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Improving academia-private sector interactions: Persistent challenges and lessons learned from the COVID-19 pandemic

Summary report of a GSF-TIP virtual workshop

16 September, 2021, hosted by OECD, via Zoom.

This is the summary report from a workshop that was jointly organised by the Global Science Forum (GSF) and the Technology and Innovation Policy (TIP) working parties to explore what could be learned from the COVID crisis with regard to policies for supporting academia-private sector interactions [DSTI/STP/GSF/TIP(2021)1/REV1].

The workshop builds on recent GSF work on transdisciplinary research and TIP work on co-creation. It is one of a series of events that contribute to a GSF project on Mobilising Science in Response to Crises and the TIP project on Collaborative Transitions: Exploring New Tools and Approaches.

The presentations and video recordings from the workshop are publicly available and the intention is that this report will also be made publically available as a resource for all interested parties.

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Improving academia- private sector interactions: Persistent challenges and lessons learned from the COVID-19 pandemic.

Summary report of a GSF-TIP virtual workshop held on 16 September, 2021

The STI reponse to the COVID-19 pandemic has included a plethora of novel collaborations between academia, the private sector and other stakeholders. The most visible outputs of these have been many of the vaccines that have been essential for managing the pandemic. There are a number of important lessons that can be learned from these collaborations. They are nearly all built on previously established networks and trusted relationships that can then be expanded as required, which has policy implications in terms of how they are supported and incentivised. Where the focus is on the production global public goods, then commercial incentives alone may not be sufficient and public sector actors may have to play a more proactive and directed role in research and innovation processes. The pandemic has demonstrated the necessity for co-creation and transdisciplinary processes to address complex societal challenges and for science and innovation policy to be more closely integrated in supporting these processes.

Background

1.   The COVID-19 pandemic has highlighted both the potential benefits of strong collaboration and exchange between academic researchers and industry and some of the challenges that need to be overcome to fully realise this potential.

2.   Co-creation and transdisciplinary research (TDR) efforts during the crisis have enabled the effective integration of the strengths of diverse stakeholders and resulted in the rapid development of new vaccines and therapies, health care technologies and digital tools or platforms for collecting analysing and sharing data and information. New networking models and collaborations[1] have emerged and many of these have the potential to be further developed and applied beyond COVID-19 to address other pressing societal challenges. To achieve this at the necessary scale, requires policies, frameworks and funding models that promote multi-actor collaboration in research and innovation.

3.   This workshop was jointly organised by the OECD working party on Technology and Innovation Policy (TIP) and the Global Science Forum (GSF). It built on the TIP's extensive work on industry-science linkages, including recent work on knowledge transfer[2] and co-creation[3]. It was directly related to ongoing TIP work looking at co-creation case studies related to COVID-19 and a project on Collaborative Transitions: Exploring New Tools and Approaches. From a science policy perspective, it built on a recently completed GSF study - Addressing societal challenges using transdisciplinary

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[1] Paunov, C. and S. Planes-Satorra (2021), "Science, technology and innovation in the time of COVID-19", OECD Science, Technology and Industry Policy Papers, No. 99, OECD Publishing, Paris, https://doi.org/10.1787/234a00e5-en.
[2]http://www.innovationpolicyplatform.org/www.innovationpolicyplatform.org/university-industry-collaboration-new-evidence-and-policy-options/index.html
[3] Kreiling, L. and C. Paunov (2021), "Knowledge co-creation in the 21st century: A cross-country experience-based policy report", OECD Science, Technology and Industry Policy Papers, No. 115, OECD Publishing, Paris, https://doi.org/10.1787/c067606f-en.

research[4] - as well as an ongoing project on Mobilising science in crises: lessons learned from COVID-19.

4.   The overall aim was to learn from the COVID-19 experience and from some of the actors directly involved in co-creation and TDR projects, as well as explore how science policy and innovation policy can work together to support science-industry collaboration for societal benefit in the future. Whilst the main focus of the workshop was the interface between academia and industry, the role of other research partners, from government and civil society was also considered.

