High-level political forum on sustainable development
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8–18 July 2024

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 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, Her Excellency Christina Markus Lassen, Ambassador and Permanent Representative of Denmark to the United Nations, and Her Excellency Inga Rhonda King, Ambassador and Permanent Representative of Saint Vincent and the Grenadines to the United Nations, were appointed by the President of the Council. This summary is circulated pursuant to paragraph 123 of the Addis Ababa Action Agenda (GA resolution 69/313) and paragraph 70 of the 2030 Agenda for Sustainable Development (resolution 70/1).

1 The report was delayed due to technical reasons.
I. Introduction

1. This 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 (STI Forum). It brings together a diverse set of views articulated through both formal and informal statements provided by representatives of governments, the UN-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, H.E. Paula Narvaez, convened the ninth annual STI Forum – one component of the Technology Facilitation Mechanism (TFM). The Forum is a venue to discuss cooperation in science, technology and innovation (STI) around thematic areas pertaining to the implementation of the Sustainable Development Goals (SDGs). It is mandated to facilitate interaction, networking, and the establishment of networks and multi-stakeholder partnerships. It discusses technology needs and gaps, promotes scientific cooperation, innovation, and capacity-building, and examines the impact of rapid technological change on sustainable development perspectives.

3. H.E. Christina Markus Lassen, Ambassador and Permanent Representative of Denmark to the United Nations, and H.E. Inga Rhonda King, Ambassador and Permanent Representative of Saint Vincent and the Grenadines to the United Nations, co-chaired the Forum. The Forum was jointly organized by the UN Inter-agency Task Team on Science, Technology and Innovation for the Sustainable Development Goals (IATT), coordinated by DESA and UNCTAD, as well as by the United Nations Group of Ten High-level Representatives of Civil Society, Private Sector and Scientific Community to Promote Science, Technology and Innovation for the SDGs (10-Member-Group), appointed by the Secretary-General and serviced by DESA. The 10-Member-Group, inter alia, moderated and substantively led the thematic sessions.

4. The Forum was held in person at UN headquarters in New York. This year’s theme was “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 SDGs, namely artificial intelligence (AI) and climate change, guided by a substantive background note prepared by the 10-Member-Group. Importantly, the Forum discussed the specific STI challenges that Small Island Developing States, Least Developed Countries, Landlocked Developing Countries, and African Countries face.

6. The Forum featured concrete solutions and innovations to support progress across the SDGs 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, like inflatable, 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 to raise attention among policy makers of the latest emerging issues in support of the Forum’s deliberations. 99 of the briefs passed the peer-review and were made available on the Forum’s website.
The Forum was well attended by scientists, innovators, technology specialists, civil society, entrepreneurs, innovators, and by representatives of governments, UN system, academia, civil society, youth and private sector. Eight ministers and four high-level delegates spoke during the Ministerial segment. The official programme of the Forum featured over 80 key speakers, and numerous more spoke in 46 side events. There were 600 registered stakeholder participants in addition to more than one hundred Member States representatives and a comparatively larger online audience via UN WebTV.

II. Highlights of discussions at the STI Forum

A. Overview and high-level segment

9. The Forum deliberated on the role of STI in reinforcing progress towards the 2030 Agenda in times of multiple crises, especially SDG1 on eradicating poverty, SDG2 on zero hunger, SDG5 on gender equality, SDG13 on climate action, SDG16 on peace, justice and strong institutions, and SDG17 on partnerships, which are under review at the July session of the High-Level Political Forum (HLPF) on Sustainable Development this year.

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

11. The Forum aimed to ignite inspiration and address apprehensions and challenges surrounding the use of STI for sustainable development. This included strengthening political leadership with clear research & development (R&D) plans, and strategies to align technological advancements with the 2030 Agenda. Collective efforts are needed to leverage STI for the SDGs, fostering action-oriented collaboration across borders and sectors to bridge divides and drive progress, and inspiring hope and empowering women and youth to face the complex challenges.

12. The opening of the Forum featured statements by H.E. Ms. Paula Narvaez, President of the Economic and Social Council, and H.E. Mr. Dennis Francis, President of the General Assembly. Two keynote speakers set the scene for the Forum, Mr. Selwin Hart, Special Adviser to the Secretary-General on Climate Action and Just Transition, and Dr. Daniela Braga, Founder and CEO of Defined.ai.

