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Open Science and Open Access Publishing in Social Sciences

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Abstract

This chapter is about open science in the social sciences, with a particular emphasis on open access. The last two decades have demonstrated various obstacles in adopting practices and models that have become established within other research disciplines, leading to the need to shape practices that acknowledge the particular circumstances of the diversity present in the social sciences. In addition to diversity, a central theme in the chapter is research quality and its relationship with open science, and how science policy can match or clash with researcher realities in the push towards more openness. A key conclusion is that caution should be taken when rules and implicit or explicit expectations are changed - sensitivity to disciplinary circumstances, predictability and trust in science policy need to be maintained as new options for introducing transparency and disseminating research arise.

Keywords: Open science, social sciences, assessment, diversity, science policy

1. Introduction

"...social science is the scientific study of the processes of societal production and reproduction in culture, the market and the state across time and space." (Brewer, 2013, pp. 47).

In this 2013 book, John D. Brewer unpacks and argues for the public value of the social sciences, specifically highlighting the bridging nature of the social sciences in connecting universities and the knowledge they produce to the wider society (Brewer, 2013, pp. 148). Brewer argues for why one needs to be careful when assessing the impact and dimensions of research when crossing over from the natural sciences where many narratives and perspectives are born, since the effects and value of research work in different ways depending on which domain of science one looks at (Brewer, 2013, pp. 117). There have been attempts at assessing the economic dimensions of open science (e.g. Fell, 2019) but since a lot of the value created by such services and outputs has indirect effects on society, it is very hard to pin down the benefits in monetary terms.

There are various definitions of what the individual components of open science are, which is essentially about trying to identify and capture the main processes and outputs of conducting research, so there is a lot that goes into such breakdowns depending on the perspective and granularity of description chosen. The most common ones include open access to publications, open research data, open software and methods, citizen science and often also open peer review (see e.g. Pontika et al., 2015; OECD, 2015) which are also the main ones referred to in this chapter. In addition to working individually the synergies between these individual open science components are an important part of the change towards openness. In a review that synthesizes 75 definitions of open science Vicente-Saez and Martinez-Fuentes (2018) came to highlight the effects rather than the means "Open Science is transparent and accessible knowledge that is shared and developed through collaborative networks".

A central thread in this chapter is that the social sciences are diverse, both within themselves but also in comparison to the natural sciences, and cross-discipline considerations need to account for the very high variation in the possibilities and trade-offs required to practice open science in different areas of research. Research within the natural sciences is more directly aligned to a direct top-down nature of research 'impact' as is often assumed when the term is used and defined (Brewer, 2013). While the social sciences are also powerful in creating change and informing society, due to their nature, they usually benefit more from a framing and assessment that Brewer (2013) refers to as public value. The concept of public value is in this chapter used as a dimension of research quality in the social sciences. Open science is something that is only indirectly addressed in Brewer's book (2013). I argue that some of the most successful advances in open science in the social sciences, as well as some of existing tensions for and against change, can benefit from being interpreted through the lens of public value. Open science is a facilitator of public value in the social sciences, and a proper connection between the two can help understanding in both directions.

This chapter is structured as follows: The following section will introduce the central open science areas in context of the social sciences: open access to publications, open research data, open software and methods, citizen science, and open peer review. The next section attempts to succinctly highlight some of the central complexities of open science by contrasting its implications in terms of using the term as either a noun, verb, or adjective - for research generally as well as considerations for the social sciences specifically. The last section summarizes the main points as they pertain to actions that are relevant for research assessment in the social sciences.

2. Main areas of open science

2.1 Open access publishing

For the social sciences, the possibility of open access to publications has highlighted the importance but also challenges related to supporting diversity in publication outputs as momentum and investment around specific models and solutions build up.