Welcome and introduction

- **Göran Marklund** Chair of the TIP Working Party, Deputy Director General, Vinnova, Sweden

- **Catherine Ewart** Vice-chair of the Global Science Forum, Associate Director of International at UKRI's Science and Technology Facilities Council (STFC), UK.

5.   The co-chairs made a brief introduction emphasising from the outset the importance of building on the lessons learned from COVID-19 to strengthen the links between science and other public and private stakeholders and between science policy and innovation policy. There are many complex societal challenges that need solutions from STI and effective partnerships between the public and private sector will be critical for developing these solutions so as to build more resilient and sustainable societies.

6.   The Secretariat (Caroline Paunov) then gave a short presentation on the lessons learned from recent GSF and TIP work on science-industry collaboration. Two major challenges for effective co-creation had been identified in ongoing TIP work: 1. Issues around openness, data sharing and digital tools for effective collaboration; 2. Aligning different perspectives on public good, inclusivity and commercial interest.   These challenges had also been highlighted in GSF work on TDR that had been completed just before the pandemic but their importance was further emphasised by the crisis. Whilst they are not new topics for STI policy, they have specific manifestations that require immediate attention in the context of a global crisis like COVID-19. The workshop was designed to shed further light on these challenges and how they are being addressed at the practical level in a variety of research initiatives (panel1) and at the policy level (panel 2).

Panel 1: Challenges and good practices in co-creation during the COVID-19 crisis

7.   This panel discussion explored the challenges and good practices from the perspective of practitioners who are leading projects that involve both academia and the private sector. It focused in particular on the two key areas that were introduced in the introductory session:

- Openness, data sharing and the use of digital tools, and
- Aligning public good, inclusivity and commercial interest.

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[4] OECD (2020), "Addressing societal challenges using transdisciplinary research", OECD Science, Technology and Industry Policy Papers, No. 88, OECD Publishing, Paris, https://doi.org/10.1787/0ca0ca45-en.

Moderator: Carthage Smith, OECD-GSF
Panellists

- **Frank von Delft**, Professor of Structural Chemical Biology, University of Oxford: *COVID Moon-shot project*

- **Kathryn Funk**, Program Manager, PubMed Central, National Center for Biotechnology Information, National Library of Medicine, National Institutes of Health: *CORD-19*

- **Kirsimarja Blomqvist**, Professor for Knowledge management at LUT University (former Lappeenranta University of Technology), Finland: *Fast expert teams*

- **Catalina Lopez-Correa**, Chief Scientific Officer, Genome Canada, Canada: *Canadian COVID-19 Genomics Network (CanCOGeN)*

- **Hande Alpaslan**, Head of Science, Technology and Innovation Policies Department, TÜBİTAK, Turkey, **Duygu Saraçoğlu**, Senior Policy Expert, Science, Technology and Innovation Policies Department, TÜBİTAK, Turkey: *The COVID-19 Turkey Platform*

8. The COVID Moon-shot project is a major international, open, crowd-sourcing initiative that aims to bring a safe, affordable, oral antiviral to patients globally. It combines expertise from multiple public and private sector actors – individuals, institutions and firms - and has identified a number of promising molecules that are ready for moving into clinical testing. The early stages of the initiative were driven by altruism and a shared sense of wanting to serve the common good. The most important resource has been the intellectual contribution of hundreds of researchers who have freely devoted their time to the project. This, combined with the leadership of a number of trusted scientific institutions, was critical for the getting the project to work. The funding has been limited, with an initial application to a competitive research funding scheme being declined – the initiative does not fit the profile of what research funding agencies would normally fund. Core funding has come from the main institutions involved in the initiative and access to facilities and materials has been largely pro bono. As the initiative moves into the next phase of clinical testing, the issue of what is an appropriate business model has come to the fore. A choice was made at the outset to adopt an approach whereby intellectual property rights (IPR) would be open and this was critical in getting so many actors to work together. However, there is no good model for the later phases of drug development, clinical testing, production and distribution that does not involve exclusive IPR or licensing arrangements and has global equitable access as its major goal.