13. Selected messages and highlights of the Forum are presented in the remainder of this 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 the SDGs that are under review by the HLPF in July 2024, as well as ways to support effective delivery of sustainable, resilient, and innovative solutions: Armenia, Belize, the European Union, Georgia, the Philippines, Poland, Serbia, Tajikistan, Turkey, and the United States of America, as well as Belize on behalf of the Caribbean Community, and Uganda on behalf of the
Group of 77 and China. The Forum also heard remarks from Mr. LI Junhua, UN Under-Secretary-General for Economic and Social Affairs and a report on the 27th session of the Commission on Science and Technology for Development by H.E. Mr. Muhammadou M.O., Kah. The following is a selective list of issues, challenges, and recommendations that were raised.

15. The Forum, with its focus on AI, climate action, and the SDGs was an opportunity to look toward the future and redirect global efforts towards the SDGs. It is undeniable that the path forward requires collaborative, inclusive, and innovative approaches that ensure the benefits of technological advancements are shared by all, particularly the most vulnerable, ensuring a resilient, equitable, and prosperous future for all nations and communities.

16. The convergence of accelerating climate change and rapid AI progress presents both formidable challenges and unprecedented opportunities for SDG implementation. The transformative power of science, science advice, and a wide range of technology solutions can accelerate progress across all SDG domains.

17. Small Island Developing States (SIDS), African countries, Least Developed Countries (LDCs), and Landlocked Developing Countries (LLDCs) face distinct challenges that necessitate tailored STI policy support. SIDS are particularly vulnerable to climate change, with economic losses from climate-related disasters averaging 2-3% of GDP, constraining funds for technological development. African countries urgently need to invest in education and innovation ecosystems and bridge digital divides, given that only 37% had Internet access in 2023, well below the global average. LDCs need focused support to tackle structural obstacles through STI, including promoting technological entrepreneurship and infrastructure investment. LLDCs experience 1.4 times higher trade costs than their coastal counterparts, limiting their access to global markets.

18. STI play a critical role in addressing national and international challenges, including climate change, healthcare, and education. Advanced technologies, such as “smart” automation and AI, if used correctly, could reduce poverty and hunger, and promote good health and well-being, in line with SDG aspirations, but their potential for many countries is limited by inadequate funding.

19. Concrete actions, partnerships, and fresh ideas are needed for the upcoming HLPF, and the Summit of the Future in September 2024. Empowering women and young scientists, and fostering international networks is crucial. Multi-stakeholder cooperation, involving scientists, national governments, universities, communities, civil society and private sector, is fundamental for scientific breakthroughs and the achievement of the SDGs.

B. Thematic discussions

20. A major 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.

AI and climate change – the Forum’s cross-cutting focus areas

21. AI is reshaping the landscape of possibility across all sectors. From agriculture, where AI-driven precision farming could increase yields by up to 70% by 2050, to healthcare, where AI algorithms improve diagnosis and treatment, the potential is huge. Economically, AI's contribution is predicted to reach up to 7% of global GDP by 2030.
22. However, this rapid ascendancy brings with it significant challenges. For instance, AI is expected to automate and potentially eliminate up to 400 million jobs by 2030, while creating new ones, altering the very structure of the global workforce.

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

24. The environmental footprint of AI is significant. Data centres alone consume about 1% of global electricity demand. This consumption exacerbates the demand on our energy grids which are too often powered by non-renewable sources. AI already causes more GHG emissions than the global airline industry. AI also uses much freshwater for onsite cooling of its servers and for electricity generation. And AI leads to huge amounts of electronic waste.

25. On the other hand, AI promises higher system efficiencies. AI can improve climate and energy planning, optimize resource use, and monitor deforestation and biodiversity loss. If focused on efficiency improvements, AI could potentially reduce global GHG emissions by 4% by 2030, instead of increasing them. Therefore, it is important to adopt and ratchet up energy and water efficiency standards for AI 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 this year, atmospheric CO$_2$ concentrations have reached a record of 423ppmv, higher than in millions of years. Immediate global action is needed to reduce these emissions by 45% by 2030 - compared to 2010 levels- and even 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. The SDG targets across Goals highlight ambitious objectives for all these climate-relevant economic activities. Science has further explored thresholds for key domains, such as aerosols, climate, water, biodiversity, and nutrients, beyond which these bio-geophysical systems could collapse, leading to significant harm to humans and nature.

