

SCIENCE, TECHNOLOGY AND INNOVATION POLICIES CAN MAKE THE EU THE GLOBAL FRONTRUNNER OF SUSTAINABLE DEVELOPMENT

The independent Expert Group on the “Follow-up to Rio+20, notably the Sustainable Development Goals (SDGs)”¹ was established by the EC to provide advice on the role of science, technology and innovation (STI) for implementing the new global sustainable development agenda (2030 Agenda). The Group’s report presents “a reference framework for EU research and innovation policy to be the engine of a transformative agenda built around universally applicable sustainability goals”. The Group gives recommendations, both in terms of general policy orientations and concrete areas of engagement, for EU STI policy to contribute to the implementation of the 2030 Agenda in Europe and beyond, as well as for possible engagement in international initiatives concerning STI. It recommends the EU to capitalise on its Horizon 2020 research and innovation programme, which is seeking to invest more than 60% of its budget for sustainable development and is fully open to international participation.

HIGHLIGHTS

- **Science, technology and innovation (STI) policy is fundamental to implement the new United Nations “2030 Agenda” for sustainable development (SD).** It enables economic and environmental efficiency, fosters new and sustainable ways to satisfy human needs and empowers people to take their own future in hand. The post 2015 sustainable development agenda calls on all countries to enhance research, upgrade technological capabilities, encourage innovation, grow the number of R&D workers per 1 million people and increase public and private R&D investment.
- **STI for SD policies (STI4SD) are a vital asset for the EU to continue to be the global frontrunner of SD.** STI policies should be enhanced and aligned with the universal 17 Sustainable Development Goals (SDGs). The EU should use STI results and products to inform and target its implementation of the SDGs.
- **Orienting public and private investments in the real economy to the SDGs will help create markets for new solutions that respond to the challenge of sustainability.** SDG-aligned research and innovation investments will accelerate economic transformation, promote technology uptake and adaptation and strengthen governance capacities, if adequately protected and if sufficient absorption capacity is in place. STI policies can turn sustainable development into a huge business opportunity for European companies and know-how.
- **Achieving the SDGs is not just a political commitment or a moral imperative. It is an opportunity for promoting jobs and growth, and achieving prosperity.** Three key avenues should be pursued for making the SDGs the organising framework for science, technology and innovation policies:

¹ The members of the Expert Group are: Professor Enrico Giovannini (chairperson), Dr Ingeborg Niestroy (rapporteur), Dr Måns Nilsson, Dr Françoise Roure and Mr Michael Spanos.

1. *Switch the focus*, reorienting mindsets and behaviours towards SD, reframing the EU's STI challenges, and refocusing from technology transfer to building innovation capacity.
 2. *Strengthen international partnerships*, enhancing engagement with developing countries through existing EU instruments, engaging all stakeholders (especially business), and developing tailor-made international STI initiatives.
 3. *"Walk the talk" and establish enabling systems* identifying causes of implementation gaps, aligning domestic STI with SDGs, ensuring Policy Coherence for Sustainable Development, seizing benefits from the "data revolution", and setting up monitoring, evaluation and assessments of STI4SD.
- **Priority actions that the EU could consider are the following:**
 - assess how STI policies can help better realise current EU policy objectives mapped against the SDGs and on this basis adopt a Communication on how STI4SD will support the implementation of EU strategies for sustainable development up to 2030 as part of the EU's overall socio-economic policy agenda;
 - develop a framework for Policy Coherence for Sustainable Development and align EU STI instruments and external policies to the SDGs framework, as well as of Member States' STI policies;
 - develop a framework for guiding STI investments to projects, programmes and initiatives with transformative sustainable potential, and establish a permanent observatory of changes and trends in new, emerging and potential future technologies for the SDGs;
 - integrate in the future Horizon 2020 work programmes the SDGs framework and language, increase the share of Horizon 2020 funds for SDGs-oriented projects and align the Horizon 2020 monitoring of the expenditure for SD to the 2030 Agenda;
 - in cooperation with behavioural economists, build a communication/education strategy on changes in production and consumption that supports the circular economy package;
 - take a leading role in relevant international collaborations related to SDGs for which the EU has a recognised leadership and promote the establishment of new cross-thematic international STI cooperation initiatives that will drive change across the SDGs;
 - carry out foresight and research to identify critical trade-offs between policies aimed at achieving specific SDGs and understand how they can be mitigated through synergy solutions and possible multipurpose actions; strengthen governance for the SDGs; improve the availability, credibility and timeliness of data related to SDGs and develop new integrated indicators for measuring progress; evaluate how single market rules can be improved to foster innovation for SD.