9. The COVID-19 Open Research Dataset (CORD-19) was established by the US National Library of Medicine at the NIH. It started with a joint statement in March 2021 from the national science advisors in a dozen countries that called on publishers to voluntarily make their COVID-19 and coronavirus related publications and supporting data, immediately accessible. More than fifty publishers volunteered and contributed to CORD-19, making relevant article available in formats, and under licence terms, that facilitate text mining and secondary analysis. This resource is being used by thousands of scientists. It provides the basis for the CORD-19 Challenge, which is a collaboration between NIH and the Allen Institute that uses the Kaggle platform and launches competitions for the community to use AI and machine learning to analyse the literature and come up with new insights in response to specific questions. Whilst the dataset is extensive, it does not include all articles relevant to the pandemic and there are gaps, for example, in relation to social sciences and humanities. There are also longer-term questions about its continuing availability and what happens post-pandemic. In this regard, funder mandates for open access will be critical. It was noted further that the shift towards

open pre-prints for biomedical research during COVID-19 is likely to continue and, whilst this is positive in terms of access, it raises a number of policy issues, relating to quality assurance and public communication of scientific evidence.

10.   Fast expert teams-initiative (FET) brings together different actors for a digital dialogue on complex issues requiring multi-sectoral expertise. For the innovation system, it provides a fast means for collective action to tackle issues that require cross-sectoral expertise and can be applied in a crisis like Covid-19. "Fast expert teams against corona - let's prevent Finland from paralysis" was conducted in March-April 2020 and brought together over 100 experts from ministries, universities, public and private organizations, who collaborated in eight temporary virtual teams for a month. These core teams used digital tools to connect with other experts and collect data and information to address a diverse range of urgent challenges, ranging from conditions for remote-working to de-contamination of respirators or design of emergency research funding instruments. The teams managed to break down ministerial silos by identifying common objectives and taking a pragmatic and flexible approach that enabled the expansion of existing trusted relationships. Echoing the situation for the COVID Moon-shot project, it was observed that IPR and ownership issues can block collaborations from the outset. It is important to understand the different motivations of different actors in a collaboration. The teams' initiative had taken a modular approach, with IPR and contractual issues being dealt with, if and when necessary, as projects progressed and once trust had been established. The emergency situation and sense of common purpose helped make this feasible.

11.   The Canadian COVID19 Genomics Network (CanCOGeN), is a $40M publically funded initiative to advance the use of genomics to help understand and control the COVID-19 pandemic. It builds on an existing national public health genomic initiative and links with a number of other national and international genomics infrastructures and research programmes. This includes the Canadian VirusSeq Data Portal that was launched in February, 2021 to track the pandemic and viral variants across Canada. The portal is a collaboration between 2 Canadian universities, a public research institute and a medium sized private enterprise and it enables real-time data sharing for public health experts and researchers. It is linked to COVID Cloud, which provides data analysis and visualisations tools and shares data, using the open community standards developed by the Global Alliance for Genomics and Health. As with the other cases that were presented, the rapid establishment of CanCOGen was only possible because much of the technical and social infrastructure was already in place. The major challenges related to different policies/ approaches to data ownership and sharing across provinces within Canada and between public and private sector actors. Whilst there are important caveats on how open the access to personal data can be, it is important to have standardised and open meta-data, including for holdings in the private sector. The public good imperative had been very important for driving cooperation between the different actors and, in this regard, a survey of citizen attitudes to sharing health and genomic data had recently been launched.

12.   The COVID 19 Turkey platform is a collection of 17 projects focusing on vaccines and therapeutics that bring together over 400 researchers from Universities, public research organisations and the private sector. It is combined with a number of other policy initiatives, including a fast track R&D support mechanism for SMEs, a dedicated rapid call for research on the socio-economic aspects of the pandemic and a hackathon. It is also linked to the EC COVID-19 data portal, which facilitates access to and dissemination of the platform's outputs. The Turkey platform effectively functions as a network of networks with shared social goals, willingness to collaborate and trust being the essential elements for it to work. Top down direction is given by the Ministry of Health and Ministry of Industry, working together to leverage bottom up ideas and expertise.

