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High-level roundtable on "The impact of rapid technological change on sustainable development"

Statement submitted by

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The Impact of Rapid Technological Change on Sustainable Development

Discussion By Dr. Elioda Tumwesigye, Minister Science, Technology and Innovation, Republic of Uganda

Science, Technology and Innovation (STI) are the drivers of socio-economic growth and transformation the world over. Science, Technology and Innovation development is an important determinant of progress and transition from pre-industrial to innovation led and knowledge-based societies. Therefore, the extent to which a country has harnessed Science, Technology and Innovation has a direct bearing on its level of development. STI contributes new knowledge, skills and the requisite capabilities for increased productivity and welfare improvement of the population. The strategic role of scientific innovation in uplifting other sectors of the economy such as Agriculture, Industry, Health, Energy, Education, Environment, and services and enhancing technological development, has been vividly highlighted in Uganda's National Development Frameworks, the Innovation Strategy for Africa (STISA 2024), the Sustainable Development Goals (Agenda 2030) and the recently adopted Paris agreement on Climate change.

The strengthening of the STI eco-system is indispensable for solving pressing societal challenges which include among others:

(i) Limited access to quality health services for all at all ages,
(ii) Hunger and Malnutrition
(iii) Poverty
(iv) Environmental and climate change effects,
(v) Limited access to affordable (low unit cost), reliable, clean and sustainable energy,
(vi) Limited access to inclusive and equitable quality education (inadequate knowledge and skills for sustainable development)

(vii) Limited access to safe water and sanitation.
(viii) Limited access to adequate, safe and affordable housing and related basic services

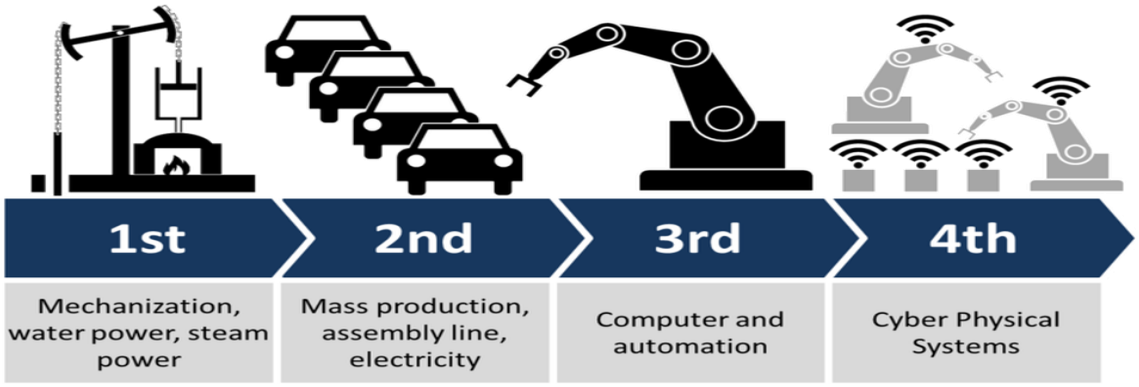
These pressing societal challenges of our time are also largely enshrined in the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development adopted by world leaders in September 2015 and officially came into force on 1st January 2016.

Fourth Industrial Revolution: A Perspective from Uganda

Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, has published a book entitled, *The Fourth Industrial Revolution*, in which he describes how the 4th Industrial Revolution is fundamentally different from the previous three, which were characterized mainly by advances in technology. "In this fourth industrial revolution, we are facing a range of new technologies that combine the physical, digital and biological worlds. These new technologies will impact all disciplines, economies and industries, and even challenge our ideas about what it means to be human", according to Prof Schwab. More literature declares that these technologies have great potential to continue to connect billions more people to the web, drastically improve the efficiency of business and organizations and help regenerate the natural environment through better asset management, potentially even undoing all the damage previous industrial revolutions have caused.

As is typical of technological watershed moments and developmental paradigm shifts, the 4th Industrial Revolution is bound to usher in grave potential risks. Schwab outlines his concerns that organizations could be unable or unwilling to adapt to the new technologies, and that governments could fail to deploy or regulate these technologies properly. He further postulates that shifting power will create important new security concerns and that inequalities could grow rather than shrink if things are not managed properly.

1784 1870 1969 NOW (?)



The 4 Industrial Revolutions (by Christoph Roser at AllAboutLean.com)

For example, as automation increases, computers and machines will replace workers across a vast spectrum of industries, from drivers to accountants and estate agents to insurance agents. A report by Brookings Institution (Washington, DC), published on 25th January 2019, says:

- One-quarter of American jobs are at a high risk of automation.
- The disruption will hit certain people harder than others, including low-wage earners and men.

Many experts suggest that the fourth industrial revolution will benefit the rich much more than the poor, especially as low-skill, low-wage jobs disappear in favor of automation, and enterprises become more profitable.

But this isn't new. Historically, industrial revolutions have always begun with greater inequality followed by periods of political and institutional change. The industrial revolution that began during the 19th century originally led to a huge polarization of wealth and power, before being followed by nearly 100 years of change including the spread of democracy, trade unions, progressive taxation and the development of social safety nets.

"It seems a safe bet to say, then, that our (read 1st World) current political, business, and social structures may not be ready or capable

of absorbing all the changes a fourth industrial revolution would bring, and that major changes to the very structure of our society may be inevitable," Prof Schwab.

