

Chapter 8

Epilogue: Open Science in an Open Society



Abstract The European Union has chosen Open Science as the way to do science and research based on its cultural and social values. Open Science can only really thrive in democracies and Open Societies to the benefit of humanity. This relationship between science, scientists and society is not trival and sometimes endangered, therefore we need to continuously engage in research with and for society.

I have described in detail the changes in science and more briefly the changes in society since 1945 that are of greatest relevance to the current practice of science and research. The old way of thinking about and doing science does not fit with the dynamics and needs of social life and society in this age of hyper-modernity. I have discussed in depth why and how research and academia have to change to make both of them fit for the future.

I have followed experts, philosophers, sociologist, historians and STS scholars in the evolution of their thinking about science. I have shown that since the 1980s they have gone back to old, but realistic concepts of pragmatism of how science produces reliable knowledge and how it will increase its impact. These concepts are still valid and since 1980 have been revitalised and modernized by the most influential and visionary thinkers about science in society. This intellectual journey eventually, and I argued in many respects inevitably, led us to Open Science, an inclusive deliberative and democratic way to set the agenda of science and research in connection with ‘the publics and their problems’ in society. By doing research according to the practice of Open Science we will in a truly inclusive way, appreciate and accommodate all kinds of academic research and their different excellences and products. I have argued that this is required to successfully take on the Sustainable Development Goals (SDGs) and the Grand Societal Challenges of our time having said this, it must be realized that Open Science needs an Open Society, and vice versa the Open Society needs Open Science to contribute in a balanced way to its social and economic future.

That future has already started and is badly in need of knowledge produced by science performed according to the model of Open Science. Writing these lines, we are daily witnessing how the COVID-19 pandemic since March 2020 has devastating

effects on global health and prosperity and hence our societies and the lives we live all over the world. In the final lines of the previous chapter on Open Science I asked the question: ‘Will there ever be One Open Science in the sense of a worldwide community committed to practice Open Science?’ In the midst of the COVID-19 pandemic, the relationship between science and society becomes immediate and urgent and is shown to be absolutely critical to our future, for the short and for the longer term. When the damage to public health and the personal drama of literally hundreds of thousands of deaths caused by the virus are in the daily news, and the worries about its effects, both on health and economics in the other parts of the world are increasing, experts and their science were immediately on the problem and at the heart of policy advice and policy making. The general insecurity and the broadly felt lack of control caused by an invisible virus directs the attention of the public to the scientific experts and they look up to them with expectation and hope. Virologists and epidemiologists first, and then social scientists and economists were asked to comment and give their views, on how to keep us healthy and on what will happen to the economy and our social life. How come we didn’t see it coming? Can we get back our control? Can a next pandemic by such a virus be prevented or at least more rapidly controlled by science?

Fortunately, the scientists were almost all honest brokers, giving honest answers about what science is and what its limitations are. We have to admit, and anticipate, this leaves the public behind with fears of high risk, lack of control and insecurity with respect to their personal future. As expected in major crises, populist parties and other groups in society playing to the emotions of their electorate and followers showed distrust of science and experts in a wave of anti-elitism. Experts and politicians in the meantime try to be as transparent as possible with respect to the incomplete data, that was literally changing and improving day by day, for their analysis and advice, and the separate process of political decision making, respectively. Apart from some loud minorities who did not believe COVID-19 existed or was harmful at all, the trust in science was high. It is quite disturbing that President Trump and other elected presidents for shorter or longer times seemed to openly sympathize or belong to these minorities. Geopolitics interfered with the free flow of scientific data on the origin of the virus and resulted in the usual blaming and scapegoating. This explains Trump’s no-evidence accusations on the part of China and the censoring and silencing of researchers and civilians by the Chinese government.

In the meantime, the international scientific organization of the open exchange of data on the molecular biology, receptor use, sequence of the viral RNA of the virus and specimens and research material and data on the course of the pandemic -prevalence, hospitalization, ICU needs, mortality and morbidity- was a true example of a near global Open Science practice. Despite Trump’s believe May 9th, 2020 that the virus would spontaneously go away without a vaccine, subsequently, initiatives to establish (pre)competitive global initiatives to develop therapy and vaccines were launched. Of course, given how we have decided to organize the production of vaccines and medicines in our societies, the interaction with pharmaceutical companies

is economically complex. They normally have to please their shareholders while operating in the international markets, but now for COVID-19 were made to commit to affordable prizes based on transparent costs, but patents are allowed. As of this writing a couple of vaccines have already been approved, have shown excellent protection and vaccinations have started and shown success. With a pandemic which appears to be extremely difficult to control, this is a major achievement and hopefully will have a major effect on the course of the pandemic worldwide. The development of COVID-19 tests and treatment modalities, but in particular the historic quick and large-scale development of different vaccines is widely heralded as a major triumph for science, comparable by some to the Manhattan project. The academic publishers have opened up their paywalls to provide open access to articles related to corona viruses and COVID-19. After the applause dies away, it prompts the obvious question why this is not common practice because thinking about biomedicine and health alone, cancer, stroke, cardiovascular disease, asthma, dementia, and Alzheimer's and many other diseases aren't they not also a major threat to our health. Wouldn't this be very helpful for research and innovation on climate change and our thinking how to work on inequality, institutions in open societies and the many other fields of research and scholarship including ethics, political philosophy, research on socioeconomics badly needed to guide our actions in complexities of the real world?