13.   The following key issues, were highlighted in the panel discussion:

Research capacity and funding

- Responding rapidly means building on existing initiatives (research infrastructures, networks and collaborations). Core institutional funding is critical to enable rapid and innovative responses. Some flexibility in the use of existing resources and access to 'emergency funding' can facilitate the development of innovative co-creation and TDR projects during crises.

- Traditional competitive funding mechanisms can be too slow and too conservative. Ministries and research agencies need to cooperate more effectively on setting priorities and integrating funding mechanisms to support multi-stakeholder or crowd-sourcing initiatives.

- Science policy makers need to provide strategic guidance and at the same time facilitate bottom up initiatives.   Altruism and trust are the key to many of the co-creation and TDR initiatives that were triggered by COVID-19. The challenge is to embed these values in research collaborations in the future, which can be facilitated by appropriate incentives and policy measures

Trust, motivation and ownership

- Building trust is critical and requires a pragmatic and iterative approach and people with good interpersonal/coordination skills that are not always valued in academia. Transparency and inclusiveness in the design and management of initiatives are important for building the necessary social and technical networks.

- Return on investment is not a sufficient driver for the generation and maintenance of public goods. Complex regulations and negotiations around ownership can hinder the establishment of large multi-actor collaborations. In crisis situations flexibility may be required. A step-wise approach can help, with contract negotiations taking place downstream as they become necessary. Having ready access to a variety of tried and tested model contracts can help also to support such collaborations.

- There is a need for innovative business models to scale up production and provide broad and inclusive access to certain public goods (re. COVID therapeutics). There is potential for direct commissioning of R&D and procurement by governments, when essential therapies are considered as public goods.

Digital tools and data

- Digital tools have proven their value in bringing experts from different sectors together to address common challenges. The involvement of respected and credible institutions that have prior connections with different stakeholders can facilitate crowd-sourcing. It is important also to provide visibility and acknowledge the contributions of all partners to ensure their continued engagement.

- Open access to scientific information and FAIR data access have proven their value during the pandemic and the progress in these domains needs to continue in the long term. Further research and surveys are required to assess citizen attitudes to personal data sharing in crises as well as to develop effective and transparent governance arrangements for personal data.

- There are limits in terms of the capacity of some actors/data providers to share valuable data and data service providers and platforms have a critical supporting role to play.

Panel 2: Policy tools and instruments

14. This panel explored the longer-term implications for science and innovation policy, taking account the practical issues and challenges that had been highlighted in the first panel.

Key questions

- Which instruments have proved effective in mobilising strong science-industry-civil society collaboration during the COVID-19 crisis?

- How can we apply our learning from co-creation during the crisis beyond the present pandemic, in particular to mobilise inputs across different stakeholders to address the environmental sustainability crisis?

- What policy actions are necessary to scale up co-creation and transdisciplinary research approaches?

Moderator: Caroline Paunov, OECD-TIP

Invited panellists

- **Mark W.J. Ferguson**, Director General, Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland

- **Myong Hwa Lee**, Head, Office of National R&D Research STEPI, Korea

- **Tateo Arimoto**, Professor and Deputy Director, Science, Technology and Innovation Policy Research Centre at the National Graduate Institute for Policy Studies, Japan

- **Marnix Surgeon**, Policy Coordinator, European Commission

- **Catarina Resende Oliveira**, President, AICIB, Portugal

15. The Science Foundation Ireland (SFI) research centres are co-funded networks of academic and industrial actors that are designed to integrate the different expertise that is distributed across the country. SFI also has a fellowship programme that enables academic researchers to spend a 1yr sabbatical in industry or public service. Hence, the necessary infrastructure and relationships were already in place when the COVID -19 pandemic struck and this capacity was leveraged with a rapid-response funding scheme that provided a single entry point for applications across all fields and for different actors and partnerships. Co-funding from different national funding sources and with international partners was organised by the relevant agencies as necessary. This was not easy as every agency has its own established culture and procedures but the 'one-stop shop' helped to break down silos and limit bureaucracy and ensured that innovative projects did not fall between the gaps. New rapid review mechanisms, e.g. short video presentations of initial applications, can also help to ensure effective and timely allocation of funding.

