

# The inclusion of Science, Technology and Innovation (STI) in the Financing of the 17 Sustainable Development Goals (SDGs)

By Prof. Enrico GIOVANNINI

University of Rome, "Tor Vergata"

and Dr. Françoise ROURE

Chair, Committee "Safety, Security and Risks", French High Council for Economy

The path towards the adoption in 2015 of the United Nations' 17 sustainable development goals (SDGs) presented a historic and unprecedented opportunity to bring the countries and citizens of the world together to decide and embark on new paths to improve the lives of people everywhere. These decisions will shape the global course of action to end poverty, promote prosperity and well-being for all, whilst observing environmental and resources limits and addressing climate change.

Since the Rio Conference in 1992, the world has tried to reconcile environment and development, stimulating a lot of important actions at both global and national levels. With the Millennium Declaration in 2000, the United Nations have launched a strong Development Agenda, built around the Millennium Development Goals (MDGs). Also thanks to the efforts linked to this process, remarkable progress has been made in several continents in economic and social terms, although the environmental costs of such a development have been huge.

Notwithstanding these improvements, economic, social and environmental conditions are far from being satisfactory in large parts of the world, and the concerns for the overall sustainability of the current and future pathways have considerably grown over the years. The Rio+20 Conference in 2012, and the outcome document "The Future We Want", launched a process to develop a strong "Post-2015 Development Agenda" around the concept of Sustainable Development (SD) and universally applicable Sustainable Development Goals (SDGs) to be achieved by all countries in the world.

The work done by the Open Working Group (OWG) to develop a set of SDGs and the results achieved through other processes led the UN Secretary General to publish, at the end of 2014, the so-called Synthesis Report "The Road to Dignity by 2030", which represented a strong call "for the world to take historic action to transform lives and protect the planet". The Report also launched the final round

of negotiations around three key events held in 2015: the Addis Ababa Conference on "Financing for Development" (July), the UN Special Summit which agreed on 17 SDGs and their 169 Targets (September) and the COP21 Conference in Paris on climate change (December).

The first section of the paper highlights the role of science, technology and innovation to achieve the UN 17 Sustainable Development Goals. In the second section, some possibilities for the EU to promote the pervasive role of STI for Sustainable Development are discussed. Finally, a set of recommendations for concrete actions is presented in the third section<sup>(1)</sup>.

## The role of science, technology and innovation to achieve SDGs

Science, technology and innovation (STI, as referred to in the UN context) have for a long time been recognized as one of the main drivers behind productivity increases and a key long-term lever for economic growth and prosperity. In the context of the Post-2015 Agenda and for achieving the SDGs, STI plays an even more central role. Actually, STI features strongly in Sustainable Development Goal 17

(1) This article is an outcome of the European Commission Expert Group "Follow-up to Rio+20, notably the SDGs" input to the Addis Ababa Conference of Multilateral Development Banks: "Financing for Development/FfD".

Means of Implementation, as well as being a cross-cutting one to achieve several sectoral Goals and Targets, while Target 9.5 elevates the role of research and innovation (R&I) policy well beyond STI as one of the Means of Implementation.

Implementation of the SDGs domestically calls for unparalleled collaboration in key areas such as enabling policy environments, developing human skills and capacities, mobilization and effective use of public finance, stimulating trade, driving transformative change through science, research, technology and innovation, mobilization of the private sector and capital, harnessing the positive effects of migration and monitoring accountability and review. For the international aspects of the SDGs, STI can provide the grounds for a new global partnership that will eventually bring a new transformative spirit of solidarity and cooperation. This global partnership should be based on universally common principles such as shared responsibility, mutual accountability, respective capacity, human rights, good governance, enabling regulatory environments, inclusiveness and non-discrimination.

Development cooperation should work more synergistically with research and innovation actors in building STI capacities in developing countries in order to enable engagement in related international activities. In this context, increasing public and private spending and investment in research and development, including through public-private partnerships, should be supported. A tangible way to flag this role might be to dedicate a certain percentage of the Official Development Assistance (ODA) to the purpose of STI for sustainable development.

Moreover, to build capabilities of exploiting opportunities offered by STI for achieving sustainable development partnership is very important. European Commission's latest Communication on "A Global Partnership for Poverty Eradication and Sustainable Development after 2015" (COM(2015) 44 final) provides a good basis for future actions in driving transformative change through STI. Science, technology and innovation, including digitization, can generate profound changes in a relatively short period of time. However, these changes might not automatically address social and environmental problems.

