Organisation for Economic Co-operation and Development

DSTI/STP/GSF(2021)12/FINAL

Unclassified

English - Or. English

19 July 2021

DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INNOVATION
COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY

OECD Global Science Forum

Workshop on "Research Infrastructure mobilisation in response to COVID-19: lessons learned"

Draft summary

11 May 2021, virtual workshop via Zoom.

This report provides a summary of the virtual GSF workshop co-organised with Science Europe and set up as a satellite event of the International Conference on Research Infrastructures (ICRI 2021). The workshop was attended by approximately 150 participants including GSF delegates. Note that, rather than providing a full summary of the workshop, the report concentrates on key elements of the presentations and on the discussions that took place during sessions.

All the speakers' presentations and the videos of the sessions are available at: Research Infrastructures mobilisation in response to COVID-19: lessons learned - OECD.

This report was approved by GSF and declassified by the CSTP on 6 July 2021.

Contact: Science and Technology Policy Division (DSTI/STP), Frédéric Sgard (Frederic.sgard@oecd.org).

JT03479539

Virtual workshop on "Research Infrastructure mobilisation in response to COVID-19: lessons learned"

11 May 2021
Draft summary

1. The COVID-19 pandemic has triggered an unprecedented mobilisation of the scientific community. Research infrastructures played a major role in this global effort, mobilising their resources and opening up their facilities to new projects targeted to COVID-19.

2. This exceptional response revealed many challenges, as research infrastructures had to reorganise their operating procedures, rapidly setting new priorities and balancing their resources to address the pandemic with continuing support for the science base as a whole.

3. This workshop was an opportunity to discuss some of the critical questions that emerged during the COVID-19 pandemic for different research infrastructure stakeholders, as well as to draw out lessons learned that could be useful in future emergencies or, more broadly, to improve the efficiency of research infrastructures in addressing scientific and societal challenges.

4. This virtual workshop was co-organised with Science Europe and was set up as a satellite event of the International Conference on Research Infrastructures (ICRI 2021). The key lessons learned fed into the ICRI conference discussion as well as contributing to the activity of the OECD Global Science Forum (GSF) on "Mobilising science in times of crises".

5. This workshop included case study presentations from research infrastructures from different research domains as well as moderated panel discussion with representatives of research agencies, funders, governments and the research community.

Session 1: *Adapting RI* processes *in emergency situations* (moderator: James Morris, Science Europe)

Case study presentations:

- **LifeWatch ERIC in the times of COVID-19: adaptations and lessons learned**
  Christos Arvaniditis, CEO LifeWatch-ERIC and Research Director in the Hellenic Centre for Marine Research
- **Use of Research Infrastructures to Identify Therapies for COVID-19**
  Philip Gribbon, Coordinator EU-Openscreen and Head of Discovery Research at the Fraunhofer Institute for Translational Medicine and Pharmacology
- **Contribution of Supercomputer "Fugaku" for the Fight against COVID-19**
  Makoto Tsubokura, Team leader of complex phenomena unified simulation research, RIKEN Center for Computational Science and Professor of computational fluid dynamics at Kobe University

6. Research infrastructures (RIs) had to face many challenges during the crisis.

7. A distributed e-RI such as LifeWatch was able to respond fairly well to the shutdown as 95% of its normal operations were already conducted online; this increased to about 99% during the crisis in response to both changing priorities and altered working conditions. However, workflows had to be adapted to respond to emergency priorities.

8. A critical element of success for working in a virtual organisational system is to have a collaborative and secure environment. An increase in cyber-intrusion attempts was noted during the crisis and the security team had to increase significantly its efforts on this issue. LifeWatch developed new in-house projects, as well as fast-track access for research on its own priorities.

9. Another challenge was to respond to the need for accelerated diffusion of data and research results. Besides the obvious practical difficulties related to physical access restrictions, RIs faced a cultural challenge, as there is an urgent need for research work to move from single scientists/team efforts towards larger networked collaborations. Internal and external joint initiatives were and are being developed that bring together diverse communities to share data relevant to complex problems (using the European Open Science Cloud for example).

10. The development of consistent cross-infrastructure workflows was an important element of success for a RI like EU-Openscreeen that focused its activities on drug repurposing (testing existing molecules for a new target). Pre-existing collaborations with other RIs helped fast-track projects, as it allowed work to start rapidly without waiting for all the administrative and legal issues associated with de novo collaborations to be addressed. Transparent and FAIR data processes were essential to obtain and share the data required to advance the research and development of potentially useful molecules.

11. Successful projects were largely based on pre-existing work: serendipity plays an important role but the experience accumulated from earlier work on rare diseases or earlier SARS and Ebola epidemics was invaluable.

12. Among the challenges faced during the crisis was the multiplication of in vitro studies worldwide that often overlapped, sometimes leading to confusing results. Furthermore, there was no consistent approach to assessing the potential of compound leads, which illustrated the need for better data exchanges. However, there is an absolute need for secure data sharing procedures, and a balance has to be made between sharing and security. In the area of drug development, there is a risk of misinformation about the potential of new therapeutics. This is a very sensitive area and all information had to be validated before being released to avoid misinterpretation.