Open access journal publishing started out as a grassroots scholar-driven movement (Moore, 2020), where the benefits of web-based communication were leveraged by researchers to set up journals without the involvement of a professional publisher as an intermediary. Over time the scholar-driven part of open access has been overshadowed by large commercial publishers adding open access options on top of their still dominantly subscription-based business models (Schöpfel, 2015). While increased open access of any kind is good in theory,

the challenge is that scholar-driven journals often struggle to get even the low amounts of funding they would need to remain active, while the open access offerings of profit-driven professional publishers eat up the available funds reserved for open access in library and research funder budgets. Here, the problems are related to a lack of scalable funding mechanisms internationally and disciplinary for scholar-driven OA journals, and researchers needing to publish in prestigious journals to remain competitive in their careers. In research evaluation support for open science should also come with the support for diversity in the publication and service provider space, otherwise movement towards openness will be needlessly slow, expensive and in control of a few commercial parties.

OPERAS (Open Access in the ERA through scholarly communication) is an excellent example of how different stakeholders can organize around facilitating open access and open science on the terms required by the social sciences and humanities. Rather than one big project organization pushing forward OPERAS is a distributed network of organizations around the ERA that work together on common goals to enable open science on terms compatible with the circumstances of the social sciences and humanities (Giglia, 2019). Platforms such as OAPEN and OpenEdition are part of the OPERAS network. A comprehensive review of many of the past and present open science initiatives for the social sciences and humanities in Europe is provided by Maryl et al., (2020) where the fundamental principles of an inclusive scholarly communication infrastructure for these disciplines are outlined. Based on the review, the authors outline the need for an inclusive infrastructure, that is scalable in terms of resourcing and content provision, while preserving and supporting the diversity in research outputs in these disciplines.

An aspect discussed in context of all disciplines and publication forms is how open access should be funded. Publishing fees for open access books need sustainable and continuous funding mechanisms to become viable paths for scholars looking for alternatives to publishing their work. This is something that is also relevant for journal publishing as open access usually implicates loss of subscription income. Article processing charges (APCs), where authors are expected to pay a one-time fee upon acceptance of a manuscript, introduces both potential financial obstacles for publishing in journals that implement such fees (Gray, 2020), as well as the financial incentive for profit-driven journals to publish more content. It has been found that articles published within the social sciences and the arts and humanities have some of the lowest degrees of co-authorship compared to other areas of research (Gasson et al., 2019). Since authorship networks are on average smaller in the social sciences, there is also a smaller likelihood that some authors would have institutional or grant funding to cover the expense of the article. Considering this aspect of "reduced institutional exposure per article", a mandate is less likely to apply as fewer authors from fewer institutions are involved.

As money and efforts from libraries have recently been tied up to increasing subscription costs and bulk pre-payments of open access fees to large international journal publishers, having support and resources available for national journals willing to convert to open access has sometimes been a struggle (Ilva, 2018). Financial models for society journals need to be re-aligned, and a lot of work is being done in this area to explore and identify various ways that journals can either lower costs or generate revenue through open access publishing (Wise & Estelle, 2019). From what can be gathered so far, funding models where the costs are recouped in a more distributed way, like the Subscribe to Open Model where journals publish their entire volume immediately open access if enough subscriptions are maintained (Crow et al., 2020; STM, 2020), or international library consortia-based funding like the model used

by the Open Library of the Humanities, seem to be more accommodating for the circumstances present for journals in the social sciences, in comparison to being APC-based.

Open access in the social sciences has shown that by empowering scholarly involvement in production there is an opportunity for benefits to both scholars and society. An example of this are regional journal portals, that in many cases host hundreds of OA journals each, of which the majority are often in the social sciences (Björk, 2017). Such portals are usually cost-effective and provide a modern, singular technical infrastructure that small journals can also use. The journals on such portals are usually scholar-run, without the involvement of a professional publisher or many other dedicated resources. For this to work and flourish, there must be an academic reward culture that acknowledges and values first-hand involvement in facilitating knowledge production beyond traditional authorship, such as e.g. hands-on editors and editorial assistants. By not outsourcing the journals to international commercial publishers (who might be reluctant to publish the journal open access, or demand high fees) their existence is not dictated by what is most profitable, but rather what is best for scholarly communication and the aims of the journal and its community. Retaining control of central assets and services can be argued to be important also in other areas of open science, rather than taking the fast and easy way out of outsourcing which risks compromising on the levels of openness and transparency as well as development not being primarily steered by scholarly needs but rather by financial needs. Other recent demonstrations of where similar dynamics have been at play are with the journals of *Lingua* and *Journal of Informetrics*, where the entire editorial boards resigned in opposition to the publisher policies towards open access, and instead created two new open access journals under terms chosen by the involved scholars.

