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Editorial

Full Throttle: COVID-19 Open Science to Build Planetary Public Goods

René Von Schomberg[1,2] and Vural Özdemir[3]

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The COVID-19 pandemic is an epic calamity. It also has a silver lining. Amid the crisis, communities around the world are contemplating on hard lessons about fragility of life, existential threats, and the importance of thinking beyond the socially constructed binary of humans versus nature (Roy, 2020; Wade, 2020). The latter binary has underpinned the invasion of animal habitats by humans, for example, through relentless extraction of finite planetary natural resources over the centuries, in effect bringing humans and animals in proximity (Özdemir, 2019). The unchecked human power on nature is a factor feeding the rise of zoonotic infection outbreaks in the first quarter of the 21st century, with microorganisms jumping from their animal hosts to humans.

But none of this was inevitable or preordained. Ecological crises can be prevented or their adverse impacts reduced by establishing planetary public goods (PPGs), as anticipatory responses to pandemics, climate change, and other crises looming on the horizon. A prominent lesson emerging from the COVID-19 pandemic is that planetary health care, vaccines, essential medicines, and personal protective equipment ought to be PPGs. This is important for both instrumental and normative reasons.

First, to stem a massive pandemic such as COVID-19, PPGs should be available to the whole of society in a sustainable/enduring manner, and to ensure that the virus does not gain a stronghold in, for example, conflict and war zones or communities faced with poverty. Second, building PPGs is important normatively, too, in terms of what kind of a society we want to live in during and after the COVID-19 crisis.

The reality on the ground has been different, however, than a vision of pandemic response based on PPGs. People without social safety nets, refugees, homeless individuals, or migrants with inadequate access to health care, and communities exposed to long-standing historical injustices are at greater risk for poor pandemic outcomes (APM Research Lab, 2020; Eichengreen, 2020). Leaving the design and development of and access to health care, vaccines and essential medicines to market efficiency mechanisms as commodities, rather than as PPGs, create communities with haves and have-nots, deepen the social fault lines, weaken the understanding of health as a universal human right, and do not bode well for anticipatory and robust governance of existential ecological risks in the 21st century and beyond.

A new *modus operandi* for science and innovation in the COVID-19 era would be putting the concept of PPGs into practice to ensure planetary health, vaccines and drugs have scale, speed, and surge capacities in times of crisis, are available to everyone in society, and importantly, designed and developed in ways that are broadly experiential and responsive to societal needs, values, and priorities (Özdemir et al., 2020).

Open Science to Build PPGs

The rationale for open science is actually simple and straightforward: sharing knowledge and data as early as possible in the research process. To build PPGs in times of normalcy as well as planetary crisis, we need open science throughout the entire innovation lifecycle, from research design, data production, and sharing to translation into knowledge-based innovations. Open science is also crucial for critically informed deliberation on veracity of data and emerging knowledge (Bayram et al., 2020; Sclove, 2020). Open science can help all relevant knowledge actors to realize science in a spirit of responsible innovation and build PPGs (Von Schomberg and Hankins, 2019; Von Schomberg, 2019).

Science progresses essentially through knowledge-communication in collaborative research settings (Zhao et al., 2014). Yet, the dominant current practice is to incentivize and reward scientists to do something else: publish as much and as fast as possible with an eye to establishing individual prestige that embeds scientists and science regulators alike in cultures that lack reflexivity, and are laden with self-serving instrumentalism and (overly) competitive science.

[1]Directorate General for Research and Innovation, European Commission, Brussels, Belgium.
[2]Technical University Darmstadt, Darmstadt, Germany.
[3]OMICS: A Journal of Integrative Biology, New Rochelle, New York, USA.

Absent open science, publishing activities focusing on quantity over quality take precedence over delivering on social relevance while science becomes self-referential: science is then assessed according to narrow criteria of excellence on which only scientists determine in ways detached from society. These criteria are used as effective arguments to keep societal and ecological interests out of the equation in defense of the ''autonomy'' of science and their institutions (Benessia et al., 2016; Guston et al., 2009; Holbrook, 2005; Özdemir, 2020a, 2020b, 2020c; Ravetz, 2016; Sarewitz, 2016). In addition, narrowly framed ''excellence''-driven science is enabled under very competitive funding systems and scientists spend a large amount of their time submitting proposals for doing self-referential ''excellent'' research rather than engaging in a collaborative manner on essential exchanges of knowledge that address PPGs and pressing social needs.