More fundamentally, moving the world development onto a sustainable path will depend not only on scaling of existing appropriate technologies, but also radical innovations (including social ones) and changes in mindsets and behaviors. Technology alone is not sufficient for a sustainable pathway, inter alia due to rebound effects. Capacity for innovation is key, and (social) innovation is needed to induce changes in mindsets and behaviors attractive. Overall, STI is vital to reduce the costs of transition, also in terms of job losses; it can be directed to areas that stimulate transitional movements in the economy and the society; and it can become a common objective of the public and the private sectors to mobilize all investments towards sustainable development.

In conclusion, STI policies should be seen as a key transformational force to change existing, clearly unsustain-

able, pathways. STI for the 17 UN SDGs should become a key ingredient of future policies in the European Union, as well as a "motto" to be used in international negotiations around SDGs and in other processes relevant to this end (GATT, International Labour Organization (ILO) conventions, etc.).

## Science, Technology and Innovation for Sustainable Development Goals: What Role for the European Union?

An ambition of the European Union to become the global forerunner of sustainable development should, in particular, include integrating STI policies in its overarching and sectoral strategies and policies. The European Union and its Member States have agreed that, by 2020, 3% of their total GDP (public and private combined) should be invested in research, development and innovation. As this is one of the five headline targets for the EU 2020 Strategy<sup>(2)</sup>, STI is at the heart of the EU's strategic agenda. Moreover, the European Commission has set out overarching implementation principles in its Communication on the Post-2015 Agenda<sup>(3)</sup>, in which it emphasizes that solutions generated by STI are important drivers for the SDGs. Finally, several of the European Commission's ten priorities, as well as some key initiatives (Innovation Union, Digital Single Market, etc.) heavily rely on STI to speed up the change and improve prosperity of the European Union, minimizing the transition costs.

Bearing in mind the key role of STI for SDGs, the following perspectives should be considered:

- "Walk the talk" and ensure domestic integration of the SDGs in/with STI. The SDGs should be fully integrated in the (implementation of the) EU Horizon 2020 Strategy for Research and Innovation (2014 to 2020) and in other EU policies related to sustainable development. One key example is the Commission's upcoming proposal on the transition to the circular economy action plan<sup>(4)</sup>, which should dramatically increase re-use and recycling in Europe and boost intelligent product design and the market for recycled materials. This will help building a new generation of innovative and energy efficient European businesses in a global world with increasingly scarce raw materials, and will create sustainable jobs in Europe. Other examples include the EU climate change agenda and the development and use of nature-based solutions to sustainability challenges.
- Develop tailor-made partnerships on STI for SDGs. STI is vital to reduce the costs (also in terms of job losses) of transition towards environmentally sustainable societies and economies. This cost-saving aspect is essential for the discussion on the Means of Implementation for the

(2) 2<sup>nd</sup> headline target of the Europe 2020 Strategy. [http://ec.europa.eu/europe2020/targets/eu-targets/index\\_en.htm](http://ec.europa.eu/europe2020/targets/eu-targets/index_en.htm)

(3) COM(2015) 44 final. A Global Partnership for Poverty Eradication and Sustainable Development after 2015.

(4) COM(2017) 33 final. Report on the Implementation of the Circular Economy Action Plan.



Photo © Paul LANGROCK/ZENIT-LAIF-REA

Egypt, Kuraymat, Africa's first solar thermal power station with parabolic trough technology.

**“Development of innovation capacity should become one of the highest priority, a prerequisite to making societies and economies sustainable in the long run.”**

SDGs. The Commission supports this: “Governments should foster the facilitation of technology diffusion, sharing and transfer through an enabling environment and incentives at domestic level that are geared towards sustainability and provide adequate protection of intellectual property rights according to the WTO rules”<sup>(5)</sup>. Recognising that there are some contentious policy issues related to technology transfer, some barriers that emerged in the past (also recognized by the OECD Forum on “Aligning Transition Policies”) still need to be addressed. For example: while many technologies are available in principle without license fees, so far they have not been implemented for SD purposes in developing countries, and most technology transfer takes place in a North-North trade; the traditional Intellectual Property Rights – IPR – system; the absence of knowledge about availability of technology without license fees; the accessibility to knowledge on available relevant technologies for SDGs; the capacity for a sustainable implementation (and related social innovation as well) that need to be overcome if one wants to make progress in this field. Moreover, it would be important to avoid rebound effects and adapt technologies to local contexts. This is why technology needs assessment is required as first step.

- Move from technology transfer to building innovation capacity. Technology transfer is essential but not enough, as it may create new dependencies in receiving coun-

tries. Development of innovation capacity should become one of the highest priority, a prerequisite to making societies and economies sustainable in the long run. The Commission already recognizes that “cooperation on technology transfer should go beyond pure technological development and include longer-term investments that are adapted to local contexts, engage with communities and users and ensure that the needs of people and the environment are taken into account (‘human-and eco-centered design’)<sup>(6)</sup>, but a more concrete focus on innovation capacity building would be recommendable. Education and other forms of investment in human capital are a key accelerator and multiplier of STI contribution to the SDGs.