If open science in the social sciences is to grow based on scholarly rather than business needs, ownership and governance of platforms used need to be transparent in order to keep users and stakeholders informed about the potential possibilities of such services being sold. A cautionary example of this is the trajectory of The Social Science Research Network, more commonly known through the abbreviation SSRN, which started out as a scholar-driven platform service in 1994 but was acquired by Elsevier in 2016 to be incorporated in their portfolio of content and analytics services business. The pattern of growing scholarly communication startups being acquired by larger publishing corporations with pre-existing market positions has become something of a common pattern within the sector (Campfens, 2019) which can be argued to stagnate progress towards openness. To avoid surprises, when actors in the scholarly communications space evaluate supporting specific infrastructures it is important to be aware of both the underlying ownership structure as well as the licensing terms of individual works.

2.2 Open data/FAIR data

The simplistic, and at this point arguably outdated view of data in the realm of open science is that there should be movement to make everything open data. Research data, particularly in the social sciences where data types and sources are very heterogeneous, are often entangled in potential obstacles related to privacy, legal or diverse technical storage practices (Betancort Cabrera et al., 2020). In order to accommodate for the obstacles and limitations often present in research data, supporting a transition from the open/closed dichotomy towards a spectrum of dimensions that can be realized to different degrees, the FAIR principles were presented (Findable, Accessible, Interoperable, and Reusable) (Wilkinson et al., 2016). An emphasis within the FAIR principles is on providing robust open metadata even if the actual dataset

might not be openly available. Betancort Cabrera et al. (2020) provide a review of the current state of implementing the FAIR principles for data in the social, behavioural, and economic sciences, concluding that a lot of progress in laying the groundwork for fully realizing the FAIR principles have been provided by the likes of e.g. the Consortium of Social Science Data Archives (CESSDA). In the cases where datasets can be more easily discovered and persistently linked, there is also the growing practice and infrastructure for monitoring and acknowledging data citations (Groth et al., 2020). The bottom line is that a lot can be done in terms of facilitating a more transparent landscape for research data even if it cannot be opened up and fully made public.

2.3 Open software and methods

In addition to making publications and underlying data more accessible, an important part of opening up science is also clearly documenting which software has been used in which configuration to obtain the results. Optimally, any potential software used is open source available to remove any financial barriers for others inspect the code or expand the research. Though the paths of development for the open source software and open scholarship communities have been mostly separate, they have also intertwined, with a lot of potential growth for synergies in the future (Tennant et al., 2020). In order to increase the reproducibility of research, i.e. the results from a study can be replicated based on underlying data by following the methods description provided, having access to the analysis configurations and scripts is important as well (Munafò et al., 2017). Citing software is still an emerging practice but something being worked on to standardize (Smith et al., 2016) which is an important step to diversify acknowledgement of such work in the academic domain as well.

2.4 Open peer review

Peer review is a central assessment method within research when grant funding, publication decisions, and academic positions are filled (Ochsner, 2020). In the domain of research publications there is a dominant practice of anonymity and secrecy around peer review processes (reviewer identities) and products (reviewer reports) which remain outside of public knowledge. However, in the domain of journal publications there has been progress in journals opening up the processes and/or products of peer review for public scrutiny. While some degree of open peer review is present among some journals in the social sciences (either identities or reports) it is more uncommon than in the natural and medical sciences (Wolfram et al., 2020). Open peer review can also be used to fundamentally change journal peer review process rather than just introduce transparency after the fact, by e.g. opening up possibilities for participation, interaction between actors, and enabling post-publication review on publication platforms (Ross-Hellauer, 2017). By making review processes more open, there is the possibility to gain a better understanding of how and with what criteria reviews are formulated, which is promising for the mitigation of various biases introduced by closed processes.