Why can we only mobilize science and scientists and academic publishers in times of intense crises and of war? I agree with Marianne Mazzucato who has with endless energy and high visibility and impact argued for more direction and guidance from governments in democracies to organize our science and development according to large societal missions (Mazzucato, 2013) (Mazzucato, 2018). In the EU, as I discussed in Chap. 7, this has already started in Horizon 2020 and is an even more pronounced founding principle of the Horizon Europe program that will from 2021.

8.1 Open Society

This idea of an Open Society, or rather the lack of it, may be the problem for optimal development and implementation of Open Science in certain regions of the world. In the COVID-19 crisis, because it started unquestionably in mainland China, we were on a near daily basis tutored on Chinese history and politics. This tutoring already began with the trade conflicts between the USA and China and by the increase of Chinese interventions in Hong Kong in 2019. For some reason, we in the EU, with the Obama administration, had high hopes for reforms in China which would we thought bring the country more towards personal freedom and some form of liberal democracy. In the past 15 years many universities started very active

collaborations with counterparts in mainland China. Many had such collaborations in Hong Kong and Singapore to keep in contact with the Far East and its huge investments in higher education and research. The Chinese Academy of Science actively started efforts to improve the quality of the research which was being critiqued in recent years in *Nature* and *Science*. In the more recent years however, these expectations of societal and political change did not materialize. On the contrary, the Chinese Communist Party and their leader who holds absolute power, have adopted state capitalism and gone back to their old concepts about politics, the state and society. Their goal clearly is not only to become an economic and political superpower, but also to show that their model of the state and society is superior to the Western liberal or social democracies. In this major scheme, it places interests of the state, determined by the CCP, above personal freedom of its citizens. It is exactly the latter that has, with the Enlightenment, brought Modernity to the West which allowed for the development of modern science. The experts on China tell us how to understand these developments in the context of the past hundred years of Chinese history, and in the present, China's interventions among others in Hong Kong. China is rapidly developing to become a global superpower in science and technology, which for science and open science means that there will for years to come not be one global community, not one way of doing science and research.

There actually never was one global science community, but after 1989 there was a brief moment in time when we believed that it might be possible to have a global science, which we in the West erroneously thought per definition would be our way of doing science. The way Chinese society and its science are governed does not allow for science and research to be performed in open deliberative relationship with the publics and their problems as I have depicted in Chap. 5 as the ideal. This does not mean that there will not be collaboration, exchange and discussion with Chinese researchers. There are many grand and global challenges, such as COVID-19, economics and climate change in which global collaboration in research consortia are to the benefit of us all, no matter our different national political systems. To investigate these problems and their solutions, normative political choices with regards to science have to be made. For this academic leadership at every level of the science system, national and international, funder or academia has to step up to the plate. The EU has chosen Open Science as the way to do science and research. It are the political, cultural and social values of the EU in which we have to keep investing to see to it that Open Science can thrive in democracies and Open Societies to the benefit of all people (Wilsdon & Rijke, 2019).

Hong Kong, Where the West meets the East.

Utrecht University has in the past seven years invested in an institutional research collaboration with Chinese University of Hong Kong. This has been established by several professors and members of their research groups and by spin outs of UMC Utrecht. I first visited CUHK with a UU life science

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delegation in December 2013, at which occasion a collaborative agreement between the universities was signed by Marjan Oudeman, the Utrecht University President and the Vice Chancellor Joseph J.Y. Sun. There are many common research interests, from regenerative medicine, 3D printing of cartilage to be surgically applied to the knees of the affected elderly, to large cohort research on schizophrenia and public health in relation to air pollution. Professor Tuan, a very open and dynamic personality, was the leader of the orthopaedic regenerative medicine program. He had an impressive career in medicine in several top-notch universities the USA before he returned to Hong Kong. Opportunities for collaboration were discussed with major universities in mainland China and especially with the enormous new research and biotech facilities that were being build, just across the border, in Shenzhen. We fully realized these opportunities and the commitment of China to science and technology, since we had just arrived from Beijing where we visited Peking University and had meetings over dinner with government officials. I remember the magnificent view overlooking Hong Kong from the high hilltop on which the Board of CUHK has her offices and where we discussed science and research over lunch in a very friendly and open atmosphere.