- Stimulate thinking and behaving differently. To tap the full potential of STI as supporting EU and other countries on a sustainable path, changes in mind-sets and behaviour of politicians and policy makers, businesses, investors, consumers and civil society are needed. As mind-sets and behaviour are strongly culturally determined, differentiated governance approaches are recommendable.

(5) COM(2015) 44 final, p.11.

(6) COM(2015) 44 final, p.11.

STI can itself foster this by investing in areas that stimulate transitional movements in the economy and the society. Social innovation is an important ingredient of this process. The orientation of STI to the 17 SDGs has to become a common objective of the public and the private sectors, to mobilize all investments in this direction and deeply engage in this effort policy makers, private investors, consumers, etc.

- Build up opportunities to fully benefit from the “Data revolution”<sup>(7)</sup>. It is quite evident that economic and social innovations will be based on the use of an unprecedented amount and availability of data available for different purposes. In this context, data should be considered an “asset” whose development for pervasive use should be the objective of public policies, also protecting people from the misuse of personal data. Some areas of the world are investing huge public and especially private resources in this field (e.g. big data, data mining, software and applications dedicated to predictive modelling) and in case H2020 would miss this opportunity the EU would be lagging behind them and insofar weakening its boldness to be the frontrunner of SDGs implementation both domestically and at a global scale. Moreover, different rules coexisting within the Union in terms of data exploitation and exchange represent huge obstacles from fully exploiting existing data<sup>(8)</sup>.
- Set up monitoring, evaluation and assessments of STI for SDGs. To ensure mainstreaming of sustainability in the EU’s policies, a framework is needed which guides monitoring, evaluation and assessment of the contributions of STI to the achievement of the SDGs, at EU and Member States level, as well as for reporting to the international level. Within the European Commission, all impact assessments (IA) must evaluate, in a balanced way, environmental, social and economic impacts. This also applies to the Sustainability Impact Assessment (SIA) and ex-post evaluations.
- Improve policy coherence. All EU Member States should be encouraged to integrate the STI for SDGs perspective in their national strategies and monitoring processes, as well as ensuring policy coherence by integrating the SDGs in their (regulatory or comprehensive) impact assessments. At EU level, policy coherence could be improved by integrating the monitoring of the SDGs in the existing processes, like the “European Semester”, the Europe2020 Strategy, as well as the Commission’s Investment Plan based on the European Fund for Strategic Investments (EFSI). An operational framework for prioritization has to be developed in these strategies and programs taking aspects of urgency and irreversibility into account.

### Recommendations to Implement a STI contribution to SDGs Policy

The following recommendations are clustered in four groups, concerning general STI policy orientations, specific options towards the achievement of SDGs, the use of STI to improve policy coherence, and options for engaging with relevant international initiatives on STI for sustainable development.

### General policy orientations

It is recommendable for the EU to:

- Continue to aim to strengthen the importance of STI policies/systems in the Financing for Development (FfD) process and Post-2015 agreement in all countries of the world as part of the Means of Implementation and Global Partnership for Development. This should include the promotion of both appropriate regulatory frameworks and the creation of enabling environments for STI around the world.
- Continue to emphasize the need for these agreements to move beyond the issue of technology and technology transfer towards a more direct emphasis on innovation systems. In this perspective, the role of capacity building along the innovation chain (including the need for secondary and vocational training in areas such as engineering and environmental technology, higher education in science, and skills in entrepreneurship and technology-driven business development) should be strengthened.
- Improve the use of aid for STI purposes in the context of the EU development cooperation. In light of the EU and its Member States’ position as largest contributor of ODA (Official Development Assistance) globally, it might be considered to dedicate a modest but visible floor percentage of the ODA to STI for SDGs, to be progressively increased according to the results of “Technology Needs Assessments” and implemented during 2016-2030. This mechanism might be proposed at the FfD Conference to other OECD DAC (Development Assistance Committee) and non-DAC members. The ODA statistical framework for monitoring this policy should be adapted consequently.
- In the context of international cooperation, orient its STI policies more explicitly towards inducing private sector involvement, as well as leveraging and steering private investments into STI domains of relevance for the Post-2015 Agenda. Efforts such as the Joint Technology Initiatives should be built on for developing countries, and especially Least Developed Countries (LDC), engagement.
- Orient some of its STI efforts for making behaviour changes attractive. As consumption and life-styles need to be re-oriented in the direction of sufficiency, and there are only few areas where a purely “technology fix” approach will suffice, changes in mind-sets and behaviour become key for transitions towards a sustainable development.
- Develop a framework to guide investments in STI on projects, programs and initiatives with transformative potentials, taking into account criteria such as urgency, severity and irreversibility of the problem (“if no action is taken”). Institutionalize a “high-impact logic”, allowing the prioritization of “impact investments” from the banking and investment sectors, multi- and pluri-lateral banks, as well as the European Investment Bank.