2.5 Citizen science

The exact definitions of citizen science differ, but the concept revolves around some or all parts of the research process being carried out in part or in full by laypeople rather than professional researchers. Though citizen science has existed before the notion of open science, the possibilities for facilitating and creating engagement to citizen science projects

through opening up more parts of the research process for involved actors has synergies (Hecker et al., 2018). In terms of how the social sciences differ when it comes to citizen science Albert et al. (2021, p. 125) state the following “The social sciences have more to offer to citizen science than bridging and mediating, and citizen social science has many more facets than merely mimicking natural science approaches.” At the same time the authors raise caution for how current reward and assessment systems might fail to acknowledge the value that engaging the public might have. For assessing research endeavours involving citizen science which are often of diverse nature, Kieslinger et al. (2018) suggest that there should be focus on three dimensions (1) scientific impact, (2) learning and empowerment of participants and (3) impact for wider society.

3. Open science as a noun, verb, and adjective

Open science encompasses many things, not only the functional replacement of various parts of the research process by more transparent and accessible ones, also broader in terms of influencing research processes and research culture, as we will further elaborate on. Though this section will neither focus on linguistics or anthropology, an analytical concept that stems from such origins will be applied here to provide a more nuanced view of open science from three different perspectives. The ‘grammatical metaphor’ is a concept introduced by Halliday in 1985 within the domain of functional grammar, whereby expressing words in different grammatical forms (e.g. as verbs, nouns) different meanings can be interpreted (Halliday & Matthiessen, 2013). Within anthropological research, treatment of the concept of ‘culture’ as a verb rather than a noun has offered a pathway to better understand how meaning is constructed in various contexts (Street, 1991). Inspired by this insightful analytical approach, this section will discuss open science in the social sciences when treated as a noun, verb, and adjective – leading to the implications of relevance to research assessment.

3.1 Open science as a noun

Open science is sometimes discussed with the qualities of a noun, as an emerging monolith that will positively influence research and society in all kinds of ways, inevitably and almost as if by itself. It is a broad and ambiguous term that can mean different things depending on the context, where a major point concerns how various functions within the domains of research interface with the broader society (Fecher & Friesike, 2014). Although different actors and schools of thought emphasize different things under the broad umbrella of open science, the differences in perspectives are not so much about what is not open science, but mainly what primary priorities and philosophical underpinnings support the ideology from a specific perspective.

The use of the term open science itself has also been discussed in the literature. The term can be perceived as an exclusion for the social sciences and humanities, with suggestions to use more inclusive, such as Open Scholarship or Open Knowledge (Sidler, 2014; Knöchelmann, 2019). Another terminological aspect concerns the ambiguity of the term. Being an emergent and broad term, it can mean different things to different actors. There have been multiple instances reported where stakeholders are unclear on what open science and related terminology actually entails (Grubb & Easterbrook 2011; Vicente-Saez & Martinez-Fuentes, 2018). As such, it is warranted to be sensitive to disciplinary inclusion as well as being specific and provide sufficient detail about the implications in using the term to avoid vague definitions and potential misunderstandings.

Open science has been a sustained megatrend in the academic discourse for over two decades, but the principle of openness in research dates back to around the 16th and 17th centuries, when dissemination of research discoveries became more focused on public knowledge building rather than secrecy and fragmentation into closed schools of thought (David, 2008; Eamon, 1985). It is through technology development that it has become possible to implement openness in entirely new ways compared to the analogue paper-based past, where access to the original research publication and its underlying data can be offered without any financial or physical threshold to access. Over time there has been a gradual roll-out of new options for how such practices can be adopted and facilitated among the different actors in the landscape, from institutional to individual.