28. According to the Earth Commission, 7 of 8 global thresholds have been crossed, concerning 52% of the world’s land area where 86% of the people live. If not addressed today, this threatens to undo decades of development progress. These thresholds have been breached even as decent living needs are not being met for billions. To achieve a safe and just pathway for all on this planet, we need to eradicate poverty and hunger and reduce the damage to the Earth systems on which all our wellbeing ultimately rests.

29. The 2030 Agenda is all about “leaving no one behind”. To ensure that emerging technologies contribute to the advancement of this promise, we must include the incorporation of a human-rights based approach. The needs of the poorest must be met not just with any technology but with best available, high performing technologies. Such an approach could ensure access to food, water, energy and infrastructure while maintaining a healthy environment.
More and more effective funding and capacity for SDG related research and innovation in all regions (SDG17)

30. The Forum explored global research cooperation and funding to achieve the SDGs, with special attention to the needs of developing countries. It underscored the critical role of international research collaboration in addressing complex global challenges such as poverty, inequality, climate change, AI, and health crises.

31. Policies are needed that facilitate increased and more effective funding allocations to SDG-related research, especially in underfunded regions. This includes innovative funding mechanisms that support international consortia and collaborative research projects, and increased funding for bridging divides in STI capacity. Public and private sectors need to be incentivized to invest in both fundamental and applied research that supports the SDGs.

32. The world-wide distribution of R&D resources remains highly inequitable – across countries and population groups. Despite increasing global volumes of R&D, there is a significant concentration of investment in developed countries and China. And women-founded startups account for only 2% 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 globally challenge effective international collaboration in SDG-related research. Despite these hurdles, capacity-building initiatives over the past decades show progress; by 2023, 57% 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, 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 among the UN, research funding organizations (RFOs), and other stakeholders are essential to align global research initiatives with the SDGs and optimize investment impacts.

35. RFOs play a crucial role in structuring and supporting research that contributes to the SDGs. Examples include significant initiatives by RFOs in South Africa, Brazil, and China, which focus on collaborative and thematic research aimed at specific SDGs.

36. Advancements in data analytics and tagging in bibliometric databases can help measure and evaluate the impact of research funding on SDGs progress and help in designing policies and determining the effectiveness of research collaborations.

37. Open science and accessibility initiatives need to be promoted to ensure that research findings are accessible to all and foster a truly global exchange of knowledge and innovations. This approach is vital for shared scientific advancement and the global achievement of the SDGs.
Strengthening scientific cooperation, technology and knowledge sharing and accelerating innovation for integrated climate action (SDG13)

38. The Forum explored how STI can help respond to climate change and its interconnected crises while accelerating the achievement of the SDGs, including by supporting the transformation of key sectors and by building on open knowledge to create localized and inclusive solutions.

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

40. STI 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 empower developing nations through STI 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, amplifying diverse and underrepresented voices.

41. Digital divides pose significant challenges, as disparities in capacity, skills, and infrastructure can impede innovation, particularly 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, 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 mitigate AI-associated risks that could exacerbate divides and inequities.

43. A holistic, multi-disciplinary approach is necessary, integrating sustainable development and climate action across all sectors. This approach requires partnerships between governments, industry, academia, and inclusive co-creation involving youth, women, indigenous peoples, and marginalized groups.

44. Strong international partnerships focused on infrastructure, capacity, and skill-building are essential to support 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 (SDGs 1 and 2)**

45. When exploring the potential of STI in bridging the divides to eradicate poverty and end hunger, the Forum acknowledged that, despite all our efforts, progress towards SDG1 and SDG2 has remained insufficient.

46. This situation has significantly worsened since 2020 with 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. STI can help reversing these trends and accelerate progress.
47. Questions of poverty, food security and nutrition are particularly intertwined in the lives of rural, 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 STI 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 is a crucial opportunity to invest in research, innovation, and infrastructure development, while leveraging locally nurtured STI solutions and indigenous knowledge. Integrated agricultural research, vocational training for young farmers, and development of digital infrastructures remains key.