Johan Bollen rightly noted that the ''European University Association in 2016 estimated that the equivalent of at least one-quarter of Europe's Horizon 2020 funding program goes to preparing grant applications. A 2013 study estimated that Australian scientists collectively spent more than five centuries of time preparing 3727 proposals in 2012 (Herbert et al., 2013)'' (Bollen, 2018).

The current rewards and incentives system for scientists has a heavy reliance on use of quantitative bibliometrics that chase researchers on their research productivity (San Francisco Declaration on Research Assessment, 2012). This results in a paradox of scientific productivity. The more individual scientists become productive (in terms of the current system), the less productive the scientific system becomes in terms of *actually* delivering on societally relevant and desirable outputs. This paradox becomes particularly visible against the current background of addressing an ecological crisis such as COVID-19.

Open science would help remedy the aforementioned deficits in our innovation ecosystems that are hindering progress toward societally meaningful COVID-19 solutions. Open science would contribute toward the need to assess research on its own merits and its relative contribution to a research mission, for example, the production of a vaccine, rather than on the basis of the journal in which the research is published. This would also help consider a broader range of research impacts such as influence on policy and practice in addition to research publications (San Francisco Declaration on Research Assessment, 2012).

Concluding Thoughts

Strengthening open science and PPGs with robust democracies

Implementing open science, alone, is not sufficient to build PPGs. We also need well-functioning democracies. The critical deliberation of research design, data veracity, and the sharing of scientific knowledge require an open society and democracy (Frodeman, 2020; Özdemir, 2020a; Sclove, 2020). Societies that lack functioning democracies are unlikely to be able to implement open science and build PPGs in ways that are accountable, veritable, and socially responsive. To this end, it is noteworthy that the recent rise of authoritarian populism as a way of governance has caused marked regression of liberal democracies (Geiselberger, 2017; Rankin, 2020).

It is oftentimes taken for granted in scientific communities that the presence of elections and procedural correctness guarantee a functioning democracy. Voting is only one component of democracy, however, and in and of itself, insufficient for a robust democracy that requires systems thinking beyond the ballot box. Political scientists have long noted the imprecision of voting as a mechanism for democracy (Lindblom and Woodhouse, 1993). In a well-functioning democracy, for those who win an electoral campaign and acquire political authority, there are, and should be, limits to their reach and power to guard against any potential tyranny of the victor or of the majority. In a genuine democracy, ''the power of an elected political authority is limited by several mechanisms. These include, for example, free press and critically informed media to hold power to account and fact-check; separation of powers (e.g., of legislation and judiciary); guarantee of civil rights and freedoms by constitution and their enforcement by an independent judiciary'' (Bayram et al., 2020). However, democracies also have to further evolve and establish mechanisms for anticipatory governance, promoting early and critically informed public deliberation on issues of science and technology. The institutes for technology assessment that were institutionalized for advising national parliaments during the latter half of the past century such as the Rathenau Institute in the Netherlands or the Office of Technology Assessment at the German Bundestag (TAB) need to be reinforced for that purpose.

Despite the immense suffering caused by the COVID-19 pandemic and the difficult road ahead, there is a silver lining. This crisis can cultivate a culture of open science and buttress democracies around the world, and by extension, build the much needed PPGs. These will help us respond to current and future ecological crises in ways that are anticipatory, democratic, efficient, and principled.

Disclaimer

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References

APM Research Lab. (2020). The Color of Coronavirus: COVID-19 Deaths by Race and Ethnicity in the US. American Public Media. https://www.apmresearchlab.org/covid/deaths-by-race. Accessed June 21, 2020.

Bayram M, Springer S, Garvey CK, and Özdemir V. (2020). COVID-19 digital health innovation policy: A portal to alternative futures in the making. OMICS 24 (in press); DOI: 10.1089/omi.2020.0089.

Benessia A, Funtowicz S, Giampietro M, et al. (2016). *The Rightful Place of Science: Science on the Verge*. Tempe, AZ: Consortium for Science, Policy & Outcomes.

Bollen J. (2018). Who would you share your funding with? Nature 560, 143.

Eichengreen B. (2020). Rage against the pandemic. Project Syndicate. https://www.project-syndicate.org/commentary/

covid19-racial-disparities-fuel-usa-protests-by-barry-eichengreen-2020-06?utm_source=Project±Syndicate±Newsletter&utm_campaign=36dca8956a-covid_newsletter_11_06_2020&utm_medium=email&utm_term=0_73bad5b7d8-36dca8956a-105990839&mc_cid=36dca8956a&mc_eid=7d6839b074. Accessed June 21, 2020.