As the 1st World mulls its readiness to absorb the new technologies of their own making, the 3rd World, particularly Africa, has yet to fully engage the technologies of the 1st Industrial Revolution of 1784! With a significant percentage of our population still engaged in subsistence agriculture, where do we start to participate in the debate about attributes and likely pitfalls of unbridled and rampant automation, big data, or block chains? Yet the contemporary global village we live in demands that we get involved in such a deliberation because, whether we like it or not, we will be affected by the trends and outcomes of these technological developments whatever the source.

To begin with, we need to identify the elements of the fourth industrial revolution that we have no business worrying about at this stage. For example: losing jobs to automation, when in reality we don't have such jobs. Dispensing with the hand hoe is long overdue, and the consequent gains in farm productivity will lead to creation of new desirable jobs. Also we need to be very prudent in our *choices of technologies we deploy so that there is a balance between industrial efficiency and gainful employment.* Lest we forget, we don't have (nor can we afford) welfare systems like in the 1st World, upon which the unemployed depend.

We must support and invest in R&D so that we can leapfrog the technological trends and developments, as we modernize our industrial base and become a player on the global technological platform. It can be done!
Regarding SDGs, Uganda was one of the first countries to develop its 2015/16 – 2019/20 National Development Plan (NDP) in line with the SDGs. GoU estimates that 76% of SDG targets are reflected in the NDP and have been adapted to the national context.

- **Current State and Likely Future Trajectory of Technologies associated with rapid technological change.**

Uganda is fast catching up with rapid technological change. Being an agro based country, it is no wonder that a number of technological applications are geared towards agriculture. This has had an enormous effect on ensuring that the return on agriculture is healthy.

It is worth noting that the race to develop mobile apps in Uganda is spawning a new generation of technopreneurs, searching for innovative ways to connect various sectors with their respective clientele. Numerous applications are being created to help bridge the infrastructure deficits, while helping to meet the aspirations of an increasingly tech-savvy Ugandan population.

This level of technological advancement must be matched with an enabling policy environment. This is even more critical in this era of emerging technologies like nanotechnology, biotechnology, robotics, artificial intelligence, quantum computing, the internet of things, big data, the industrial internet of things, fifth generation wireless technologies (5G) among many others.

Currently the existing policies have limited capacity to shape technological trajectories. It is hoped that with the review of the Science, technology and Innovation Policy, this will be addressed. The review therefore comes at an opportune time for Uganda to position herself as a regional leader in Science, technology and Innovation

- **Rapid technological change and inclusive sustainable development**

Uganda in her development frameworks has prioritized women, girls and marginalized groups. Gender and Equity are taken by the Government of Uganda as cross cutting and have been given due consideration. Government has ensured access to information by making internet affordable to all segments of the society and liberalization of the airwaves in Uganda.

- **Developments in renewable energy technologies and related frontier technologies that provide opportunities for Uganda to accelerate efforts to build a green economy**

While Uganda has an endowment of a variety of renewable energy resources, only large hydro resources along the Nile have been developed to some extent to provide electricity through a national grid. The other resources that have remained largely untapped include small hydro, biomass, solar, wind and geothermal sources. Renewable energy technologies are recommended as a fulfilment of fulfilment of Government's commitment on greenhouse gas emission reductions, under the Kyoto Protocol and contribute to the global fight against climate change.

In line with this Uganda has developed the Uganda Green Growth Development Strategy 2017/18 – 2030/31. One of the focus areas is to generate Energy for green growth with increased emphasis on renewable energy investment through biomass energy for electricity and improved technology for enhanced efficiency in using biomass for domestic and industrial uses, enhancing solar power potential for on-grid, exploitation of geothermal energy and reinforcement of environmental, health and economic safeguards for energy generation.

- **Best practices at the national level for developing an AI strategy and lessons learned for a successful consultation process involving multiple stakeholders**

Artificial intelligence is one of the emerging technologies and is considered a fundamental innovation. It is becoming the driver of digitalization and autonomous systems in all areas of life. It is therefore prudent for all stakeholders (public sector, private sector, society etc) to embrace the opportunities it provides and to face up to the risks it poses. In as much as it is still underdeveloped in Uganda, the development of an AI strategy must encompass all the relevant stakeholders involved. This calls for integration of AI in all sectors of the economy and society. This is made possible through participatory and inclusive development of the strategy.

- **How Uganda can ensure the swift diffusion of rapid technological change that is inclusive, development-oriented, and accessible to all countries, regardless of whether they are technological leaders, early adopters, or followers**

Uganda's success in the diffusion of rapid technological change depends on its ability to strengthen the National System of Innovation (NIS). It therefore follows that there should be a thorough mapping of all stakeholders in the NIS that should allow for flexibility to respond to the ever emerging technological trends. An enabling legal environment is therefore crucial in position the NIS to relevantly address swift diffusion of rapid technological change

- **How non-governmental actors - including charitable foundations, academic institutions, and civil society – are supporting rapid technological change for sustainable development**

Uganda has created a conducive legal and political environment for every actor to support rapid technological change for sustainable development. This has been synergistic and created an environment conducive to learning and interaction among actors in the public sector, private businesses, and civil society. The non-governmental actors have numerously supported innovators and researchers to commercialize their innovations and built their capacities as well. The academic institutions are carrying out extensive Research and Development (R&D) with enormous potential.

The strong commitment of government together with the interaction with non-government actors has therefore been key in ensuring that Uganda is on the trajectory of technological change. **Thank you**