

Science, technology and innovation as catalysts for the Sustainable Development Goals

Presentation by

Shamika N. Sirimanne

Director, Division on Technology and Logistics

UNCTAD

Commission on Investment, Enterprise and Development, 22 November 2017

Slide 2

It is my pleasure to present to you the more salient points of the note that the secretariat prepared to provide some background to the discussions of the Commission at this session, that will focus on the role of science, technology and innovation (including ICTs) as catalysts of the SDGs.

The note that I have the honour to present to you responds to the mandate established in paragraph 55 (t) of the outcome document of UNCTAD 14, that declares that we should:

“promote effective international and national policies to help developing countries harness science, technology, innovation and entrepreneurship as an effective means of implementation of the SDGs, through policy analysis, sharing of experiences and policy-oriented capacity-building”.

In order to facilitate a policy dialogue and sharing of practical experiences about STI at the service of the SDGs, the background note is structured as follows:

Slide 3

The first section of the note addresses some of the main features of new and emerging technologies and how they may have different implications for development than earlier waves of technical change.

This is followed by the description of examples of how entrepreneurs are applying new technologies, in many cases using ICTs, to innovate with products, services or business models – and how in doing that they are also addressing social needs that are relevant for the SDGs.

The next section of the note presents some possible policy responses that countries may consider in order to ensure that STI contribute effectively to sustainable development in all its dimensions: economic, social and environmental.

The paper ends with some suggestions about the topics that the Commission may want to address in its policy dialogue.

Slide 4

Development policy has always stressed the role of STI in raising productivity, generating economic growth and promoting structural economic transformation. These are urgently needed, and achieving them poses fundamental and demanding challenges.

But the 2030 Agenda and the SDGs represent an even bigger ambition to radically change the development path for the global community. Achieving it means maintaining solid economic growth but giving equal weight to social inclusiveness and environmental sustainability.

STI is present throughout the 2030 Agenda. SDG 17 about global partnerships for sustainable development establishes the key and general enabling role of STI; STI is also directly addressed in Goal 9, about innovation. But it is almost impossible to mention any other Goal in which progress could be achieved without a strong effort in STI.

It has been said many times that with the SDGs business as usual is not possible, and this is nowhere more so than in the case of STI. The 2030 Agenda will be implemented in a context of quick and radical transformation – amounting to a 4th industrial revolution – that is driven by several converging technologies, enabled by exponential change in ICTs. There is no definitive list of these technologies, but they certainly include fields such as artificial intelligence; big data; robotics and autonomous vehicles; the Internet of things; 3D printing; virtual and augmented reality; materials science and nanotechnology; synthetic biology; genetic sequencing and editing; and neuroscience.

Common features of new technologies relevant in the context of Agenda 2030 are considered in the note:

1. Fast change and short adaptation cycles: Performance, cost and applicability across various sectors is improving at exponential rates. The disruptive potential is stronger because digital platforms allow new innovative combinations of different technologies, cross-fertilization and collaboration. Change also becomes more unpredictable and spreads faster. This is a challenge for the ability of societies to adapt.
2. Lower costs and wider choices. The marginal cost of digital products is essentially zero; the cost of sequencing a human genome decreased fivefold in 2001–2015. The cost of solar panels decreased was less than \$0.50 per watt at the end of 2016, and continues to decrease. This means better goods and services at lower prices are available to broader segments of the population and public sector agencies can do more and better with smaller and more flexible investments.
3. More open STI. New technologies rely more on open standards and collaborative networks. They create opportunities for top-down and increasingly bottom-up innovation processes. Innovative firms, including relatively small firms in developing countries, can benefit from easier access to international markets. For example 3D printing allows

individuals and community groups to develop cheaper, customized solutions and to produce those innovations in more diverse contexts.

4. New forms of work and inclusiveness. Labour-saving technological change may result in reduced demand for low-skilled labour. Artificial intelligence and automation also have the potential to augment the productivity of suitably skilled workers by amplifying their ability to use data and information in innovative ways. The result may be increased labour market polarization. New technologies may also have significant implications in terms of gender impact: more women are employed in low-skilled routine occupations most subject to automation. Women also tend to be underrepresented in the occupations that are most likely to benefit from the spread of new technologies.

Slide 5

Before considering how policy can respond to these features of new technologies, the note provides some examples of how different kinds of new technologies can result in socially, economically and environmentally sustainable outcomes relevant for a wide range of Sustainable Development Goals.

1. Precision agriculture: Goals 1, 2, 9, 12 and 15

Precision agriculture involves using a range of digital and other technologies such as drones to better manage areas under cultivation through improved data collection on the field-level performance variations of crops. The objective is to increase yields while optimizing inputs and preserving resources.

2. Water management, wastewater treatment and nutrient recovery: Goals 6, 9, 11 and 15 18.

Technologies in this area include membrane filtration and oxidization processes for pollutant elimination; micro-level irrigation, to increase crop intensity and economize water use in agriculture; wastewater nutrient recovery, to reduce pollution and increase fertilizer resource availability; zero liquid discharge; off-grid desalination using solar power; and water remediation, often linked to extractive industries.

3. “Transformative technologies”: Goals 3, 4, 8, 9 and 10 19.