13. It should be noted that many RIs outside the health area were mobilised during the crisis. The new and world fastest super computer "Fugaku" in Japan is a good example. Its deployment was accelerated at the beginning of the crisis so that its capacity could be used to model virus diffusion. Its main fundamental science mission was adapted to integrate various disciplines used to address societal challenges. This led to a reorganisation of the workload, with about 40% of time being allocated to priority issues (such as COVID- 19), 40% for traditional academic use, 10% for industry and 10% for internal projects.

14. New broad collaborations had to be developed that brought together public, private and government stakeholders to work on topics such as droplet dissemination simulation in different situations.

15. The societal impact of this emergency research was important, as results were used to issue policy guidelines for the general public. Considering the sensitivity of the issue, the Fugaku team set up regular meetings and communication mechanisms with the media

to inform the public of the results in a transparent way. This resulted in a high number of publications in different media and contributed to public engagement. This also helped to increase public confidence in the policy recommendations regarding the use of masks and social distancing issued by the government.

Key lessons

- Collaborative RI networks established prior to crisis greatly facilitate cooperative work and data sharing during crisis;
- Most RIs were able to re-allocate resources and re-organise their operating procedures very quickly during the crisis, but working in a quasi-virtual-only environment requires specific training and resources. Digital processes were an important contributor to the resilience of RIs during the crisis, and should be considered, where appropriate, as a means of building further future resilience. It was noted, however, that some processes (training, education and engagement) still benefit from physical interaction;
- Sharing data and research results rapidly is critical in emergency situations, but a proper balance must be established to validate any results disseminated externally, as research data may be easily misinterpreted and misused.

Session 2: *Preparedness and Response of life science and health RIs* (moderator: Heidi Bandulet, Canada Foundation for Innovation)

Case study presentations:

- **Making new treatments possible**
  Michaela Mayrhofer, Head of ELSI Services of the Research of Biobanking and BioMolecular resources Research Infrastructure (BBMRI-ERIC, Austria)
- **Preparedness and response to SARS-CoV-2**
  Volker Gerdts, Director and CEO of the Vaccine and Infectious Disease Organization (VIDO), University of Saskatchewan in Saskatoon, Canada)
- **Facing new challenges in the next 30 years**
  Bryan Charleston, Director of The Pirbright Institute for animal health and virology (UK)

16. For life science and health RIs, the issue is not if, but when the next health crisis will occur. Therefore, preparedness is essential. For BBMRI, the experience previously acquired from working on rare diseases at global level was invaluable during the COVID-19 crisis, allowing all researchers to access biobank data through the local BBMRI partners. The crisis put biobanks in the spotlight and underlined the need to look at risks and opportunities for the use of biobanks for different purposes. The Ethical, Legal and Societal Impacts unit was heavily involved to address a variety of issues, including how to deal with conflicting priorities, and this showed the need for consistent and transparent procedures. The adoption of the FAIR guiding principles to data management and sharing – that is to make data Findable, Accessible, Interoperable, and Reusable – also proved a necessity to overcome barriers to cooperation.

17. The pandemic underlined the need to identify synergies and build networks prior to crises, as it is very hard to set up new international collaborations in an emergency situation. The success of BBMRI was therefore said to have been predicated upon its ability to leverage its existing network. The crisis highlighted also the importance of effective collaboration not only with other RIs but with all relevant stakeholders and user groups. To

that end, BBMRI intensified its outreach activities during COVID noting that education and training of a broad range of stakeholders is key to ensure preparedness to future crises.

18. For VIDO, which is Canada's largest biocontainment facility, the COVID-19 crisis meant undertaking a series of priority actions that were closely linked to policy needs. Being part of the WHO expert groups was very valuable for allowing the quick and efficient sharing of information and data worldwide. VIDO worked with close to a hundred companies, both domestic and international, to accelerate the search for vaccines and treatments.

19. Beside the expected role of VIDO in isolating virus strains and developing animal models, the crisis also led VIDO to undertake new roles, such as establishing procedures for sterilising medical equipment. This meant that the capacity of the infrastructure was stretched to its limit and that VIDO had to recruit many new staff, raising issues about training as the RI could not take the time to carry out extensive staff training in an emergency situation. Identifying sources of funding to cover these new activities also proved a challenge.

20. During the crisis, VIDO had to manage 10 times the normal volume of research contracts; this necessitated rapid reallocation of resources, and a reduction of non-COVID activities. It resulted also in severe staff pressure. This highlights the need for preparedness, as crises need fast responses. There is a need for vertically integrated structures, including quality manufacturing (i.e. GMP) which is often the missing capability causing significant delays in the development of treatments. It was recommended that more research institutions be geared towards an 'one-health' approach for emerging diseases to build up the necessary core resources, and a proactive programme for the development of vaccines in-between crises (conducting the initial phases of vaccine development) would be invaluable to cut the time for vaccine development and production in emergency situations. VIDO underlined the need for more funding support to ensure those facilities and their human resources are kept in a state of research readiness.