(7) See the Report “A World that Counts: Mobilising the Data Revolution for Sustainable Development”, [www.undatarevolution.org](http://www.undatarevolution.org)

(8) See the recent Communication on Digital Single Market, COM(2015) 192 final.

This would shift resources to those activities that may stimulate, trigger and make rewarding behaviour change amongst investors, businesses and consumers and those that may build on and enhance interconnections and synergies between different SDGs (multipurpose actions).

- Strengthen efforts to develop education for innovation and entrepreneurship, including ICT vocational skills of EU scientists as well as of partners in third countries. Education is a key accelerator and a multiplier of the impact of STI. It is also a source for paving the ground for behaviour changes, through which also the demand for different choices can be stimulated.
- Develop a strategy to make businesses and people fully benefitting from the “Data revolution”, making Europe a champion in the digital world, also overcoming existing barriers for data exchange and use within the Union<sup>(9)</sup>. Moreover, the EU should foster the investment in human capital at all levels (not only at school), to both create appropriate skills to support these processes (for example, investing on the training of “data scientists”), and to allow people to be informed consumers and citizens.
- Conduct more research about interdependencies between problem areas (i.e. also between the 17 SDGs) and solutions, also to identify win-win solutions and possible multipurpose actions. Insights in both areas will impact the criteria for prioritization. In this context, the EU should develop analytical models and other tools to evaluate these aspects, also for ex-ante and ex-post impact assessment, especially taking into account long-term perspectives.
- Take into account the three principle impact spheres of SDGs related policies in the impact assessment framework, including the domestic policies’ impacts on other regions and countries. The relationship between the general IA framework and the Sustainability Impact Assessments (SIA) for free trade agreements (including the ongoing TTIP) needs to be reconsidered and aligned in light of the SDGs, as well as the underlying methodologies, particularly assumptions in economic assessments.

### Specific options towards achievement of SDGs

It is recommendable for the EU to:

- Promote a global Intellectual Property Rights (IPR) initiative to ensure that the global intellectual property regimes are consistent with the aims and action mechanisms of the Post-2015 Agenda. This regime needs to overcome the barriers for sharing IP, and needs to strike the right balance between open access and IP protection. Special attention should be given to enabling open access to publications, data, etc. for developing countries.
- Support the establishment of capacity development mechanisms for STI in developing countries, especially LDCs, including vocational skills in the STI sector, across

the innovation system from laboratories to markets including entrepreneurship skills. Investment in human capital policies needs to relate to these aspects, both within the EU and for developing countries. In light of the multiplier effect of education, a new program for higher education collaboration (also to build a generation of data scientists) might be set up (possibly with online platforms).

- Take the lead in international collaboration on a few Post-2015 topics, carefully selected building on EU recognized strengths and leadership (such as sustainable energy, water and sanitation, health and diseases, agriculture and food security). Put emphasis in cross cutting policy strategies that will drive change across the SDGs, where the EU is a clear leader, such as the circular economy, resource efficiency and (potentially) updated and upgraded bioeconomy strategies. Apply more integrative risk assessment frameworks that address critical uncertainties and indirect effects of the adoption of new technologies.
- Align the future H2020 structure to the SDGs framework and language. Specifically, future H2020 calls should explicitly require to incorporate in the submission of proposals the proposed research project’s intended contribution to the achievement of SDGs. In order to enhance, in quality and in quantity, the alignment of proposals to the SDGs in H2020, an adaptation of the guidelines describing ethical compliance and H2020 related mandatory procedures could be made to better assess proposals and carry out evaluations from this new perspective.
- As an input to H2020 and beyond, use European Commission inter-service task forces for each SDG in order to diagnose the STI needs along the innovation chain, to consider trade-offs and possible conflicts (competitiveness, etc.) for each goal/target. Moreover, the “Environmental Knowledge Community model” could be expanded and aligned with the Post-2015 Agenda. Finally, by coupling research and innovation, Horizon 2020 can help to achieve this goal with its emphasis on excellent science, industrial leadership and tackling societal challenges. Alignment of H2020 objectives with the SDGs will ensure that Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to address environmental and societal challenges.
- Increase the share of funds allocated to the 17 SDGs oriented projects, including those aimed at supporting open-ended science and technology research to discover the future technologies and innovations that will drive the next generation of implementation towards SDGs achievement.

(9) COM(2015) 192 final.