This designation is used to refer to technologies with exponential growth and impact due to strong linkages to ICTs, such as big data, virtual and augmented reality, blockchain technology or 3D printing. For example, fab labs, a global network of local technical facilities, enable innovation by providing individuals with computers and computer-controlled tools – including computer-aided design, computer-aided manufacturing, additive manufacturing, computer numerical control and virtual and augmented reality – to design and prototype technology-enabled products.

4. Innovation and entrepreneurship. Goals 7, 8, 11, 13, 15.

New and emerging technologies can drive innovative entrepreneurship to address needs relevant to the SDGs. In a moment we will hear the presentation of several examples of innovations that combine technologies, processes and business models in ways unique to their locality, including

the specific Goals they help to address. All are for-profit ventures and illustrate the notion that commercial interest, entrepreneurship, innovation and sustainable development can be complementary and mutually reinforcing elements.

Slide 6

What can policy-makers do to make the best of the new trends in technological change and to support the development of innovation-driven entrepreneurship that contributes to the achievement of the SDGs? The note suggests several considerations:

1. **STI policies for the SDGs should not only aim to adapt economic conditions but also to guide social changes.** Policies to support the diffusion, appropriation and financing of technology should be complemented by policies to address inclusion and sustainability, at both national and international levels. Many countries may be left behind unless a concerted effort is made to build STI capabilities. New technologies present risks of social exclusion that should be proactively addressed by Governments and social actors.
2. **Policy fundamentals.** STI strategies to achieve the Goals require some basic elements that remain weak in many countries. This is about building technology absorptive capacities and innovative capabilities in an economy. Countries need to create an enabling environment for human capital development and technological learning. Securing Internet connectivity for all is critical. Fundamentals also include fair and balanced regulatory regimes for intellectual property, investment and competition policies. Finally countries need mechanisms to link and coordinate STI stakeholders in a strong national system of innovation.
3. **Supporting innovative firms.** Leveraging STI for the SDGs requires opening STI policy to new social actors, but the development of technology and innovation capabilities among firms and farmers should remain clearly a priority. Countries can support the development of innovative new firms through instruments such as accelerators and incubators. A key aspect of the support policy is financing for innovation. Innovation often involves significant capital investments and is an uncertain, risky undertaking. Developing countries could benefit from better sharing of best practice in the use of tax incentives, venture capital, angel investors and innovation funds.
4. **Strengthening education and training.** Education systems are another fundamental component of strategies to harness science, technology and innovation for the Goals. Especially important is to improve education in science, technology, engineering and mathematics, with great emphasis on nurturing STEM talent among girls and young women. Lifelong learning will soon become indispensable to deal with the risk of social exclusion created by new technologies. Digital technologies are enablers and multipliers of other emerging technologies and education should ensure that students gain sufficient IT skills.

5. **Building domestic and international linkages.** Strong linkages among innovation actors in industry, academia and Government, both nationally and with international networks are essential. They tend to be weak in developing countries. Clusters, S&T parks and incubators can be used for this. In terms of international linkages global value chains can play a useful role in technological learning and the transfer of technology, provided that knowledge spillovers are enabled by sufficient technological capabilities among firms and by a strong national system of innovation.

Slide 7

1. **Demand-side innovation policy.** Demand-side innovation policy creates new demand for innovation or aggregate existing demand to make it more visible to all players. This lowers the risk of investing in innovation and creates incentives for more firms to do it. Public procurement, regulation, standards and consumer policy are the most used instruments. For example, in Sri Lanka, transparent and competitive tender procedures stimulated the technological development of local SMEs in the ICT sector.
2. **International collaboration.** Given existing technology gaps, national policy should be supported and complemented by global collective action. Since we are at the earlier stages of new technological revolution there may be an opportunity for international cooperation in STI to shape future trajectories before new gaps appear and path-dependency effects limit the benefits to developing countries of new technologies. New models of engagement between international finance and STI stakeholders in developing countries, such as impact investments can be useful to better mobilize resources for STI for sustainable development. Such new forms of partnership may also help change mindsets in the financial community about the role of STI for social and environmental purposes. There is a need to understand better how these new forms of resource mobilization could be organized and leveraged for STI for development.
3. **New policy frameworks for Goals-relevant innovation.** If business as usual is not an option then new approaches to innovation policy need to be developed to change the direction of innovation towards more inclusive and sustainable outcomes. The CSTD has discussed several interesting models such as mission-oriented innovation, pro-poor and inclusive innovation, grass-roots innovation, social innovation, and digitally-enabled open and collaborative innovation.

A new innovation policy framework, that some call Innovation Policy 3.0, suggests that the concept of innovation should be broadened beyond traditional notions related to R&D and productivity. Using the concept of sociotechnical system change, this approach seeks to support innovation in products, services and organizational models to meet social and economic challenges and better target social and environmental aims to achieve the SDGs. These are all issues that are eminently relevant for UNCTAD's policy and technical

cooperation work in STI and we are exploring to what extent these new approaches could be adopted in our work. This is particularly important in order to respond to the Maafikiano's mandate to enhance our STI Policy review programme to make it more fit-for-purpose in the SDG context.

Slide 8

The paper closes with a few suggestions of questions that the Commission may wish to address during its policy dialogue on STI for the SDGs

Thank you for your attention.