21. The necessity for preparedness and a global health approach were also highlighted by the UK Pirbright Institute, as fighting a pandemic involves research beyond just human health. The Pirbright Institute, which constitutes the main UK capacity to address epidemics in livestock, was also heavily involved in the COVID-19 crisis. This involved research on understanding how viruses switch between hosts and the development of animal models, but also support to the health system such as using its existing diagnostic capacity to manage samples and develop high-throughput screening and train health service staff on diagnostic testing and biosafety. The rapid response of this RI would not have been possible if it weren't for the fact that it had available the necessary contingent of well-trained staff that could be deployed in a timely fashion across the country.

22. The link with policy-making was also very strong; for example, the Institute played a major role in the surveillance of new variants and understanding their potential impact on human health; such a role can only be carried out with broad international collaborations. It should be noted that these collaborations helped science drive the policy agenda worldwide.

Key lessons

- RIs should conduct stress tests in-between crisis, to assess their capacity to respond to emergency, and this should include assessment of communication challenges;
- The whole research system needs to be pro-active to facilitate response in emergency: this includes networking, training a workforce that can be mobilised quickly, and establishing

integrated structures that help cut down administrative and legal requirements during crises;

- Proactive development of vaccines (initial development phases) and therapeutics by public research institutions on emerging diseases could dramatically reduce response times and the resources needed for making vaccines broadly available quickly in future crises.

Session 3: *Policy lessons learned from COVID-19, and potential role of research* (moderator: Petr Bartunek, CZ-OPENSCREEN)

Panel discussion:

- Lidia Borrell-Damián, Secretary General, Science Europe
- Martin Taylor, Executive Director, Canadian Research Data Centre Network
- Yasdan Yasdanpanah, Head of the French agency for emerging infectious diseases
- Antonio Zoccoli, President of INFN, Italy
- Lukas Levak, Director of Department of Research and Development at the Ministry of Education, Czech Republic

23. For Lidia Borrell-Damián, the crisis has underlined the role of RIs as catalysts in the overall response of the science system, as they are often focal points for unique and excellent research and collaboration between stakeholders. The crisis has demonstrated the role of RIs in data sharing, and new funding should be made available for data and sample platforms to reinforce this role, as well as to improve interoperability (for example through the EU science cloud).

24. Martin Taylor stressed the need to build long-standing relationships; in the future, RI networks can become an extension of government's response to pandemics. In the SSH field, the crisis revealed the need to include new types of questions in population surveys as the crisis was characterised by many non-health challenges. He supported the view that RIs are national assets for crisis management; there could be agreements between RIs and governments to reinforce this role (with appropriate support) so that RIs remain in a state of readiness for crisis response.

25. Yasdan Yasdanpanah supported the view that RIs are paramount for implementing a research strategy for crisis preparedness and response. He identified a series of specific shortcomings that could be addressed, such as access to samples internationally, need for metagenomics databanks to better monitor the evolution of the pandemic, the need for resources for bioinformatics analyses, and ways to improve the availability of sensitive data.

26. What is required in the future is a common and transparent vision; needs should be prioritised, and there should be funding to ensure the sustainability of RIs, including there emergency response capacity. Links between basic and applied research could be improved, as well as links between human and animal health and the environment. Finally, nationalism is creating obstacles that need to be overcome, and low-middle income countries should be involved much more that they are currently.

27. Antonio Zoccoli underlined the challenges that RIs that are not usually involved with public health issues had to face. Keeping facilities open was a daily struggle and many projects had to be redirected as access to new users was fast-tracked. Overall, the crisis proved to be a mix of challenges and opportunities; it showed the need for better preparedness and more structured organisation ahead of time, but also the capacity of RIs to respond quickly to new challenges.

28. Lukas Levak also underlined the flexibility of the RIs during the crisis and their capacity to serve both traditional and new users despite the challenges. He also mentioned that RIs had developed new innovative models of cooperation, which would help data sharing in the future. In terms of policy action, he indicated that countries needed to prioritise investments in R&D in public budget sand support the sustainability of RIs, whose life-cycles span over decades. He also stressed the need to have a large diversity of RIs in the landscape as nobody can predict the expertise that will be needed in future crises. There is a need to enhance collaboration between RIs and policy makers outside science and link RIs to other non-scientific facilities in serving society.

29. During the discussion, the panel raised the issue of the governance of the system. This requires attention at the level of individual RIs where governing boards need to be sensitised to the challenges related to responding to crises, but it requires attention also at the level of networks and internationally. In the health area, while recognising the essential contribution of WHO, the COVID-19 crisis revealed gaps in international governance that led to delays in the development and communication of critical research.

30. The challenge of maintaining data and making them broadly available was also mentioned; there is a need for a clear and transparent system of data stewardship, and ensuring that data are safeguarded over time.

31. The panel concluded that the COVID-19 crisis had raised the question of what society can expect from RIs, and how their sustainability can be ensured so that they can benefit society in the long run.