

STATEMENT

1. The 20th Annual Meeting of the Science and Technology in Society *forum* took place from October 1 to 3, 2023 in Kyoto, with the participation of nearly 1,500 global leaders in science and technology, policymaking, business, and media from over 80 countries, regions, and international organizations.

Artificial Intelligence

2. One of this year's revolutionary advancements is the emergence and rapid progress of generative AI. This innovation signifies progress in science and technology, offering the potential to connect disparate fields of knowledge, extract essence from each, and integrate them in previously unimaginable ways. However, integrating AI into daily life presents risks and challenges. We must carefully evaluate the technology, recognizing both its potential and its challenges, to ensure that its benefits are universally shared and not divisive.

3. The rapid rise of Artificial Intelligence (AI) has had a transformative impact, but its dependence on vast internet-fed human data raises concerns about bias, job displacement, misinformation, and opacity in algorithms, challenging various aspects of society. Despite its potential, many experts worry about embracing AI without addressing these issues, underscoring the need for a clear approach as humanity deepens its collaboration with machine-based intelligence.

4. The advancement of AI also holds significant potential to revolutionize the field of healthcare. However, obtaining large-scale medical data can be challenging and may suffer from incompleteness or bias. The quality of data used to train AI algorithms is also crucial for their accuracy. These issues highlight the need for establishing frameworks and ongoing monitoring to expand the benefits of AI in the field of healthcare.

Digital Equity

5. Digital technology has facilitated and transformed almost every aspect of our lives, including communication, education, research, business, and healthcare. However, since the beginning of this digital revolution, its impact has been uneven and currently, about one-third of the world's population remains unconnected to the internet. Unequal access and distribution of digital technology limit individual opportunities and deprive the global community of diversity in ideas and contributions that drive innovation. Finding ways to bridge the digital divide is an urgent challenge.

Trust in Information

6. In contemporary society, trust in information is indispensable for personal choices, business decisions, and government policies. Various risks challenge this trust, from misinformation and disinformation to biases and lack of transparency. Data manipulation and ethically questionable research also erode trust in information sources, as do security breaches. Ultimately, distrust in information exacerbates social and political divisions, hindering constructive dialogue and decision-making. These risks must be acknowledged and addressed through policy-making and multifaceted collaboration.

Climate Change

7. There is a broad scientific consensus that increased CO₂ concentration in the atmosphere is a driving force behind climate change. Despite commitments from countries worldwide to reduce emissions, we have yet to reverse the trend of increasing emissions. To achieve net-zero emissions within the necessary timeframe and avoid unacceptable environmental consequences, we require technology development, infrastructure investment, and policy changes. The industrial sector poses the most challenging and time-consuming task in terms of decarbonization due to its complex energy use. Considering the difficulty of complete decarbonization in some sectors, we must explore negative emissions options to offset remaining emissions. But these efforts at mitigation of GHGs emissions, must be accompanied by expanded efforts at adaptation and resilience, especially for the poorest and most vulnerable populations, who are already suffering the consequences of the extreme weather events.

Food and Water Security

8. With the evidence of global warming now incontrovertible, and ever-increasing amounts of greenhouse gases in the atmosphere, food and water security in the global system are central to the well-being and potential survival of many millions of people. Climate change is only one of many stressors on the global system, among them environmental destruction and regional and global conflict, all in the context of increasing incidences of natural disasters.

The food and Agricultural Sector is currently the major consumer of water withdrawals, and is also a major emitter of GHGs.

Yet it also has enormous wastage and much of the food produced never reaches the consumer. Thus mobilization of new technologies, from genetically improved crops to the use of remote sensing and ICT to optimize soil, water and nutrient management, in a Climate Smart Agriculture (CSA) and precision agriculture is essential.

Biodiversity

9. A 2005 report by the Millennium Ecosystem Assessment found that 60% of global ecosystem resources were degraded or unsustainably used. In 2019, the Intergovernmental Platform on Science-Policy Advice on Biodiversity and Ecosystem Services warned that one million out of eight million species are threatened with extinction. Despite a 2010 plan to halt biodiversity loss, none of the 20 Aichi Biodiversity Targets were met by 2020. After four years of negotiation, the Kunming-Montreal Global Biodiversity Framework was adopted in December 2022, aiming to protect biodiversity, restore ecosystems, and safeguard indigenous rights. It set a goal to putting 30% of the planet under protection by 2030 and increasing financing for developing nations, emphasizing the vital role of the private sector in addition to government responsibilities. The global Gene Banks are a vital resource for humanity, and the very large collections of accessions need to be fully genetically analyzed and catalogued, to increase the searchability and analytically driven utilization of the sample accessions.

Preparing for the Next Pandemic

10. Preparing for the inevitable next pandemic is the highest priority for humanity. The rate at which zoonotic infections are affecting human populations is likely accelerating, primarily associated with climate change, and thus monitoring diseases in both wildlife and domesticated animals is crucial. To ensure quick delivery of tests, vaccines and treatments in an unfolding pandemic, rapid sharing of data and sequence information is vital. Testing, tracing, and containing any new pandemic are essential, as are establishing research protocols and infrastructure and keeping them on standby in preparation for the next pandemic. Much greater equity in the access to tests, vaccines and therapeutics should be ensured for all regions and people.

Basic Science

11. Today, we face ever greater challenges: climate change, food security, increasing energy demand, rising social inequalities or the outbreak of epidemics are just some examples. Science has a key role to play in addressing such complex issues, and curiosity-driven research helps lay the foundations for more effective approaches to meet these challenges. Basic research can lead to breakthrough innovations, but requires certain framework conditions in order to fully develop its innovative potential, which are often not adequately mirrored in policy goals. Sufficient funding doubtlessly is an important aspect for basic research to flourish, but policy agendas must also focus on creating optimum conditions allowing for basic research to be translated into application and innovative technologies.

Collaboration

12. Collaboration among industry, academia, and government is essential for advancing science and innovation in the modern knowledge-based economy, harnessing the strengths of each sector to drive progress, economic growth, and societal advancement. Industry brings market insights and resources, academia provides theoretical frameworks and environments for knowledge exploration, and government offers regulatory frameworks, funding, and a macro-level perspective on national priorities. However, the tripartite model has its challenges such as power imbalances and sometimes conflicting goals. To address power imbalances among tripartite collaborators and mitigate risks of technology misuse or abuse, there is a need to cultivate an environment of stakeholder inclusion, open discussion, promotion of interdisciplinary solutions and building regulatory frameworks that facilitate effective cross-sector implementation. International collaboration is also needed for developing scientific monitoring and early warning systems as the world faces ever more risks.

Space Utilization

13. Fifty years on from the completion of the Apollo program, the frontier of space is finally opening up. Access to space, previously monopolized by a few superpowers, is becoming increasingly open to the general public due to the proliferation of commercial enterprises. At the same time, using space for security and surveillance purposes has expanded. Global accessibility to space promises increased international cooperation, economic opportunities, new types of technological innovations, advanced communication, comprehensive environmental monitoring, and scientific advancements. However, challenges related to governance, ethical dilemmas concerning surveillance safeguards, and the potential for militarization will arise. Cooperation and collaboration are required to establish norms and regulations that promote the peaceful and equitable use of space.

14. Our explorations of these and other issues are far from over. We will continue our interactions and discussions to accompany the evolving lights and shadows of science and technology in the world. We look forward to convening again next year in Kyoto and have agreed to hold the 21st Annual Meeting of the STS *forum* from Sunday, October 6 to Tuesday, October 8, 2024.