Researchers enjoy a lot of autonomy in their line of work when it comes to what and how research is conducted and disseminated, yet they are often employed and given institutional guidelines and policies to facilitate work in line with the policies of the institution. It is in this interesting dynamic that open science practices and policies (or lack thereof) exist, where individual and institutional motives and circumstances are intertwined. Open science is supported in many countries by a top-down push by science policy. This push for open science top-down can potentially create alienation on the individual level among researchers, rather than instant or gradual adoption (Lilja, 2020). Progress in open science has yielded many positive examples of grassroots practices growing to eventually be implemented into wider policy and practice (e.g. like open access publishing [Moore, 2020]), but also cases where initiatives have been communicated top-down without sufficient considerations for the realities of conducting research in a specific discipline, creating friction and dissonance among those affected. Top-down pushes towards collaborative and distributed research can sometimes be perceived as incompatible with the individualistic reward systems currently in place, where it is mostly only publications and authors who give orders to acknowledge their contribution (Lilja, 2020).

To avoid treating open science as noun in the negative sense, effort should be taken to go beyond surface-level in any chosen communication and context, and actually connecting to the practices (current, desired or already conducted) of any given research discipline.

3.2 Open science as a verb

For researchers, open science has to take on the qualities of a verb, as implementing actionable practices that open up one's research for open inspection and sharing requires conscious effort and planning to ensure it. It has long been recognized that change in behaviour and priorities of researchers is necessary if new practices related to open science are to be pursued, including at the individual level (O'Carroll et al., 2017). Why would researchers put in extra effort and potentially modify their research design, make optional parts of their work more transparent, or select a publication venue in the name of openness if such factors carry little or no weight in research assessment and career advancement contexts? Alignment of rewards and incentives have been identified as the key to facilitate systemic change towards more open and transparent scholarly communication (Guédon et al., 2019). However, changing the rules of a globally distributed system with generations of active researchers with ingrained processes and perceptions of merits is not something that can happen quickly. Leonelli et al. (2015) argue for a well-planned mix of sticks and carrots to encourage open science at the source, among researchers. An important factor to consider in this context of incentivizing and rewarding open science practices is the relationship that such activities have on research quality and assessment - is what is mandated or required also

reflected in what is valued as merits for career advancement? An example here is the popularity of open access policies especially among European universities (Morais & Borrell-Damián, 2019), is it just an administrative task or is openness of research also something that is acknowledged and valued as part e.g. recruiting and tenure evaluations? For organizations implementing open science policies, it would be strongly advised to also ensure that research assessment practices are consistent with such policies.

The various areas of open science relate to different areas of the research process with different implications for changing the status quo. Open access presents a good example where making publications open access might require no changes to the research process and can even often be done after the fact, as long as funding is provided to enable flexible choice of publication venue. On the other hand, if one wants to ensure that data can be made available as FAIR as possible, this must be taken into account in the fundamental research design. This highlights the importance of commitment to open science practices at an early stage as it might be impossible to increase openness afterwards. Gaining an understanding for the different parts of open science breaks down into how different research disciplines could gradually come to adopt such practices at various paces on their own terms. However, it is also important to pay attention to what happens between the different individual parts, how they are interconnected, and whether there are any gaps to create obstacles to maximize the holistic transparency of the research endeavour.

Open data is something that researchers in the social sciences have expressed hesitance about both in terms of its utility to the public as well as with regards to practical matters (Lilja, 2020). While there have been strong and influential voices around open science concerning its emergence, and what should be done to facilitate various goals, investigations into actual use of outputs of open science, particularly in the social sciences, are still scarce. Recently Late and Kekäläinen (2020) studied what datasets were downloaded for what purposes from a social sciences data archive, finding that most of the data was downloaded for research purposes, with quantitative survey and statistical data among the most downloaded types of data. Doing research is hard and often uncertain work, without good arguments for why additional effort and potentially exposure to new types of risks should be taken, things are easily left undone. To understand open science as part of research assessment one needs to appreciate and bridge towards the qualities it has as a verb for researchers.