49. However, major challenges such as accessibility and affordability of STI solutions, particularly in developing countries, alongside digital literacy and connectivity issues, especially in rural and marginalized areas, remain to be tackled by transformative and inclusive policy making.

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

Building ecosystems for STI to drive economic growth and sustainable development in Small Island Developing States

52. The Forum aimed to explore the potential of STI in driving economic growth and sustainable development in SIDS, while focusing on evaluating the current state of STI, identifying the unique challenges faced by SIDS, and uncovering opportunities for leveraging STI to overcome these challenges and achieve resilient prosperity, including in disaster risk reduction, renewable energy, agriculture, health, marine science and fisheries, and governance-related technology, among others.

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 SIDS share common obstacles to the growth and development of their STI ecosystems.

54. STI can be a crucial tool to overcome specific SIDS challenges, promote prosperity and wider sustainable development. Higher investments in R&D can support youth unemployment, improve the availability of high-quality, disaggregated data, and in the longer run improve access to financing and budgetary resources for education.

55. The SDGs will not be achieved without safe, affordable, inclusive, and meaningful global connectivity for all. Groups that are economically and socially disadvantaged, should not be excluded in terms of technology as well.

56. The reality for many SIDS is that offline inequalities are also reflected online and that part of the population remains unconnected to the Internet. Many SIDS struggle with underdeveloped STI infrastructure, in terms of telecommunications systems, institutions, and innovation governance.
57. AI applications can advance sustainable development but also pose challenges. In climate-vulnerable countries, AI can analyze satellite imagery before and after disasters to pinpoint affected areas and aid in developing resilience programs. However, emerging technologies carry risks, such as the lack of local data potentially leading to biases in global AI models.

58. Strengthening partnerships between North-South, South-South, and SIDS-SIDS is crucial for enhancing SIDS STI ecosystems and ensuring that global digitalization promotes inclusive growth and innovation. Notable initiatives include the announcement of a program of the International Research Center of Big Data for Sustainable Development Goals in China which offers big Earth data utilization training to all 39 SIDS.

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

59. The Forum 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 SDG16 holds the promise of achieving more inclusive, just and peaceful societies, and serves as a great enabler for all the other SDGs, efforts towards preventing and reducing violence, access to justice for all, inclusive governance, and 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, 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 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. While technology offers significant potential to address challenges like climate change, food insecurity, and environmental degradation, effective regulations are necessary to ensure that its benefits outweigh its risks.

62. Rapid adoption of AI applications, most recently including generative AI, highlights their usefulness. Policy makers need to anticipate these changes and be explicit about addressing the inequalities and exclusion that may be caused by them.

63. AI can enhance cost-efficient sensing and data collection for early-warning systems in regions with inadequate infrastructure, particularly by helping governments and organizations in humanitarian, development, and climate adaptation efforts utilize remote sensing and satellite imagery effectively. However, policymakers and stakeholders must responsibly address potential downsides of these technologies, such as unsustainable energy use, misinformation, bias, and increasing public distrust.

64. Integrated, science-informed, and proactive policies are essential to develop transformative digital and frontier technologies that align with sustainable development goals. To maximize their potential, equitable access to data, technology, information, infrastructure, and resources is crucial for international support and cooperation.
65. STI plays a critical role in ensuring peace and security by addressing issues that contribute to social unrest, political crises, and unsustainable migration. National and multilateral policies should recognize the contributions of the social sciences and aim for science engagement to promote social cohesion.

**Advancing sustainable development with women-centered science and technology solutions**

66. The Forum explored the intersection of gender equality and STI solutions for sustainable development. It showcased the successes and challenges of diverse initiatives from governments, international organizations, business and civil society in forging innovative women-centered solutions in science and technology, to advance sustainable development. These include women-led initiatives for sustainable development, as well as solutions that specifically target women’s needs.

67. While gender equality and the empowerment of women and girls is a fundamental human right and a foundation for a peaceful and prosperous future, the world is currently not on track to achieving gender equality and the empowerment of women and girls by 2030 and STI solutions are rarely designed with women’s perspectives in mind.

