

## **Open Science in Practice**

### **STS approaches to open cultures in research**

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Our conference track invited STS scholars to explore Open Science from an STS perspective and to discuss what STS can bring into the broader discussion. Open science is broadly defined as science that is transparent, accountable, and shareable, involving the participation of (all) relevant stakeholders in the scientific process. With this report we would like to highlight several discussion points of the broad spectrum from normative imaginaries of openness to undogmatic open practices. Therefore, while the emphasis of our remarks is on the diversity of enactments of openness, we can only present four snapshots of our track: co-production of knowledge in participatory settings, open data practices, scientific ethos and trust, and policy imaginaries of openness in research and innovation.

Open Science (OS) is currently regarded as the next ‘big thing’ in European science policy and elsewhere (Mayer 2015; Levin et al. 2016). It is broadly defined as science that is transparent, accountable, and shareable, involving the participation of (all) relevant stakeholders in the scientific process. Policy visions do not only highlight the transformative powers of OS in regard to research culture, they are also setting high expectations in regard to creation of economic growth, new jobs and innovation opportunities. In practice, tensions are emerging in how OS is enacted and governed by scientific communities, science policy organisations, funding bodies, the publishing industry, and science-related institutions, with diverse uptakes of commons, knowledge sharing, democratisation of technology, participatory design, hacking etc.

This conference track invited participants to explore OS from an STS perspective and to discuss what STS can bring into the broader discussion of OS, e.g. by studying institutionalizations of OS, appropriations of OS within prevailing traditional epistemic culture, or how OS is co-shaped by negotiation processes promoted by different stakeholders. Presentations covered socio-technical dimensions of openness in sciences - including the social sciences and humanities. There was less discussion of the “sticks and carrots” (Leonelli et al. 2015) or the perceived benefits to researchers, research organisations and funding agents of utilising open scientific methods, the “disincentives and barriers, and the degree to which there is evidence to support these perceptions” (Whyte & Pryor 2011) - though one of the papers remarked how pressures on scientists to collaborate with industry and commercialize their work, within the framework of open innovation, can work against policy expectations to share research data and results [Sánchez-Jiménez/Aibar]. The aim of the conference track was therefore not to gain consensus over how to define open science in research practice, nor to reach a conclusion on how STS should approach these matters. On the contrary it was an attempt to grasp the multitude of enactments of openness and approaches to study it without being normative about its valuation<sup>1</sup>.

#### **Grasping openness**

Most of the discussions in the four sessions revolved around diverse (and unusual non-idealized) forms of co-production of knowledge in various open configurations – involvement of local communities [Albagli et al.], local expertise [Dosemagen] and interdisciplinary collaboration

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<sup>1</sup> See also Judit Gárdos in this issue, who criticizes the inherent normative and largely undisputed dimensions of the term open science and in particular its taken for granted connotation of Western scientific tradition.

[Oberhauser], hackathons, open consultation processes [Noel, Gruson-Daniel], the open and collaborative editing of scientific articles in Wikipedia [Aibar/Lerga], replication of scientific results, open institutional policies, open access publishing and its abuse by predatory publishers [Wyatt] and so forth. Eighteen speakers told very diverging stories about challenges and limits of collaborations in open settings, some highlighting the need for both normative and legal frameworks in order to safeguard open practices. [Spök et al] particularly pointed to the need of closed spaces for debate in controversy and risk research.

A number of speakers - involved in ongoing open science or citizen science initiatives - focused on collaboration between academia and different kinds of local communities in several countries [Fressoli/Arza]. The relevance and role of lay-expertise and the design of hybrid and innovative institutional settings were highlighted as key points in such experiences. The focus was implicitly moved, from open science as a more effective way of producing science, to open science as a new way to engage citizens (mainly as specific community members) and other stakeholders as active agents in the development of more socially robust research. While open science is commonly associated with access to peer-reviewed knowledge, the emphasis in our conference track was shifted towards peer production.

This line of inquiry understands open science as a social learning venture where the process itself is even more important than the specific scientific outcomes or products than can arise out of it. Consistently with this move from open science as product-oriented to open science as process-oriented, institutional experimentation and the involvement of local communities are considered much more important than technologically deterministic approaches to open science that place great emphasis in the use of new tools. Furthermore, some of the conclusions in our track highlighted the necessary soft-skills and adequate estimation of capacity of such participatory approaches, which are traditionally also a domain of STS.

