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**Discussion on "Harnessing rapid technological change for inclusive and
sustainable development"**

**Discussion on "Exploring space technologies for sustainable development and
the benefits of international research collaboration in this context"**

Written statement submitted by

Kenya

Theme 1:   Harnessing rapid technological change for inclusive and sustainable development and

Theme 2:   Exploring space technologies for sustainable development and the benefits of international research collaboration in this context can be discussed in the above context.

1. Introduction

A Kenyan expert has opined that more than 70% of professions and organizations will be disrupted by the emerging digital transformative technologies that have characterized the onset of the 4th Industrial Revolution (4IR). In Kenya, introduction and expansion of new subjects like coding in schools, through Kenya's Digital Literacy Programme (DLP), are already providing the problem-solving and critical thinking skills needed for 4IR competitiveness and the accompanying new skill requirements and new jobs.   It is necessary to acknowledge that there still exists a huge digital skills gap that needs to be plugged. Science, Technology, Engineering and Mathematics (STEM) education and training is critical for the 4IR and needs to be made more diverse, less traditional and inclusive of girls and women, the marginalized and those with special needs.

Kenya needs younger digital leaders in the public sector with both a clear digital strategy and a culture and leadership poised to execute it. They should be nimble, embracing of digital tools to remain competitive and be making strategic decisions with the future in mind. Young people are also looking for a technologically-savvy and digitally-mature Government which boldly sets the standards and leads the way in the digital revolution. Kenyan Think tanks around 4IR integration should focus away from tackling job losses to equipping for new jobs, embracing of non-traditional ways of working and on making the informal economy and the 'side hustle'; the main African economy and innovation hub, more productive, innovative and digitally-empowered.

Digitally-skilled governments, which embrace their own digital champions, are armed with the technologies and the capabilities to use them according to clear roadmaps. The Kenyan youth (75.1% of Kenya's total population in 2019) and women (50.1% of Kenya's total population in 2019) will be the most impacted by the digital era and the 4IR; hence the GOK to develop the relevant and inclusive policies in this light. Kenya officially joined the space-faring nations when it launched its first nanosatellite, 1KUNS-PF 1X1U (a cube satellite) on 11th May 2018.

2. Global perspectives

Current global technological dynamics are dominated by increased digitalizing of older and new technologies. This mix of technologies is currently cover niche areas that include biotechnology,

genomics, nanotechnology, synthetic biology, engineering physics, energy. and medicine. It is also envisaged that the new technologies will, deepen and converge alongside advancing high-tech fields like Artificial Intelligence (AI) and the associated group of digital technologies including the Internet of Things (IoT) and Big Data, blockchain, quantum computing, advanced robotics, self-driving cars and other autonomous systems, additive manufacturing (3D-printing), social networks, the new generation of biotech and genetic engineering. This set-up will therefore have far-reaching consequences in maintaining the momentum of sustainable development.

In the current age of the Fourth Industrial Revolution (4IR) and the 2030 United Nations' Sustainable Development Goals (SDGs), there is renewed recognition of the role played by strategic collaborations and partnerships in achieving national development objectives and international obligations. Thus, the two thematic areas (i) Harnessing rapid technological change for inclusive and sustainable development and (ii) Exploring space technologies for sustainable development and the benefits of international research collaboration in this context.

Both themes can be discussed in the context of the Fourth Industrial revolution (4IR) and within emerging challenges like Covid-19. Specifically, in both thematic cases, developing countries need to establish both National and Sub National Think Tanks with competencies and skills necessary for offering advice on technology. The responsibilities for the Think Tanks will be as follows:

  i.   Provide strategic advice on technology needs

 ii.   Advise and create plans based on analysis of changing technologies, and how these link to optimum exploitation and benefits

iii.   Develop well-informed advice and strategies that are sensitive to the various needs of citizens in terms of technology

 iv.   Scan the ever-changing, complex environment of technology development in anticipation of emerging global crises like Covid-19.

  v.   Gather and analyze strategic information and Big Data

3. Challenges

The challenges posed by these new technologies and their increasing convergence should be of crucial interest for policymaking in science, technology and innovation (ST&I). Policy for R&D in Emerging Technologies need to focus on promoting technologies that specifically do not leave any country or region behind. The tragedy of trying to catch up in technological advancement can be worsened by exploitation of specific resources in developing countries, a scenario that is sugar coated "competitive advantage". Tackling global challenges in areas such as the environment, energy or health need specific platforms or take a hybrid approach where certain priority platforms are advanced while focusing on priority needs of the world at large and the local population at the same time. The development of emerging technologies is envisaged more in terms of an ecosystem than in terms of basic research with a clear interest in the applicability of these technologies and in ways to optimize their commercialization.

In light of the weak policy environment prevalent in most developing countries such as Kenya, the focus is to model an understanding on how this future scenario could play out in the country and be at the forefront of coming up with policies in Research areas, emerging technologies and their convergence. Such policy(ies) will guide and empower Kenyan teaching staff at all education levels, researchers, and innovators together with business firms so that they properly address the risks and reap the benefits of new and emerging technology domains. This is especially urgent in view of capital intensive programmes and related projects.

Globally, it is vital that Countries determine the policy direction for the strategic rollout of programmes and projects that have potential for technology development, with the related policy, legal and institutional reforms, and make the necessary long term projections.