68. There is great need of concrete strategies to empower women throughout all stages of STI 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 communities most likely to be impacted by AI to develop ethical frameworks, prioritizing fairness and accountability, and establishing monitoring processes for AI systems. Ongoing commitment and vigilance to ensure equitable participation in STI are necessary.

69. Challenges such as lack of awareness, infrastructure, and funding, along with disengagement of girls in science, technology, engineering and mathematics (STEM) and entrepreneurship, need to be addressed. Investment in STI solutions is seldom directed to address the challenges or opportunities faced by women and girls the world over. Digital literacy among women and girls, aiming to equip them with the necessary skills for the digital era, must be promoted in order to achieve digital equity.

70. On top of the gender digital divide, the unjust treatment of women in healthcare is yet another challenge faced by women and girls. There is urgent need for gender-equitable solutions in healthcare to address disparities and advance women’s well-being. The trillion-dollar impact worldwide due to the loss of women’s health and its residual effects on households stresses the economic imperative of rectifying these disparities.

71. The significance of global partnerships and financial investments in closing the gender gap in STI cannot be understated. Collaborative efforts to empower women and girls through STI are key to reinforce the 2030 Agenda for Sustainable Development.

**STI partnerships for accelerating structural transformation in African countries, Least Developed Countries and Landlocked Developing Countries**

72. The Forum emphasized the necessity of partnerships in STI to drive structural transformation, leading to economic diversification and more sophisticated productive capacities and technological capabilities in African countries, LDCs, and LLDCs.
73. Structural transformation is essential for economic diversification and sophisticated technological capabilities and development, helping the LDCs escape commodity dependence. It relies on technological learning and innovation, which is why enhancing technological capabilities is vital. 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 STI ecosystems in LDCs, LLDCs, and many African countries. Major disparities in STI capabilities exist between countries. These gaps manifest in R&D investment, scientific output, and policy environments, with developed countries outspending lower-income nations by 65 times in R&D and dominating frontier technology markets, primarily led 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. UNCTAD’s frontier technology readiness index shows that LDCs and some LLDCs and African countries are least prepared to harness these technologies, risking missing out on current opportunities.

76. Beyond the digital divide, the increasing gender, age, and minority gaps call for a balanced STI policy approach. Bridging these divides requires active participation from youth, women, and vulnerable groups and a pluralistic scientific approach to the social costs of digitalization.

77. Including women, youth, and vulnerable groups in the formation of science policies and promoting STEM education are crucial for leveraging technology’s transformative power in fostering empowerment, entrepreneurship, and economic growth. Investing in education and training that equips these groups to utilize STI for sustainable development is essential.

78. Pursuing STI solutions requires careful consideration of sector-specific needs, potential trade-offs, and the risk of increasing inequality. Addressing uneven technology adoption and the potential for STI to exacerbate disparities requires a comprehensive approach that assesses 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. These efforts should enhance digital infrastructure, research funding, and knowledge transfer to tackle shared challenges and encourage regional specialization. Additionally, collaboration among 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. 46 side events were organized by TFM partners, including 17 in-person events at UN headquarters, one off-site in-person event in New York City, and 28 virtual events. Organizers included Member States, UN system, intergovernmental organizations,
academia, organized science and engineering communities and a range of civil society and private sector stakeholders.\(^2\)

**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 SDGs. Technological innovations can help to reduce disparities and ensure benefits for all. They can accelerate sustainability and learning.