16.   Ireland had recently started experimenting with challenge-based funding schemes to promote co-creation and address societal challenges beyond the pandemic. An essential part of this is the curation of problems, linking local issues to global challenges. The Creating our Future initiative, which is a major public consultation on future research needs for Ireland, was being launched. This planned to use digital tools, local meetings and mainstream media to reach out to schools, households and communities across Ireland.

17.   The effective research response to the pandemic in Korea, was built on existing capacities and policy incentives to encourage individuals and institutions from the public and private sector to work together. Research infrastructures and a variety of public research institutes were at the centre of the research response in Korea and played a critical intermediary role in bringing together different actors.

18.   An important part of the research response to the pandemic in Japan, were the Centres of Innovation (COIs). There are 18 COIs, which bring together public and private sector actors to promote vision-driven innovation. These were ready to respond to the crisis and they had already established the necessary trusted relationships and procedures for working together. This included, in many cases, having tried and tested arrangements for IPR allocation and technology transfer, although it was noted that IPR waivers can also potentially be useful in certain circumstances (see session 1). Nevertheless, there is a challenge for rapidly scaling-up promising technological developments.

19.   Looking to the future, big data and artificial intelligence have the potential to change the way we manage crises but there is a need for a broad dialogue, engaging different sectors of society in different ways, to establish a framework for the collection, sharing and use of different types of data. It was noted, in this regard, many companies in Japan (and other countries) were reticent to share their data during COVID-19, even where these data could potentially benefit the research and policy response to the crisis.

20.   The European Commission has responded rapidly to the pandemic and launched a number of initiatives to support and coordinate R&D activities, many of which were focused on bringing together public and private sector actors. This included a major initiative, under the Horizon 2020 programme, on vaccine research and innovation and the establishment of the Health Emergency Research Area (HERA) Incubator for research on coronavirus variants. The EC COVID-19 data portal was set up to provide rapid dissemination and access to data and information from different countries and sectors and hackathons and other tools were used to promote the use of this resource to generate novel insights.

21.   A small number of major co-creation or TDR programmes were established quickly by the STI agencies in Portugal. Notable among these was the tech4COVID19 programme had brought together 5000 volunteers from a wide range of sectors – academia, industry, non-governmental orgnisations and citizens. The expertise and knowledge of these different stakeholders was leveraged to dvelop technological solutions for a variety of very practical challenges, including use of digital tools to support health professionals and COVID patients.

22.   The following key issues were highlighted in the panel discussion:

Building multi-stakeholder networks

- It is evident from the response to COVID-19 that academia, industry and other stakeholders all need to be involved early on to effectively address such a crisis. It

should not be a case of public versus private interests but cooperation and collaboration towards shared goals.

- There are different schemes for network-building, co-funding with industry or internationally that can all be used to build and support the collaborative partnerships that are essential for responding in crises. Sustainable funding to maintain and strengthen successful partnerships is important before, during and after crises.

- Research infrastructures and public research institutes can play an important role as facilitators for collaboration between academia and private sector partners to address societal challenges. This can be proactively encouraged and incentivised at the policy level.

IPR and data

- SFI research centres in Ireland or Centres of Innovation in Japan are interesting examples of policy initiatives that promote partnership building between different disciplines and stakeholders. These centres were able to respond rapidly to COVID because they had already established trusted relationships and IP/technology transfer arrangements. The option of IPR waivers may merit further attention in specific circumstances, particularly where there is a global public good imperative.

- Whilst some companies have opened up their data, this is limited and more policy attention needs to be given to access to data from public and private actors that is important for crisis management and, more broadly, for public research that is important for society.

Looking beyond COVID-19

- Citizens need to be engaged from the outset in creating a common vision for the future and translating this into research challenges/goals. Problem curation to define these challenges is a particular area for policy experimentation. Increased challenge-based funding that supports co-creation and TDR approaches will be required to address these challenges

- Policy makers need to provide more opportunities for public engagement/citizen science and promote transdisciplinary research. This is a challenge for research funding agencies (and research institutions) and their peer review and evaluation processes.