4. Strategic direction

In order to *harness rapid technological change for inclusive and sustainable development*, we will undertake the following:

i. Set in motion adequate strategies and policies that will increase the benefits from new job markets especially for women and the youth e.g. the policy on emerging technologies, the framework for international collaborations in research, science, technology and innovation etc.

ii. Promote national, regional, international and multi-stakeholder cooperation for digital application to achieve Kenya Vision 2030 and the Sustainable Development Goals (SDGs).

iii. Sustain participation in international assessment, research and foresight and, build consensus on normative guidelines for rapid technological change.

iv. Step up market, consumer and data protection by investing in robust cyber-security.

v. Look at underlying trends in technology, demographics, resources, climate change etc. and seize the opportunities available.

vi. Prepare the national innovation system to deal with the economic, social and environmental disruptions that will come from job losses, job replacement and new jobs together with a diverse array of stakeholders.

vii. Support enhanced automation and agility of government (expanded e-Government with the requisite cyber-security) and automate micro, small and medium enterprises – MSMEs (with relevant technological integration plans developed around the youth and women) for sustainable businesses and economic growth.

viii. Collect data and develop statistics to inform plans to domesticate rapid technological change, take advantage of the emerging opportunities, address the challenges and mitigate the risks.

ix. Focus on technological innovation for the education sector, agricultural transformation, information and communication technologies (ICT) and other strategic areas.

x. Sustain Kenya's leadership on the continent through pro-entrepreneurship policies, targeted support for new generation start-ups, increased public participation and enhanced inclusivity.

i. Establish capabilities and capacities for exploring and exploiting technologies

ii. Promote the development of innovative technologies that enhance communication on platforms for Virtual meetings

iii. Promote the use of automated work flows and dash board systems

iv. Acquire, adopt, adapt and diffuse technologies

v. Assess for feasibility, prototyping and commercialization of innovations that lead to the development of new and improved technologies

vi. Promote investment in Technology development

vii. Plan for long term sustainability of effective Technologies

viii. Show case devolved counties that are relying on space technologies to manage their affairs

In order to *explore Space technologies for sustainable development and the benefits of international research collaboration in this context*, we will;

i. Enhance public awareness about space technology, science and innovation and its practical applications in daily life.

ii. Build local capacities and skills to design and operate space missions for peaceful utilization of space resources.

iii. Increase national capacities to utilize space technologies around weather forecasting, remote sensing, global positioning system (GPS) capabilities and applications in agriculture, environmental conservation etc., satellite television and the relevant long-distance communication systems.

iv. Integrate the Kenya Space Agency (KSA) and the private sector in the Luigi Broglio Space Centre (BRC) at Malindi, Kenya.

v. Create jobs, research and infrastructure to sustain Kenya's Space Programme around Kenya's first nanosatellite, 1KUNS-PF 1X1U (an international collaborative effort between the University of Nairobi – UoN for Kenya, Italy and Japan), before it retires as well as the planned development of the future nanosatellites of ILOSS_1 1X3U (2020) and ILOSS_2 4X3U (2023) for providing designated services.

vi. Make a long-term commitment to the participatory development of a National Space Policy and mobilize resources for Kenya's Space Science Programme to support ongoing activities at the KSA, the National Commission for Science, Technology and Innovation (NACOSTI) and other new initiatives that may come on board.

vii. Engage in international North-South and South-South research collaborations on space science, technology and innovation to drive down the national costs, increase access to space and facilitate the international effort towards human survival, innovation and progress in space.

viii. Manage the political expectations from local and international space research collaborations by clarifying both technical and non-technical ambiguities.

ix. Envisage and prepare for future space commercialization through public-private partnerships (PPPs), after the significant decrease of costs for launching into low Earth orbit (LEO), by strengthening the linkages between government, industry, academia and investors (the Quadra Helix) in space research, science, technology and innovation.

x. Manage the effects of space competition for new space frontiers since Kenya is a new space-faring nation

xi. Exploit Space technology in the following areas:
   a. Food security and agriculture
   b. Health; Telemedicine, use of drones etc
   c. Disaster risk reduction and humanitarian crisis prevention
   d. Natural resource and environmental management
   e. Connect the unconnected
   f. Management of resources in devolved governments

5. International Collaboration, Partnerships and Linkages

In order to harness collaborations, partnerships and linkages in Space technologies, there is need to develop a Policy to manage the process of entering into Memorandum of Understanding (MoU). The Policy ought to define the need, rationale, scope, methodology, regulations and, monitoring and evaluation of MoUs. With the developed world moving toward knowledge-based and innovation-led economies, international collaborations are taking centre stage as developing countries like Kenya put in place mechanisms to make the best use of these relationships and cascade the benefits down to her citizens. Thus ccollaborations, partnerships and linkages are of vital importance as the world integrates through globalization, digitalization, and the Fourth Industrial Revolution (4IR).

Benefits of Collaboration, Partnerships and Linkages may include the following:

i. Collaborate to promote adaptive technologies by enabling employers to streamline their employees' training needs, providing long-term solutions for upgrading employee on emerging technologies

ii. Collaborate to enable Countries to prepare their citizens for the wave of Artificial Intelligence (AI), new data and robots that are being called the 4IR.

iii. Collaborate to promote systemic technological change in order to harness citizens potential and better equip them for the future.

iv. Collaborate to create a new architecture for people to acquire, adapt, adopt, and diffuse technologies and how technology pipelines are being created.

v. Collaborate to harness smart factories/industries in which technologies are augmented with web connectivity and connected to a system that can visualize the entire production chain and make decisions on its own.

vi. Collaborate to champion technology development by investing in people and nurturing talent that generates innovation, while recognizing individual 'attitude' of creativity, curiosity and a relentless desire to make things better.

vii. Collaborate and share the benefits of digital manufacturing technologies, in order to remain competitive since technology is evolving and developing at a rapid pace and, changing the way that individuals and businesses do business with each other. Whether to save costs, improve efficiency or meet industry regulations, it is important that businesses cooperate.

viii. Collaborate to share international research infrastructure and Big data

END