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\(^2\) Side event organizers included the Governments of Armenia, Austria, Bahrain, China, Colombia, 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; European Union; Organisation of African, Caribbean and Pacific States; Dag Hammarskjöld Library; Food and Agriculture Organization; International Telecommunication Union; UN Department of Economic and Social Affairs; UN Department of Global Communications; UNDP; UN Economic Commission for Africa; UNESCO; UNEP; UN Geospatial Information Network; UN Global Pulse; UN Habitat Youth Programme; UN Habitat; UNIDO; UN Interagency Task Team on STI for the SDGs; UN Office of Information and Communications Technology; UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States; UN Office of the Secretary-General’s Envoy on Technology; UNCTAD; World Food Programme; WHO; WIPO; African Center for Equitable Development; African Centre for Cities; AFS Intercultural Programs; All European Academies, The European Federation of Academies 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; CAS-TWAS Center of Excellence for Climate and Environment Sciences; CAST UN Consultative Committee on Open Science and Global Partnership; CAST-UN Consultative Committee on Disaster Risk Reduction; Catalyst LATAM 2030; Centre for Training and integrated Research in ASAL Development, 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 Women's Association for Science and Technology; Coalition for the Advancement of Research Assessment’s Working 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; CODATA – ISC; Confederation of Indian Industry; Consejo Superior de Investigaciones Científicas; Ecotece; Elsevier; Engineering for Change; European Commission DG RTG ERIS; European Commission Joint Research Center; European Council for Doctoral Candidates and Junior Researchers; European Open Science Cloud – Future (EOSC-Future); European Research Council; Extreme Tech Challenge; Federation of Finnish Learned Societies; Future Earth; German Center for Research and Innovation; Global Initiative for Digital Rights; GloCha Global Challenges Fdt. NY; Good Clinical Practice Alliance – Europe; 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; Intergovernmental Forum, Dynamic Teen Coalition; International Association for the Advancement of Innovative Approaches to Global Challenges; International Centre for Physics International Organisation of Employers; International Science Council; International Society for Digital Earth; International Youth Conference; New South Institute; On Think Tanks; Pan Africa Great Green Wall; Quantum Ecosystems and Technology Council of India; Red Dot Foundation; Research Data Alliance Europe AISBL; Research Data Alliance International; Samahi Research; Science Technology Engineering & Innovation Policy Asia and the Pacific Network; SDSN Youth, UN Sustainable Development Solutions Network; Sistema B; Slalom Element Lab; Springer-Nature; Stanford Angels & Entrepreneurs; Strategic Initiative for Developing Capacity in Ethical Review; Technology Bank for LDCs; Tecnológico de Monterrey; Tianjin Institute of Industrial Biotechnology; UN Major Group of Children and Youth; UNESCO Regional Office for East Asia; 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; Young Women Leaders for Planetary Health; and Zhejiang Lab
82. Systematic efforts are needed across the world to promote 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 reducing disparities and providing context specific solutions. Technologies and institutions co-evolve, with progress in one area limiting progress in the other. Communities as users tend to know best what type of institutions are needed.

84. Here’s a brief account of the presentations of solutions by young innovators featured at the Forum:

85. Atuservicio Bogotá is a digital platform for municipal services created by Wingu, a nonprofit, which collaborates with marginalized communities to develop inclusive digital tools and enhance social organizations' capabilities in crisis management.

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

87. The Uganda Spiral Water Wheel Pump is a hydraulic machine that utilizes the kinetic energy from flowing water sources like 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 regulatory transparency.

90. Ampersand, Africa's pioneering electric transport energy company, operates a substantial e-motorcycle fleet and battery swapping network, revolutionizing motorcycle transport by making it cleaner and more profitable, thereby accelerating Africa's shift to a zero-carbon future.

91. The Union Island Environmental Alliance developed a grassroots approach to environmental conservation and community resilience. It 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, primarily driven by citizen science. This innovation aids in identifying hot spots, raising awareness, and motivating community action to mitigate air pollution's effects.

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, land planning, and restoration for migrant, host, and refugee communities, supporting policy planning and agricultural capacity building.
95. Resham Sutra's "Unnati Solar Silk" is a solar-powered machine designed for reeling Tassar silk yarn in East India's forested areas, enhancing efficiency and quality of life, particularly for rural women. This innovation, developed in collaboration with local artisans, significantly increases productivity and energy efficiency.

96. Burn Design Lab has developed the Improved Shea Roaster, reducing firewood use by up to 90% and emissions significantly, in partnership with SAYeTECH in Ghana. This innovation, designed with user feedback, has garnered recognition from USAID and several awards in 2023.

**Science-policy briefs and case studies**

97. This year, more than 250 authors – scientists and engineers from academia, NGOs, private sector and the UN system – submitted science-policy briefs and case studies, in response to a call for inputs in English and French languages. 99 briefs passed the peer-review process organized by IATT and its partners.