- The development of trusted AI platforms that promote a cross-sectoral interdisciplinary and citizen science approaches to data collection, dissemination and analysis are likely to be important for the management of future crises.

- At the governmental level, Ministries or agencies responsible for health, industry and innovation, the economy and science need to have an open dialogue about COVID-19 and develop a common vision for responding to future pandemics. Coordination both horizontally and vertically across ministries and agencies is critical for effective response to crises and for dealing with complex societal challenges. Urgency creates new opportunities (and promotes altruism). A critical

question now is whether we can create the same sense of urgency to address the crisis of environmental change.

Takeaways for GSF and TIP

23.   In this final session short interventions were invited from GSF and TIP Bureau members in response to the following questions:

- What are the key take away messages?

- What are the specific implications for science policy (GSF) and innovation policy (TIP) and are there areas that would benefit from being better integrated?

Moderators: Göran Marklund (TIP) and Catherine Ewart (GSF)

Interventions:

- **Catherine Ewart**, **Associate** Director of International at UKRI's Science and Technology Facilities Council (STFC), UK

- **Göran Marklund**, Deputy Director General, Vinnova and Chair of the TIP Working Party, Sweden

- **Tiago Santos Pereira**, Principal Researcher and Vice Chair of the TIP Working Party, CES, Portugal

- **Jerry Sheehan**, Office of Science and Technology Policy (OSTP) and Vice Chair of the TIP Working Party, USA

- **Kimikazu Iwase,** Japan Science and Technology Agency (JST), Japan

- **Kai Husso,** Ministry of Economic Affairs and Employment of Finland and Vice Chair of the TIP Working Party, Finland

24.   Building on the issues identified in the earlier panel discussions, the Bureau members highlighted 10 key takeaway messages from the workshop.

1. There are many lessons to be learned in relation to co-creation and TDR from the COVID-19 situation and the challenge for policy is to translate the lessons from this particular emergency into routine practices. Co-creation and TDR are important aspects of the STI policy toolkit and they will be critical for dealing with existing and new societal challenges.

2. Availability and access to (public and private sector) research infrastructures, data and knowledge are central to the response to COVID-19 and have played a valuable role in facilitating co-creation and TDR initiatives. Policy measures continue to be required to support and incentivise open science.

3. There is a need to go beyond academia-industry partnerships and truly engage civil society in science and innovation. This is an area where GSF and TIP should continue to contribute, including looking at how innovation agencies and research funding agencies can work more clearly together

4. The pandemic has shed light on the challenges for STI and cross-sectoral policy governance at the national level. There are interesting experiments in this regard, such as a new cross-sectoral parliamentary committee in Finland, and this is an area where countries can learn from each other.

5. Platform infrastructures, including digital platforms, are critical for the STI response to crises and there is a need for trusted facilitators and coordinators - both individuals and institutions. These need to be recognised, valued and supported accordingly as they are likely to play a critical role in transitions to more sustainable societies.

6. The perfect STI system does not exist and, on the whole, actors were able to work across their silos in responding to the pandemic but more can be done in this regard. In particular, science policy and innovation policy need to continue efforts to ensure closer integration.

7. The COVID-19 crisis required new solutions from STI and the rapid development of vaccines illustrates how challenge-driven research can focus efforts to address societal challenges. Whilst recognising the need for more challenge driven research, it important to bear in mind that the STI response to COVID-19, including the development of vaccines in public private partnerships, was dependent also on decades of prior investment in discovery research.

8. Where global public goods are concerned, then a more proactive role for the public sector, new approaches to IPR, new business models and ways of managing intellectual property will be interesting to explore further, building on experiences during the pandemic.

9. Both flexibility and adaptability need to be built into STI systems, e.g. with regard to funding mechanisms, in order to enable rapid response and effective inter-sectoral and international collaboration, which is essential to address global challenges.

10. Looking to the future, there is likely to be entrenchment, and a tendency to return to business as usual, post-COVID-19. Science and innovation need to build on the societal support and trust that have been established during the pandemic, learn from the past and ensure public engagement going forward.