



Technology Executive Committee

06 April 2021

Twenty-second meeting

Virtual meeting, 20-23 April and 26 April 2021 (TEC-CTCN Joint session)

Draft executive summaries on research, development and demonstration for targeted audience

Cover note

I. Background

1. As per activity 2 of the thematic area Innovation of its workplan for 2019–2022, the TEC is to produce executive summaries on research, development and demonstration (RD&D) for targeted audience.
2. Building on the findings of the compilation of good practices and lessons learned on international collaborative RD&D published by the TEC,¹ the innovation task force prepared draft executive summaries for target groups, namely policymakers, academics and research institutions, international organizations, and private sector actors.

II. Scope of the note

3. The annexes to this note contain the draft executive summaries on RD&D to targeted audience, prepared by the TEC task force on innovation.

III. Expected action by the Technology Executive Committee

4. The TEC will be invited to consider the draft executive summaries and provide guidance to the Innovation task force for their further improvement and finalization after TEC22.

¹ See <https://unfccc.int/ttclear/tec/rdandr>.

Annex I

Draft executive summaries on RD&D for policymakers

Technology Executive Committee

International collaborative RD&D

The Paris Agreement stipulates that accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development. Collaborative approaches to climate technology research, development and demonstration (RD&D) are crucial to accelerate the development and commercialization of the needed emerging climate technologies at a large scale. The aim of international RD&D collaboration is to enable sharing of knowledge and experiences on innovative technologies among regions and countries for each country to develop the capabilities to find its own path towards a low-emission, climate-resilient society and economy. Such collaboration can be successful and effective, but the design and implementation of collaborative RD&D initiatives require careful attention, need to be goal-oriented, systemic and need to support capacity-building globally. This would help such initiatives to better contribute to the overarching goal of strengthening climate innovation across the world to address the urgent global climate challenge.

KEY FINDINGS FOR DOMESTIC POLICY MAKERS

Policy makers play a key role in defining patterns of international collaborative RD&D and designing effective policy instruments for creating a supportive environment to encourage climate technology innovation. Policymakers are fundamental in **bridging gaps** that hinder the long-term sustainability of international RD&D initiatives for climate change and their successful delivery, including by:

- **Facilitating a high-level political buy-in:** institutional engagement and support in both planning and implementation phase of international RD&D initiatives enhance the sustainability of the program and ensure linking the program's focus to national RD&D strategies and priorities of participating countries.
- **Linking RD&D initiatives to climate change goals:** many international RD&D initiatives are not climate-specific, they have instead very broad and non-specific goals, which indirectly includes climate change-related topics; and there are relatively few initiatives that address climate change adaptation;
- **Ensuring proper governance and management processes:** due attention should be paid to the design of governance structures and management processes that are inclusive and enable equal participation to the international RD&D initiative. In developing countries, where funding for RD&D is extremely sparse, and researchers are overstretched, providing support for ensuring proper participation in the management of the initiative is particularly challenging;
- **Facilitating private sector involvement:** The participation of the private sector is crucial to translate RD&D results into market deployment. Although various RD&D initiatives have made a special effort to engage with the private sector, its involvement in the early stages of the technology cycle is limited. Private sector mostly gets involved in the demonstration, incubation, commercialization and diffusion phases.

POSSIBLE OPTIONS FOR ACTION

Policymakers should prioritize measures that facilitate commercialization of international RD&D results. This includes **policy framework** and **engagement in international standardisation processes** to create early markets and conditions for broader deployment while promoting performance specifications that are likely to enhance acceptability by users.

Alignment with national priorities, needs and capabilities is crucial for the ownership, impact and long-term sustainability of international RD&D initiatives. It would be important to incorporate needs assessments in the program design by identifying (and regularly updating) thematic areas in line with country goals and establishing calls for funding RD&D proposals accordingly.

RD&D initiatives should be given a **flexible operational and funding structure** that allows countries to choose the activities to participate in based on their national interests and capabilities. For instance, the use of **multi-institutional consortia** with sector specific objectives would allow for flexible participation of countries, facilitate mobilization of expertise from academia and private sector as well as funding from private sector.

Smooth and streamlined management of RD&D programs should be ensured by anchoring them to **existing science and technology institutions** with a well-developed administrative infrastructure. Support should be provided to ensure effective participation of experts from developing countries, especially the least developed countries, that usually have weaker innovation systems and limited financial resources for academics and researchers. Particular attention should be paid to the participation of female experts.

Approaches to stimulating the participation of firms range from setting incentives such as **follow-on grants** for particularly promising candidates to ensuring close connection between collaborative **RD&D initiatives and incubators** should be encouraged. Similarly, engaging in international RD&D programs via the creation of **public-private partnerships** would allow private actors to diminish the high risk that research and innovation entail, particularly for small and medium enterprises, while opening to new markets and commercialization opportunities.