Frodeman R. (2020). What happens when society emphasizes technical education and treats the humanities as irrelevant? The Dallas Morning News. https://www.dallasnews.com/opinion/commentary/2020/02/03/what-happens-when-society-emphasizes-technical-education-and-treats-the-humanities-as-irrelevant/. Accessed June 21, 2020.

Geiselberger H. (2017). *The Great Regression*. Cambridge, United Kingdom: Polity Press.

Guston DH, Sarewitz D, and Miller C. (2009). Scientists not immune to partisanship. Science 323, 582.

Herbert DL, Barnett AG, and Graves N. (2013). Funding: Australia's grant system wastes time. Nature 495, 314.

Holbrook JB. (2005). Assessing the science–society relation: The case of the US National Science Foundation's second merit review criterion. Technol Soc 27, 437–451.

Lindblom CE, and Woodhouse EJ. (1993). *The Policy-Making Process*. Upper Saddle River, New Jersey: Prentice Hall.

Özdemir V. (2019). Innovating goverance for planetary health with three critically informed frames. OMICS 23, 623–630.

Özdemir V. (2020a). Genomics, the internet of things, artificial intelligence and society. In: *Applied Genomics and Public Health*. Patrinos G, ed. San Diego, CA: Academic Press, 275–284.

Özdemir V. (2020b). The science and politics of coronavirus. DUVAR English, Istanbul. https://www.duvarenglish.com/opinion/2020/03/16/the-science-and-politics-of-coronavirus/. Accessed June 21, 2020.

Özdemir V. (2020c). Embracing veganism and animal sentience: The long view on Coronavirus outbreak. Istanbul: Agos Weekly. http://www.agos.com.tr/en/article/23573/embracing-veganism-and-animal-sentience-the-long-view-on-coronavirus-outbreak. Accessed June 21, 2020.

Özdemir V, Springer S, Garvey CK, and Bayram M. (2020). COVID-19 Health Technology Governance, Epistemic Competence, and the Future of Knowledge in an Uncertain World. OMICS 24 (in press); DOI: 10.1089/omi.2020.0088. Accessed June 21, 2020.

Rankin R. (2020). Hungary's emergency law 'incompatible with being in EU', say MEPs group. Measures voted on Monday will allow Viktor Orbán to rule by decree without time limits. The Guardian. https://www.theguardian.com/world/2020/mar/31/hungary-emergency-law-incompatible-with-being-in-eu-say-meps-group-viktor-orban. Accessed June 21, 2020.

Ravetz J. (2016). How should we treat science's growing pains? The Guardian. https://www.theguardian.com/science/political-science/2016/jun/08/how-should-we-treat-sciences-growing-pains. Accessed June 21, 2020.

Roy A. (2020). The pandemic is a portal. Financial Times. https://www.ft.com/content/10d8f5e8-74eb-11ea-95fe-fcd274e920ca. Accessed June 21, 2020.

San Francisco Declaration on Research Assessment (2012). https://sfdora.org. Accessed June 21, 2020.

Sarewitz D. (2016). Saving science. New Atlantis 49, 4–40.

Sclove R. (2020). Democracy and technology: An Interview with Richard Sclove from Beth Simone Noveck. Digit Gov Res Pract 1, Article 5. https://dl.acm.org/doi/fullHtml/10.1145/3368273. Accessed June 21, 2020.

Von Schomberg R. (2019). Why responsible innovation? https://app.box.com/s/h8gib5ga6wtcv81dste3kjlhyz1zpu91. Accessed June 21, 2020.

Von Schomberg R, and Hankins J. (2019). *International Handbook on Responsible Innovation. A Global Resource*. Cheltenham and Northampton: Edward Elgar Publishing.

Wade F. (2020). Judith Butler on the Violence of Neglect Amid a Health Crisis. A conversation with the theorist about her new book, The Force of Nonviolence, and the need for global solidarity in the pandemic World. The Nation May 13. https://www.thenation.com/article/culture/judith-butler-force-of-nonviolence-interview/. Accessed June 21, 2020.

Zhao F, Chen Y, Ge S, et al. (2014). A quantitative analysis of the mass media coverage of genomics medicine in China: A call for science journalism in the developing world. OMICS 18, 222–230.

Address correspondence to:
Dr. René Von Schomberg
Directorate General for Research and Innovation
European Commission
Belgium 1049

E-mail: rene.vonschomberg@ec.europa.eu

Dr. Vural Özdemir
Editor-in-Chief
OMICS: A Journal of Integrative Biology
New Rochelle, NY 10801
USA

E-mail: OJIB@liebertpub.com;
vural.ozdemir@protonmail.com

Abbreviations Used

PPG = planetary public goods