THE REPORT ON "THE ROLE OF STI POLICIES TO FOSTER THE IMPLEMENTATION OF THE SDGS": KEY MESSAGES

In September 2015 the United Nations agreed on a new global Agenda to take the world on a sustainable pathway. To be implemented, the new "2030 Agenda" will require a fundamental change in the approaches followed so far. In particular:

- The new Agenda is based on the principles of *universality* (including the “no one will be left behind” principle but also the principle of “action in all countries for all countries”) and *integration*.
- The SDGs *mark a shift in the economic and political relationships between developing, emerging and developed countries*. This requires significantly rethinking not only the EU's external actions, including development cooperation, but also domestic ones.
- The new Agenda *calls for a new cooperative paradigm based on the concept of “full global partnership”* that requires the mobilisation of all citizens, stakeholders, business and policy makers, these processes need to be conducted in a participatory manner.

STI is a fundamental tool to implement the new Agenda, as it can accelerate the transition to higher efficiency of economic and social activities, reduce the impact on the environment, minimise the transition costs to a sustainable path and create new business opportunities. In the SDGs framework, STI features strongly both in Goal 17, as well as a cross-cutting one to achieve several sectoral Goals and Targets. Fostering innovation is part of Goal 9 related to resilient infrastructure and inclusive, sustainable industrialisation, while Target 9.5 elevates the role of research and innovation policy well beyond STI as one of the Means of Implementation. Moreover, the Addis Ababa Action Agenda (AAAA) has identified concrete STI policies and actions as key for meeting the SDGs. Finally, the negotiations for the Paris climate COP21 in December 2015 address STI issues, proposing a framework for enhanced action on technology development and transfer.

In line with the **“universality” of the SDGs**, the EU has already committed to moving towards a sustainable Europe where people are “living well within the limits of our planet”, but it needs to prepare adequate responses to the pressures on its economies, environment and quality of social life caused by global megatrends. To do that, STI policies should be enhanced and aligned with the aspirations of the 2030 Agenda, making STI for SD policies (STI4SD) a key asset for the EU.

Investments are a vital instrument to change the current economic paradigm, increase social outcomes, improve energy and resource efficiency and reduce environmental costs. Indeed, one of the key actions undertaken by the Commission over the last year is the establishment of the European Fund for Strategic Investments (EFSI). Orienting public and private investments to achieve economic, social and environmental sustainability should be a must, also to foster governance capacities, especially in less developed countries.

Building on the above, the Report suggests three main avenues for change:

- 1) Switch the focus towards innovation systems;**
- 2) Strengthen partnerships;**
- 3) “Walk the talk” and establish enabling systems.**

In addition, the Report provides a set of recommendations clustered in different groups, as follows:

- o general policy orientations;
- o recommendations concerning the improvement of existing tools (including Horizon 2020) to reinforce their orientations to contribute to the achievement of the SDGs;
- o possible STI-related policies for strengthening policy coherence for SD;
- o communication and information about STI4SD and to change behaviour towards SD;
- o suggestions for engagement with international initiatives linked to STI4SD;

- option for evaluating the success of STI4SD policies;
- priority research needs.

Some of the recommendations can be implemented in the short-run, using existing tools and instruments, others require more time to be carefully designed; some can be carried out at technical level, others require a political commitment about the orientation of EU policies, also vis-à-vis the rest of the world. Key messages from the Report are presented below, also taking into account the three principles of **“open innovation, open science, and openness to the world”** announced by Commissioner Moedas and that will inspire the future EU research and innovation policy.