3.3 Open science as an adjective

This brings us to our third and final grammatical metaphor of open science, where it is perceived from an adjective perspective, where the actual elements opened up during the research process can be observed, verified, and assessed. The possibilities to practice open science have grown together with the growth and level of details of various research metrics in the research environment, and in particular concerning research outputs. In recent years there have been several initiatives and suggestions made by various actors to facilitate more diverse assessment of research, where a prominent one is The Declaration on Research Assessment (DORA) which pushes for a move away from simple publication outlet-based evaluation and suggests moving towards judging research on its own merits instead. Such a transition would make the landscape of scientific journals more elastic over time in addition to facilitate open science practices, as now the higher prestige journals are cemented at the top, making it hard for new journals to gain a foothold due to researchers sending their best manuscripts to the outlets they know will count when making assessments. Among the different initiatives that have been brought forward, the Open Science Career Assessment

Matrix (OS-CAM) prepared by the European Commission's Working Group on Rewards under Open Science is of particular relevance when considering how research assessments could change to give recognition and reward to those that contribute towards making their research open in various ways (O'Carroll Valdes et al., 2017).

A central process in which open science is observed and various implemented attributes are described is in the context of research assessment, yet the relationship between research assessment and open science practices is not yet well-established. What about the direct influence of openness on research assessment, is openness something that automatically increases research quality? For publications the OS-CAM recommends acknowledging (with potential numerical weights) to what extent research has been published in OA journals or self-archived (O'Carroll et al., 2017). There are also examples where this dilemma has been explicitly acknowledged by attempts, at the policy level, to distinguish between research quality and openness. One of the four principles of the Finnish National Policy for Open Access to Scholarly Publications goes as follows "When assessing scholarly publications, the quality and openness of individual research publications are considered independently." (Open Science Coordination in Finland, 2019). This clearly demonstrates the balancing act of incorporating open science into science policy, acknowledging its existence and potential, but not defining it as something automatically superior without considering contributions on their own merits.

When observing open science practices for research, individuals, and institutions relevant to the social sciences it is important to be aware of the surrounding circumstances. From existing studies of the journal landscape we know that the social sciences have among the lowest share of OA journals in international bibliometric databases particularly high-ranked ones (Erfanmanesh, 2017; Liu & Li, 2018). Social science journals also have lower occurrence of data sharing policies and requirements in journals (Resnik et al., 2019).

One fundamental aspect of research quality is research integrity and adherence to research ethics, both of which intersect with open science in different ways. Guidelines for research integrity and good practices are often codified in documents commonly referred to as Codes of Conduct (CoC) that are issued by national and international stakeholders. In a recent analysis of four such CoC's focusing on research integrity (The European Code of Conduct for Research Integrity, Singapore Statement on Research Integrity, Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations, Guidelines of the Finnish Advisory Board on Research Integrity) Laine (2018) studied to what degree these documents include mention of practices that relate to open science (defined by openness in the following categories: publication, research data, research methods, evaluation, collaboration, and communication.). Overall Laine (2018) found that none of the CoC's were contradictory to the ethical principles of open science, but the European Code of Conduct for Research Integrity was the only one that elaborated on and supported such practices. The formulation of such science policy documents is interesting because they should be encouraging and forward-looking, yet sensitive to the realities present across research disciplines, while being provided at a detailed level to be actionable.

To summarize this "grammatical metaphor" approach, it is to a large degree the gaps created between how open science is framed in high-level discussions, how it is practiced across different research disciplines, and how approaches to quantify and assess open science adoption that need to be addressed to gain a better understanding of the present and future circumstances for open science to flourish in the social sciences.