*Case studies*

98. Case studies submitted to the Forum spanned a variety of topics, focusing primarily on the integration of STI to advance the SDGs 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 in the Philippines aim to modernize agriculture. Others explored 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. This included projects like the digital transformation strategy for Africa, which could benefit telecommunications, and approaches to carbon capture and storage technologies aimed at zero emissions. Additionally, initiatives like decentralized wastewater treatment models and the valorization of industrial waste in Brazil highlighted methods to mitigate environmental impact.

101. Health and climate change intersected in several studies, which looked at 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 IoT technology in adapting to sea level rise in small island states.

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

104. Finally, several case studies highlighted the need for community and grassroots involvement in innovation and technology application, showcasing the mapping of food security technologies,
exploring grassroots innovators’ contributions towards SDGs, 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 SDGs while also addressing key societal and environmental issues.

106. Several briefs 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, aimed at ensuring sustainable health in low- and middle-income countries.

107. In the realm of education and capacity building, briefs proposed ways to empower young science leaders and revisit engineering education to better align with SDGs. 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 entries discussing the transition to a circular economy through waste valorization and exploring 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 the creation of nature-based industrial solutions for inclusive sustainable development.

109. Technology and innovation were also central, with briefs discussing the implications of AI in various fields like scientific research, health surveillance, and even ethical considerations in neurotechnology. The potential and challenges of implementing AI and other emerging technologies in global settings were considered, particularly in terms of their environmental impacts, such as AI’s excessive water use.

110. Public health and food security were explored, with discussions on maximizing the functionality of ocean observing systems to manage marine ecosystems and using nano-fertilizers for food security in sub-Saharan Africa. Additionally, science diplomacy and discussions around macroalgae culturing aim to address global food security challenges.

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

112. The briefs collectively underscored 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 impacted by the latest, extremely fast progress in and applications of frontier technologies in multiple areas, highlighting the importance of rapid skills building as well as the need to use the latest digital and AI technologies to monitor and understand these rapid changes in real-time. Developments are building on increasingly interdependent infrastructures, leading to ever new technology divides, even as poorer countries catch up on the basic connectivity. And the next high-tech waves emerging from basic research labs are rapidly remaking development models. Much greater
funding will be needed for basic research, for university-industry collaboration, and for mission-driven innovation.

III. Recommendations for consideration

113. The Forum highlighted many practical examples and proposed recommendations for action by Governments, the UN system, scientists, academia, civil society, and the private sector. The following may be considered, in addition to the wider range of issues outlined in section II above.

A. General and thematic recommendations

114. STI and especially digitalization and AI hold great potential to facilitate key transitions across sectors such as agriculture, energy, healthcare, and education. To achieve these goals, we must refine the training of AI models, the acquisition and utilization of data, and uphold human rights and privacy. We need robust oversight for multinational companies that develop these technologies to ensure an equitable digital transformation. To remain timely, discussions on how digitalization and AI can expedite SDG progress and manage trade-offs should continue at the UN throughout the year.

Funding and capacity for SDG-related research and innovation

115. Enhanced funding is crucial for SDG-focused research and innovation, both through reallocating existing finances and attracting new investments from partners like the private sector. Public research funders worldwide should improve coordination and consider close collaboration with the UN system to significantly impact beyond 2030.

116. International STI cooperation, multi-stakeholder partnerships, and community engagement are vital. Networks for SDG research can facilitate collaboration and boost funding. Early involvement of national practitioners enhances technology adoption, and builds R&D and innovation ecosystems, particularly in developing nations.

117. Governments are encouraged to increase spending on SDG-focused basic or applied research by an additional 3.7% annually from 2025 to 2029. Funding selections should prioritize international collaborations, encouraging funders to jointly issue open calls for proposals, and select and finance research projects. Public funders should also seek matching funds from the business sector.

STI cooperation on climate change

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

119. The digital divides threaten to undercut innovation efforts to address climate change. To address this requires international partnerships to implement knowledge-sharing and technology transfer that prioritize infrastructure, capacity and skill-building.

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3 This would increase the public R&D funding by 20% from 2025 to 2029 and would ideally be measured against the average yearly expenditure executed for the pre-pandemic period of 2016 to 2020.
Bridging STI 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 specifically target rural and impoverished areas to equip young people with the knowledge and resources needed to harness STI for socioeconomic development.