STI4SD actions oriented to establish enabling systems

In terms of general policy orientations, it is recommended to undertake a stock-taking and analysis of current EU strategies, to assess how STI policies could underpin them, and to adopt a Communication on STI4SD, to describe the proposed framework and expected actions. Moreover, science-to-policy task forces should be established for each SDG in order to diagnose the STI needs along the innovation chain and consider trade-offs and possible conflicts for each goal/target.

Policy coherence is at the centre of effective enabling systems and is crucial to minimise the cost of transition to SD. Therefore, the Report suggests, first of all and as an overarching recommendation to the EC, to engage in the conceptualisation of Policy Coherence for SD, pursue alignment of EU STI instruments and of EU external policies to the SDG framework, and promote a similar alignment of Member States' STI policies. Moreover, it would be important to include in the ongoing “gap analysis” of EU policies vis-à-vis the SDGs an analysis about how STI tools could help in supporting actions aimed at filling the gaps or in improving policy coherence, and complement the policy gap analysis with an implementation gap analysis. Finally, it is recommended to evaluate the policy coherence between internal market rules (including state aid), international trade rules and STI4SD policies, and evaluate how the coherence between existing tools needs to be improved, especially in the linking of the domestic and the external dimensions.

STI4SD actions that support “Open Innovation”

To stimulate “open innovation” the Report recommends to integrate in the future Horizon 2020 work programmes the SDGs framework and language, increase the share of Horizon 2020 funds allocated to SDGs oriented projects and align the Horizon 2020 monitoring of the expenditure for SD to the key underpinnings of the 2030 Agenda. In addition it would be important to establish a permanent observatory of changes and trends in new, emerging and potential future technologies for SDGs, and a grassroots surveillance framework for ongoing evaluation of STI4SD policies.

Investments in STI on projects, programmes and initiatives with transformative potentials should be definitely preferred. In this context, EU structural and innovation funds should be used to make EU cities as STI breeding grounds for experiments. Moreover, the mission of the European Institute of Technology should be fully aligned to the SDGs and annual/biennial awards on STI4SD should be established.

As communication and information on STI4SD is vital not only to foster investments towards SDGs, but also to change policy makers', citizens' and stakeholders' behaviours, it is recommended to build a communication/education strategy to stimulate changes in mindsets that could support the package on circular economy and lead to positive modifications, towards sustainability of production and consumption patterns.

Finally, as an important ingredient to reach sustainable development is the change in behaviours, the SD perspective and the SDGs should be deeply embedded in social innovation research, in order to foster societal change and lower the transition costs that moving onto a sustainable pathway necessarily implies.

STI4SD actions that support “Open Science”

Building a truly “open science” is a fundamental driver of the transformational change that the embracement of the SD framework implies. Making science open is not only about sharing scientific evidence among experts, but also using it to change the behaviours of businesses, governments, regulatory bodies, civil society organisations and citizens. Therefore, first of all, it is recommended that the EU develops a strategy to make businesses and people benefit from the “Data revolution”, making Europe a champion in the digital world.

More effort should be put into communicating across the society the knowledge gained in Horizon 2020 projects in support of the SDGs. Moreover, an effective communication between the science and the policy community should be established, in order to both inform policy makers about emerging issues and the role that STI can play to identify feasible solutions, and improve the science base in policy making: formalising this kind of communication (e.g. by establishing dedicated scientific advisory bodies on a mid- to long-term basis and build on good practice, including lessons learned, in Member States and at EU level) would be crucial. The production of an annual report and/or database on actions taken in STI4SD policies would also help in better communicating the importance of EU policies in this field to the both experts and the wider public.

Finally, the Horizon 2020 ethical framework should be expanded to EU international STI4SD initiatives, non-financial Ratings Agencies in the field of STI4SD should be established, and the Common Defence and Security Policy should be included in the evaluation scheme of STI4SD success.