### **Sharing data**

Data and data sharing practices got also quite a lot of attention in the analyses presented. In times when new technology meets old forms of governance, contradictions emerge, illustrating the complex orientations of data generators, researchers and others to open science. Here, criticism was raised by some speakers about the neutral character associated to data in standard open science approaches and in usual calls for data sharing. They problematized data sharing by exposing how data encompasses compromises, ethical standards, different epistemic cultures and values, even different levels of privacy or security, which may entail severe problems in their re-use and replication [Harp-Rushing et al., Velden, ...]. Such issues, which built upon traditional STS claims against the value-free or non-situated character of scientific knowledge, should be taken into account in the analysis of barriers to open science and the design of public policies to foster data sharing. Mainstream open data discourse (see the current implementation of data management plans) was criticised for its narrow concept of data (as text or numbers in structured form) and counter-illustrated with other forms of data or data generation, such as organic materials in biobanks [Murtagh et al.] or biohacking citizen labs [Rosen], but also urban social data [Perelló], and multimedia data from ethnographic or experimental settings. Besides raising awareness for the intractability of certain materialities or spatialities towards technocratic ideals of openness, the speakers were calling for more ambitions to open up the whole range of media through which “scientific knowledge is processed, validated and circulated” [Pedersen et al.]. However, when it comes to making data resulting from such studies openly available some of the speakers also experienced limits and challenges: unclear copyright issues or vague institutional data policies, for instance, are still hindering data sharing. But what about our own data politics as STS researchers? How could we share our data in its broadest sense, not only among ourselves, but with the

communities we work with? We see that issue is prominently addressed in citizen science projects that treat citizens not as research partners, but as data aggregators.

Altogether the open research data theme provides a fruitful ground for many STS concerns. Besides the already mentioned issues, we should deal with the various expectations and imaginaries that science policy and research administration currently develop in regard to open data governance. From the quest of evidence based decision making to the realms of messy research data, following different data pathways could offer rich and exciting STS topics related to scientific ethos, interdisciplinary collaboration, citizen science, infrastructure studies and so forth.

### **Scientific ethos, predatory practices and metrics**

Coming to questions of scientific ethos and trust, even if debated only briefly during the track, the phenomenon of predatory open access publishing triggered a discussion on metrics and scientific credit systems. In the predatory business model authors are charged publication fees for publishing an open access article without proper peer review or any other editorial services. In the last years this exploitative practice has not only created confusion about the quality of open access publishing in general, it has also made, once again, visible the problems of researchers from developing countries in need to play the game of scientific recognition and reward. Not to mention the emergent evidence – for instance while analysing EU policy documents [Mayer] - that open science can also be instrumental for worsening present trends towards the commodification of science, within the neoliberal agenda (Mirowsky 2014).

All in all, the fear of losing competitive advantages by opening up access to scientific knowledge production is not only present in innovation contexts, but much more so when it comes to planning one's career [Attenbourogh]. Giving up control over use and reuse in times of vague institutional data policies and without an established reward/incentive system for opening up data would need more critical engagement with ethical dimensions of scientific practice such as trust and responsibility. Again a domain where STS would be best suited for involvement.

Open research practices shaped by digital technology offer a whole new spectrum of metrics to measure and assess scientific quality and productivity. But what does it mean to count social impact with downloads, clicks or retweets? Such alternative metrics would probably just plug along what we already have, but at least they put existing metrics for impact factors and rankings into perspective (Leiden Manifesto 2015). No doubt, they will also co-shape and preformat research agendas and increase impact driven research (which is not necessarily always a bad thing!). However, policy makers increasingly ask for impact measures to legitimate public expenditure. Alongside counting patents as indicators of innovation scientometricians work on new indicators to assess all kinds of open science including the cooperation of societal stakeholders in research.

### **A reflexive take on Open Science by STS**

With open science currently being mainstreamed into western research funding frameworks, STS could help to demonstrate the situative appropriateness of top-down open science policies and engage with bottom-up activities as some of the track's presenters have shown. Open should neither be defined in strict opposition to closed nor should it be a universalistic principle applicable to all research practices everywhere. STS would furthermore be able to study how such policies impact traditional communication and collaboration procedures, existing reward structures, timescales and hierarchies, as well as reflexively interrogating our own practices as researchers and our specific position with respect to other sciences. If STS were committed not only to study data practices in their diversity, but also in different scientific disciplines and regional contexts, we could critically accompany and help to realize the core principles of the open science movement: being as

transparent, accountable, and shareable as possible, and involving stakeholder expertise on an equal footing in the research process.

Last but not least, in the context of open science, STS could once again reflect its own configurations of access to knowledge production and expertise. Maybe we need to step out of a disciplinary ivory tower constructed over the last years (with a whole lot of exceptions, of course!). We should take the opportunity to learn – also on a methodological level – from citizen scientists, hackathons and grassroots movements and rethink how open we want our epistemic cultures to be.

#### References:

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[Names] refer to presentations at the conference track and a more detailed description of each presentation can be found here:

[http://www.nomadit.co.uk/easst/easst\\_4s2016/panels.php5?PanelID=3966](http://www.nomadit.co.uk/easst/easst_4s2016/panels.php5?PanelID=3966)

<http://openscience-thebetterscience.blogspot.co.at/2016/10/open-science-in-practice-4s-easst.html>

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