data, among other things;

(e) Provide science-policy advice on safe and just targets, boundaries and transformations, in follow-up to the findings of the Earth Commission, including on minimum access indicators, climate commitments and just and inclusive energy transitions;

(f) Track and assess emerging applications and their benefits brought about by the convergence of artificial intelligence and biotech, especially for agriculture and food security;

(g) Provide expert support and training on strategic governance for and regulation of science, technology and innovation and for institutions for science, technology and innovation policy, especially in small island developing States, the least developed countries and African countries.

C. Recommendations for the Technology Facilitation Mechanism

133. The science, technology and innovation forum is a part of the wider Technology Facilitation Mechanism that brings together knowledge and stakeholders to enable science, technology and innovation to support delivery on the Sustainable Development Goals.

134. The Mechanism has made significant strides in promoting science-based, solution-oriented, multi-stakeholder and collaborative approaches to support the achievement of the Sustainable Development Goals. It has become an unprecedented new United Nations entry point for science and technology communities and has led to many complementary multi-stakeholder partnerships and actions. However, significantly more resources are needed to support the Mechanism for it to be commensurate with the ambitions of the 2030 Agenda.

135. The 10-Member Group serves as an active and engaged part of the Mechanism. Building on recommendations made by the Group prior to 2024, the 10-Member Group highlighted a number of actionable recommendations that could provide inputs for deliberations on science, technology and innovation-related United Nations processes and initiatives. The role of the Group in providing scientific and technological advice and in engaging expert communities should be strengthened and adequately resourced.

136. The United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals continues to serve as an effective United Nations system arrangement for collaboration at the working level. Each participating United Nations entity contributes to the work of the task team within its existing resources and based primarily on volunteer efforts. Despite persistent funding shortages, the task team has supported collaboration and enhanced partnerships on road maps on science, technology and innovation for the Sustainable Development Goals, emerging science and technologies, capacity-building, research and gender equality in science, technology and innovation, among other efforts. The task team should be reinforced and properly funded to expand its outreach and fully inform Member States of its benefits.

137. Forum participants heard calls for further enhancing ties between the Technology Facilitation Mechanism and the research funding organizations of the world, multilateral development banks, international financial institutions and donor countries, as well as with related regional or thematic forums and initiatives on science, technology and innovation across the United Nations system, including the Commission on Science and Technology for Development.

138. The Technology Facilitation Mechanism can broker connections for new types of collaboration and co-creation throughout the research, technology and innovation cycles. Through enhanced dialogue, open science and strategic funding, common goals for solutions can be focused and prioritized and knowledge and resources shared more widely.

139. However, significant areas for improvement of the Mechanism's science-policy interface remain, especially in terms of effectiveness, reach and scale, as well as in terms of fully coherent cooperation across the United Nations system.