STI in Small Island Developing States

122. International cooperation and support are needed for SIDS which face special challenges in developing their STI ecosystems, including low levels of investment in R&D, inadequate access to financing, lack of high-quality disaggregated data, and limited budgetary resources for education.

123. STI solutions must be demand driven, growing out of local lived experience and priorities, capitalizing on community, national and regional capacities while encouraging partnerships of all shapes and sizes. SIDS are prioritising a whole-of-society transformational approach and can bring their “know-how and show-how” to enhance STI applications across regions.

124. Systematic efforts need to be made to transform SIDS 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, essential for long-term planning and development milestones. AI improves understanding of climate hazards, enhances scenario modeling, and strengthens social resilience. Governments should adopt standard software solutions to expedite digitalization and incorporate best practices.

126. There is a need for higher AI system efficiency and safety standards to minimize their use of electricity, water, and materials while ensuring human rights protections and reducing biases.

127. The multilateral system should establish norms and guidelines for technology and innovation that align with human rights standards. Engaging all stakeholders is crucial in developing international cybersecurity, genetic material usage, AI regulations, and data governance standards, ensuring equitable participation in these critical discussions.

Women-centered science and technology solutions

128. STI solutions should be directed to address the challenges or opportunities faced by all women and girls.

129. Gender-responsive education and training is useful to enhance digital literacy among women and girls, for protecting their rights, promoting their economic and social empowerment and ensuring safe environments, and for breaking down harmful gender-based norms and biases.

STI partnerships in African countries, 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, 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 STI and those left behind begins to narrow.

**B. Recommendations by the 10-Member-Group of High-level Representatives**

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

   a. Documenting best practices and develop reliable and fine-grained data on advancing gender equality in STI.

   b. Developing innovative ideas and practical partnerships for cooperation on funding R&D for the SDGs.

   c. Building a UN collaborating hub/centre for a sustainable and safe Built Environment to support decent living standards. The hub could focus on decarbonizing building materials, provide strategic foresight/roadmaps on infrastructure transformations and materials, provide information on tech options, social and institutional innovations, and help understand synergies and trade-offs, and monitor progress.

   d. Synthetic (technology-enabled) data production to monitor SDG progress in agriculture, built environment, oceans, and on poverty and socio-economic development, leveraging AI, satellite and remote sensing data, among others.

   e. Science-policy advice on safe and just targets, boundaries and transformations (in follow-up to the Earth Commission’s findings), 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 AI and biotech, especially for agriculture and food security.

   g. Providing expert support and training on strategic STI governance, regulation, and institutions for STI policy, especially in SIDS, LDCs, and Africa.

**C. Recommendations for the Technology Facilitation Mechanism**

133. The STI Forum is a part of the wider Technology Facilitation Mechanism that brings together knowledge and stakeholders to enable STI to help deliver on the SDGs.

134. The Mechanism has made significant strides in promoting science-based, solution-oriented, multi-stakeholder, and collaborative approaches to support SDG implementation. It has become an unprecedented new UN 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 for Sustainable Development.

135. The 10-Member-Group of High-level Representatives serves as an active and engaged part of the TFM. Building on previous 10-Member-Groups, the latest edition of the Group has highlighted a number of actionable recommendations throughout the Forum which could provide inputs for deliberations on STI-related UN processes and initiatives. The Group’s role in providing
scientific and technological advice and in engaging expert communities should be strengthened and adequately resourced.

136. The IATT continues to serve as an effective UN system arrangement for collaboration at the working level. Each participating UN entity contributes to the work of the IATT within its existing resources and based primarily on volunteer efforts. Despite persistent funding shortages, the IATT has supported collaboration and enhanced partnerships on STI4SDG roadmaps, emerging science and technologies, capacity building, research, and gender equality in STI, among others. The IATT should be reinforced and properly funded to expand its outreach and fully inform Member States of its benefits.

137. The Forum 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 STI across the UN system, including the UN 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, we can focus and prioritize our common goals for solutions and share our knowledge and resources more widely.

139. However, there also remain significant areas for improvement of the Mechanism’s science-policy interface, especially in terms of effectiveness, reach, and scale, and in terms of fully coherent cooperation across the UN system.