Interactions with **private investors and financial institutions** should be explored further for them to implement environment, social and governance provisions in their portfolios, with a focus on long-term societal benefits of investments.

Annex II

Draft executive summaries on RD&D for academic and research institutions

Technology Executive Committee

International collaborative RD&D

The Paris Agreement stipulates that accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development. Collaborative approaches to climate technology research, development and demonstration (RD&D) are crucial for deploying mature climate technologies and developing emerging ones at a large scale. The aim of international RD&D collaboration is to enable every region and country to develop the capabilities to find their own path towards a low-emission, climate-resilient society and economy. Such collaboration can be successful and effective, but the design and implementation of collaborative RD&D initiatives require careful attention, need to be systemic and need to support capacity-building globally. This would help such initiatives to better contribute to the overarching goal of strengthening climate innovation across the world to address the urgent global climate challenge.

KEY FINDINGS FOR ACADEMIC AND RESEARCH INSTITUTIONS

Academic and research institutions provide the skilled workforce that is needed for innovation and are also the source of new knowledge and technologies that underpin innovation. Actors such as universities and research laboratories play a central role in RD&D for climate technology as well as in widely disseminating the RD&D results by translating highly technical information into formats that are understandable and regionally relevant. In the context of international collaborative RD&D, academic and research institutions play an important role in various ways, including by:

- **Enhancing cross-sectoral collaboration:** advances in new technologies, environmental challenges and the need for social inclusion force countries to address increasingly complex problems. Solutions require, for instance, enhanced collaboration between private companies and research centers or higher education institutions;
- **Facilitating knowledge sharing and local capacity-building:** all international RD&D initiatives that have achieved meaningful developing country participation have supported local knowledge sharing and capacity development. This may sometimes be a challenge for many developing countries, given their relatively weaker innovation systems and funding for academics and researchers;
- **Conducting independent evaluation and assessment:** while some collaborative RD&D initiatives established internal assessment processes, evaluation by third-party assessment against pre-defined criteria is less common. Such assessments are critical for understanding the most effective collaborative formats and approaches for joint RD&D.

POSSIBLE OPTIONS FOR ACTION

Universities and research institutes play a central role in international RD&D initiatives. They could be instrumental in increasing the **participation of private companies and end users in RD&D programs**, by redefining research objectives and approaches more in line with the needs of the private sector.

Those forms of cooperation that facilitate equal participation of academia and industry, such as **multi-institutional consortia** using **public-private partnerships** funding model, should be prioritized. This would enable a broader knowledge sharing and a quicker deployment of the result of the research.

A **multi-disciplinary approach**, incorporating economic, social and policy expertise into the RD&D process since the planning phase, would increase the ability of the RD&D program to address rapidly changing market and social conditions and ensure a longer-term sustainability of the technology.

Knowledge sharing and capacity-building is certainly an area where academic and research institutions could contribute most, particularly when oriented to increase the effective participation of developing countries in RD&D programs. Strengthening human resources through, for instance, **scholar and student training**

and exchange in parallel to the RD&D activities would increase the chance of the continuation or expansion of RD&D activities in the future while building local capacity and promoting local ownership. This transfer of knowledge would be critical for the training of new generations of innovators.

In conducting capacity-building activities, universities and research institutes should put emphasis on **user-oriented approaches** that integrate local communities and their traditional knowledge.

Scholars and researchers could also play an important role in enabling a **regular independent evaluation and assessment** of international RD&D initiatives. This would include developing clear assessment criteria, conducting periodic reviews, and recommendations on refining program elements. Publishing such assessments would contribute to the understanding of success and failure factors of an initiative as well as to the development of new initiatives by other agencies.

Academic and research institutions should enhance their engagement in international RD&D initiatives and actively seek opportunities to **apply for funding** in the context of such initiatives.

Annex III

Draft executive summaries on RD&D for international organizations

Technology Executive Committee

International collaborative RD&D

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KEY FINDINGS FOR INTERNATIONAL ORGANIZATIONS

International organizations are active partners in various international RD&D initiatives; though not always directly engaged in actual RD&D on hardware technologies, they participate to RD&D efforts with dedicated networks that contribute significantly to the worldwide exchange of knowledge and best practices, thereby facilitating access of countries, particularly developing countries, to new climate technologies. International organizations play a critical role at various level, including by:

- **Supporting equal participation and joint ownership:** for international RD&D collaboration, all engaged researchers need to be able to cooperate on an equal footing. Meaningful participation of developing country researchers requires some external support, which needs to be structured in such a way that ownership is not negatively affected.
- **Facilitating knowledge sharing and local capacity-building:** all international RD&D initiatives that have achieved meaningful developing country participation have supported local knowledge sharing and capacity development. This may sometimes be a challenge for many developing countries, given their relatively weaker innovation systems and funding for academics and researchers.
- **Stimulating private sector involvement:** The participation of the private sector is crucial to translate RD&D results into market deployment. Although various RD&D initiatives have made a special effort to engage with the private sector, its involvement in the early stages of the technology cycle is limited. Private sector mostly gets involved in the demonstration, incubation, commercialization and diffusion phases.