In January 2019, I returned to CUHK, with an Utrecht University delegation now lead by our President Anton Pijpers. A warm welcome was expressed by professor Rocky Tuan, the CUHK's Vice Chancellor since January 2018. I passionately delivered my short opening talk on Open Science in UMCU and UU and our aim to increase impact by public engagement. I was, I am afraid, a bit hyped-up since because of delays, we came straight from the airport. Besides, that the speaker on behalf of the host started with the usual figures, metrics and the Shanghai ranking of CUHK, the idea of science for real impact was met with sympathy and we heard that similar actions had started in CUHK. We again had very constructive conversations and exchanges and, though we did not visit CUHK at Shenzhen, were impressed by what had there been achieved. This clearly was a big opportunity with indeed major investments coming also to the advantage of CUHK. In the evening we took part in a meeting with UU students and alumni at the Dutch Consulate. The Consul reassured us, in a private talk, that Hong Kong was politically stable, and that Beijing was more than happy with Hong Kong as an international business and science hub. The recent unrests were to be regarded as minor incidents, no need to worry about.

Things have taken another course though. It happened that I was again in Hong Kong in the first week of June 2019, to give a talk at the 6th World Congress on Research Integrity (<https://wcrif.org/wcri2019>). The meeting was hosted by Hong Kong University in the person of Mai Har Sham, **Associate Vice-President (Research)**, a biomedical researcher by training who has a strong track records in research integrity. It was a very international meeting with a program that touched upon the different levels of academic integrity, including students, PhD's, professors but also at the institutional Board level of Deans and Vice Chancellors. As discussed in Chap. 7, I discussed Open Science as a practice of science and research which may help to improve research integrity at all levels. I stressed that for this to be successfully achieved, we have to reflect on our way of doing research, how we organize academia, and about our ideas about the relationship with society. This resonated well with the opening statement of the congress, which emphasized the need to reflect on cultural differences and how they influence our ideas about science. There were plenary presentations by colleagues from universities and government agencies around the world and from the Chinese Academy of Sciences. In her presentation professor Mai Har Sham touched upon the current issues regarding scientific integrity and the actions that were ongoing.

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After a presentation by a colleague from a Chinese university about the university's actions and code of conduct, critical questions from the floor regarding problems with integrity and intellectual autonomy caused inconvenience by the speaker and the audience. Here we witnessed that Open Science needs to take into account, reflect on and continuously discuss cultural and political differences, that are deep seeded in society and ingrained in its practice of science. That evening, when the first of many marches against the influences of the Chinese government on Hong Kong democracy took to the streets, at the congress dinner party I shared a table with young successful civil servants from Beijing confining ourselves to small talk about science, their lives in Beijing, kids and parents.

Taking stock of science in the COVID-19 crises, it seems that science and scientists as an international community are committed and more than ready to practice Open Science. However, the open society- with its plurality, economic inequality, the speed and the use and abuse of social media, the higher levels of education, but also the increasing differences in education levels, the populism fuelled by politicians- is often felt to make the connection between science and the public no less complex and to someeven dangerous. Social media and the role of the tech giants since 1990 have had an enormous impact on how, when and where the debates in the public sphere take place. Fuelled by ugly partisan battles, the internet it seems has divided countries and people more than it has resulted in open debates, in which listening to each other's fears and opinions is being practiced, to reach mutual agreements. This is a major problem for science and society. Recently we have seen the worst of it in the USA, where partisan battle lines already since the 1980s are raging. Despite the ideals of the Founding Fathers and the Constitution, before and after the Progressive Era of 1890-1920 or FDR's New Deal, the USA has seen such ugly episodes before Google, Facebook, Twitter, the internet and cable news with CNN, Fox News nearly wiped out serious media and national newspapers. These episodes have to a great extend determined politics in general and the politics of science in particular (Diggins, 1992, 1994). Lepore's impressive history of the USA, through the lens of the Declaration of Independence (1776) and the Constitution (1787), is a surprisingly gloomy reading experience (Lepore, 2018). The Founding Fathers clearly anticipated the ugly episodes with partisan battle lines, so we must, nor in politics nor in science be naïve, but we must from academia engage in continuous debate with policy makers and the various publics. There are many experiences showing that engaging in serious discourse about contrasting ideas and convictions is helpful to reach levels of understanding, if not common ground about issues in social life. Moreover, as Habermas argues, these

deliberations, more than our voting, make our society truly republican and democratic and ‘we must find knowledge through these deliberations and utterances in the social context where the action is’ (Diggins, 1994)(p365).

The time is long gone that the claims and views of science and experts were automatically accepted because of mythical ‘God given’ authority or a ‘unique scientific method’. As I have argued and demonstrated, the sciences, in their many different communities of inquirers do produce reliable and robust knowledge that has proven successful and has in the past contributed enormously to the quality of life. Much is still to be done and at this very moment scientist around the world are working 24/7 on therapies and vaccines for COVID-19 which are badly needed. To make clear what science has to offer we have to engage tirelessly in continuous conversation, debate and discussions about science and society. With the same energy and perseverance, because of geopolitics, ugly partisan politics and outright suppression we have to keep campaigning for open debates and deliberative democracies, as the stakes for humanity are higher than ever, this needs to be done within our own region, country, in the EU and in global collaborations around the globe.

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