4. Conclusions

As discussed in this chapter, there are many factors that are intertwined in shaping the current and future landscape of open science in the social sciences. As discussed at the outset, the narrative concerning open science can be perceived by researchers as disconnected or even contradicted the reality of conducting social science research under prevailing circumstances. Optimally, there would be alignment and meeting in the middle, where the gap between policy and practice is not too large. At this point, disciplinary differences become apparent concerning researchers' readiness and circumstances to open up central parts of their work. While there is no simple explanation or description of the circumstances a relevant keyword is diversity, both in research outputs, languages, and research cultures existing within the individual disciplines of the social sciences. A diverse research environment requires solutions that accommodate this diversity rather than enforcing homogenization between all research disciplines. Public value is generated when research directly or indirectly contributes to the surrounding society, and that function is best served if the outputs are openly available without financial barriers. Open science opens up not just the outputs and processes of research for observation to the whole society, but can also invite to and enable citizens to engage with various processes (e.g. data collection). Such citizen science interactions have great potential for furthering public understanding and public use of science (Stodden, 2010), something which resonates well with the social sciences research commonly having a more close societal connection to start with. This is also in line with how Brewer (2013) emphasizes the bridging nature of the social sciences to connect universities and the knowledge they produce with wider society.

Open access has shown that practices change gradually, through a large mix of mechanisms that are shaped based on the needs and possibilities of scholarly communication, technology, science policy, and commercial interests. If you expand this to other areas of open science, there is no need to map and exhaust the entire landscape at once. The fact that publications were the earliest area of open science to develop and become established helps a lot with this as the other parts (e.g. open peer review, open data, open methods/software) which can then just be linked or added in conjunction to the open full-text file that acts as hub for the other elements of open science linked to it. Not all aspects of open science need to be adopted at once, they can be considered akin to optional attributes of the manuscript.

Despite the comparisons to other disciplines that sometimes show social sciences in a reluctant light when it comes to open science adoption, there is still a lot of promising evidence that when done right and fit for the discipline, uptake will likely follow. However, developing scalable technological and financial solutions that support diversity in open science approaches takes time, both to gather stakeholder support and to have sufficient knowledge and tools available to know how to approach the problem. What has seemed to be a successful recipe is creating robust common infrastructures or collaboration networks that allow for diversity in services and content. Good examples of this are e.g. open access journal portals, SSHOC (Social Sciences & Humanities Open Cloud), OPERAS and OAPEN. All of these initiatives have been designed with the circumstances of the social sciences in mind, something which will likely show in their uptake and success as they develop and mature.

Open social sciences research is a good fit for being perceived through the lens of public value, which helps frame assessments of research quality and shaping of science policy. As Brewer (2013) notes, public value can be direct by e.g. informing decision making in society,

but often indirect which is hard to trace back to the research. Indirect value is also created when products of research are put in context with each other, and then the value is realized much later and in a distributed way stemming from many works. Open science does not automatically make anything better or worse, but it has the power to increase many important dimensions in the public value of research, reproducibility, and facilitation of future research.

5. Implications for research assessment

Open science is worth promoting and encouraging as part of research assessment. But when stated or implied, there needs to be full clarity on how such encouragement is operationalized as part of the assessment process. When criteria for assessment are formulated it is worthwhile to consider how open science practices are related to the overall assessment – as something that is treated and assessed separately or something that is an implicit part of assessing the overall quality of the research. Furthermore, in cases of research-performing institutions, how do the organizational policies for mandating or encouraging various open science behaviour align with what is assessed as part of the recruitment assessment when filling new positions? An important element in all of this is to have a clearly stated vision for where to set the priorities and expectations that are given as part of research quality assessment, otherwise it becomes a very unpredictable process for everyone involved. During this transitional time when a lot of conducted research still adheres to the closed paradigm - be it due to lack of awareness, training, perceived utility, lack of alignment in reward systems or overall availability of customized and well-established services to support open science fully - these inhibiting factors that affect disciplines unevenly need to be considered. Within the social sciences the diversity in research and its outputs is a richness which is valuable and at risk of becoming diminished if too blunt models and technical solutions are adopted purely in the name of open science. There are now very promising technical infrastructures emerging that can enable this diversity to be maintained while offering the benefits of a large common infrastructure. Actors involved in research assessment who also fund scholarly communication in some way should be encouraged to look into supporting such services in the future.

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