POSSIBLE OPTIONS FOR ACTION

International organizations can play a crucial role in providing **local support** to countries and their administration for the **assessment of technology needs** and the design of RD&D initiatives in line with national needs and priorities. A more active role of participating countries from the earliest stages of decision-making would give a greater sense of ownership and enhance potential for the R&D output being utilized since this is driven by locally identified objectives (such as the nationally determined contributions).

Thanks to their global networks and regional presence, international organizations would be fundamental in establishing **local offices and centers** with qualified personnel. Building capacity of local offices and training their staff to be specialized in RD&D matters could improve the pace of technological development and contribute to expanding the network of local actors that share interests in undertaking RD&D.

Support to local offices could also expedite and improve coordination between government, academia, the **private sector and financial institutions**. International organizations can facilitate the adoption of funding models, such as **public-private**

partnerships, that would incentivize participation of industry actors and diminish the high risk that research and innovation entail for the private sector, particularly for small and medium enterprises.

Supporting the participation of local actors from various backgrounds in the RD&D process would allow the marshalling of a diversity of knowledge sources, including **local traditional knowledge and techniques**.

Building capacity of local policymakers and researchers would enable a more effective and equal participation of countries in RD&D programs. **Capacity-building** can be offered in the form of technical training, workshops, study tours that can be integral part of or complement the activities of the RD&D programs.

The engagement of international organization in RD&D programs can also facilitate the identification of **private or international donors** to support effective participation of countries, particularly of least developed countries. They may, for instance, leverage funds from **private investors and financial institutions** that implement environment, social and governance provisions in their portfolios.

Annex IV

Draft executive summaries on RD&D for private sector actors

Technology Executive Committee

International collaborative RD&D

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KEY FINDINGS FOR BUSINESS AND INDUSTRY ACTORS

The participation of the private sector is generally recognized as being crucial to the translation of RD&D into market deployment and many collaborative RD&D initiatives have made a special effort to engage with the private sector; however, its involvement in the early stages of the technology cycle is limited. Private sector mostly gets involved in the demonstration, incubation, commercialization and diffusion phases, which is too late for a proper incorporation of companies' needs, for instance for intellectual property arrangements. Engaging in collaborative RD&D initiatives bring mutual multiple benefits for the private sector and the other actors involved, such as:

- Access to **new approaches to RD&D**;
- Identification of **new applications and markets** for climate technologies;
- Leverage of **additional investments** to advance the commercialization of climate technologies;
- **Reduction of financial risks** that research and innovation entail for the private sector;
- Opportunities for **capacity-building** inside the company;
- Enhanced **competitiveness, technological competence** and **innovation capability**.

POSSIBLE OPTIONS FOR ACTION

It is recommendable for private entities to engage in **networks or consortia** dedicated to RD&D of climate technologies in order to share experiences with other enterprises, researchers and academics, and acquire knowledge about good practices. Participation in **thematic networks** within RD&D program would facilitate the exchange of knowledge with other RD&D groups of public or private entities on specific thematic areas and enhance the success of the RD&D initiative.

Engaging in RD&D programs via **public-private partnerships** would allow private actors to diminish the high risk that research and innovation entail, particularly for small and medium enterprises (SMEs), while opening to new markets and commercialization opportunities. Linking public and private fund would optimize the use of resources through the sharing of personnel, equipment and **intellectual property**, and support the involvement of innovative SMEs.

The more recent thematic area of **technology-based incubators** is a good example of a new instrument that promotes collaboration and innovation among the private sector, research centers and/or higher education institutions to increase the competitiveness of national industries in the member countries. Through such

collaboration, private actors would gain access to international markets and funds, as well as to new technologies and innovation.

Collaborative entrepreneurial experimentation (both in private and in the publicly funded settings) and **resource mobilization** in the form of skills and human capital from related industries would be crucial assets made available to private actors through engagement in RD&D programs.

The need for the private sector to commit to research is not just a financial matter, but it is also closely linked to the human resources invested on research. **Empowering qualified staff** in the context of RD&D programs and provide them with necessary resources for the application of their knowledge would be an important **capacity building** opportunity for a company, which increases competitiveness, technological competence and innovation capability.

Another field, where private actors could play an important role, is the **financial sector**. Interactions with private investors are rarely sought in collaborative technological RD&D and could be explored further to mutual benefit. Cooperation with and among the private sector would conduce to the design of RD&D programs and business schemes that can attract **private investors** and bring discoveries to the commercialization phase.