STI4SD actions oriented towards increased EU “Research and Innovation Openness” to the world

Although the 2030 Agenda calls for a strengthened international cooperation in all fields, there is a special focus on cooperation for STI, because of its cross-cutting and potentially transformational impact. Therefore, it is recommended that the EU considers taking a leading role in existing international collaboration on selected 2030 Agenda topics: the choice should be made by building on its recognised strengths and leadership. Also, the EU should promote the establishment of new cross-thematic international initiatives that will drive change across the SDGs, where the EU is a recognised global leader, as well as engage in relevant global STI related initiatives, as indicated in the Report, and support the effort aimed at the global monitoring process, follow up and review of SDGs. The Report recommends to pay special attention to:

- on the policy side, the Scientific Advisory Board to the UN, the Global Sustainable Development Report and the High Level Political Forum;
- on the science side, Future Earth, the Intergovernmental Panel on Climate Change and the Group on Earth Observations.

It would also be important that the EU applies for itself and advocates for specific levers and investment in STI4SD accelerators selected by the AAAA (as the Least Developed Countries' Technology Bank and the Multi-stakeholder Forum on Science Technology and Innovation for the SDGs), moving beyond technology transfer and towards a broader emphasis on innovation systems.

Extremely helpful would be the development of a global initiative for the SDGs on the model of ERA, the promotion of the internationalisation and access for developing country participants in EU innovation

instruments and research infrastructures by extending their remit and mandates, and the establishment of incentives to "globalise" key on-going EU innovation and Public-Private Partnerships initiatives.

Last, but not least, it is recommended to promote international efforts for capacity building and education for innovation and entrepreneurship, strengthen the use of aid flows for STI purposes, consider capacity building and early inclusion of social innovation as part of the initial investment projects evaluations by Development Banks and International Financial Institutions. Moreover, it is suggested to promote an initiative to ensure that the global intellectual property regime is consistent with the aims and action mechanisms of the 2030 Agenda.

From vision to action

A sustainable Europe in line with the 2030 Sustainable Development Agenda requires transitions in the way we use natural resources, generate and use energy, produce and use food, organise transport modalities and competitively decarbonise production processes. **The SDGs present an unparalleled opportunity for the EU, as part of a global effort, to prepare responses to the pressures on its economy, environment and quality of life.** These pressures stem from global megatrends that affect all countries in the world: population growth, migration, competition for scarce natural resources for which Europe is heavily import-dependent, climate change and other environmental stressors, which will put growing pressure on Europe's various infrastructures and present new health threats, such as pandemics. The current migration crisis shows how Europe is internationally connected and vulnerable. The world's problems are EU's challenges and vice-versa. Europe's prosperity depends on global sustainability. The world and Europe stand to benefit from a Europe that builds its competitiveness on sustainability.

The 2030 Agenda calls on Europe to use its scientific and technological prowess to anticipate future risks and challenges, to make evidence-based decisions and to adopt innovation-enhancing enabling environments, based on rigorous and comprehensive impact assessments that incorporate all dimensions of sustainable development for domestic and external aspects of its policies. It calls on Europe to share its experience and knowledge with other parts of the world, supporting other countries to move onto sustainable pathways, developing and/or adapting technologies that meet their needs and respect their economic, social and cultural specificities, and engaging all stakeholders in this process.

Steering Europe towards "the future we want" requires an extraordinary investment in knowledge creation and use, thus in science, technology and innovation, as well as the capacity to successfully address the deep systemic causes of the current and future challenges.

The set of SDGs offers a comprehensive framework for promoting economically, socially and environmentally sustainable jobs and growth. The interconnected nature of the SDGs requires a structured policy response with a coherent and integrated approach to sectoral policies.

The concerted pursuit of these objectives **could make the EU the "world champion" in SD.** The more and the earlier the EU gears its strategies and STI policies towards this overarching goal, the more it will minimise the costs of transition and reap the economic and societal dividends from being the frontrunner. The recent Communication of European Commission (COM(2015) 610 final) on the 2016 work programme underlines the commitment to secure Europe's future sustainability through the development of "a new approach to ensuring economic growth and social and environmental sustainability beyond the 2020 timeframe, taking into account the Europe 2020 review and the internal and external implementation of the United Nations Sustainable Development Goals". This is a perfect opportunity to put the 2030 Agenda at the core of the EU policy agenda and fully benefit from STI4SD policies to move Europe and the world on a sustainable path.