

Anti-transparency within the EU shift to open science

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Abstract

In 2014 the European Commission initiated a process to strengthen science 2.0 as a core research policy concept. However, this turned into a substantial ideational shift. The concept of science 2.0 was dropped. Instead, open science became established as one of the three pillars of the €94 billion research framework program Horizon Europe. This article scrutinises the official narrative regarding the shift of concepts, identifying transparency issues, specifically misrepresentation of concepts and data, and the redaction of key material. This can be characterised as problems of input legitimacy. A public consultation did take place, but numerous transparency issues can be found. From science 2.0 to open science, the ideational shift was portrayed as simply a matter of exchanging two synonymous concepts. However, science 2.0 is a descriptive concept referring to science being transformed by digitalisation. In contrast, open science involves normative assumptions about how science should work and be governed.

Keywords: open science, science 2.0, problems of transparency, input legitimacy, source fragmentation, source redaction, haystacking

Introduction

This article identifies anti-transparency activities within the framework of transparent government: source fragmentation, source redaction, mislabeling and haystacking. This conclusion comes out of an analysis of the policy documents of the EU public consultation in which the change from science 2.0 to open science took place.

The aim is to achieve some clarity regarding the adaption of the open science concept with the help of officially available documents. However, during the investigation it became clear that such documentation was flawed. This article therefore attempts to both articulate problems of transparency and investigate arguments for adapting open science. Unfortunately, problems of insufficient documentation make it difficult to clearly reveal what actually mattered in the process leading to science 2.0 being replaced by open science (hereafter referred to as *the shift*). It is paradoxical that, as will be shown, shifting to a concept signalling “open” was performed through a process somewhat lacking in rigour and transparency.

Renegotiation of the core concepts of EU research policy has substantial implications, primarily leading to three “pillars” that each in different ways highlights the concept of “open”. The concepts

appear to have open science as the central notion. However, concepts signalling openness are also complex and problematic. Policies of transparency can be interpreted by a variety of actors more or less strictly. Furthermore, successful projects of openness tend to be exploited on the one hand by powerful commercial actors and, on the other hand, by non-serious or even criminal actors, sometimes working in a grey area (Zittrain, 2008). Data brokers, such as Google, are examples of the former within the development of open data (Zuboff, 2019). Predatory publishing is a case of the latter within the development of certain funding models in open access (Nelhans and Bodin, 2020).

The scrutiny at hand reveals a messy consultative process and does not follow the predetermined rational trajectory that satisfies the ideals of open government. Two research questions are pursued.

- Which transparency problems were associated with the process performed jointly by DG Research and Innovation and DG Connect?
- What do the available documents reveal regarding the arguments behind how open science was adopted?

Our focus is strictly on the relabeling of science 2.0 into open science. We are not concerned with the various policy directives that have since been launched in order to implement idealized visions of open science. Naturally, the process that we are studying should be understood in the context of multiple parallel policy streams. We will outline some contextual features, but otherwise put them aside.

In the following, a conceptual framework will be provided, introducing key concepts of open government, public consultations, input legitimacy and ideational power. This leads into the background section, presenting the historical events involved. The concept of open science is also explained. The method chapter introduces some unconventional methods, such as the use of the *Wayback Machine*. We have uncovered lost or misfiled data in several ways. Nonetheless, we have also used conventional quantitative and qualitative methods. The findings are divided into five parts, each dealing with a separate problem of transparency. The discussion highlights aspects of input legitimacy and major takeaways for future public consultations.

Conceptual framework

The ideal of transparency starts with Kant and the Enlightenment (Weinert, 2009). Birchall (2011) noted that transparency has, with time, become broadly relevant to a range of social, financial, political and corporate problems. Crucially, the UN General Assembly (1997) connected public administration and development with “transparent and accountable governance”. During the 2000s EU and the US have moved forward on open government in tandem. The Transparency and open government initiative (White House, 2009, 4685) was published by US President Obama on his first day in office. The aim was to enhance “transparency, public participation, and collaboration”, promising “an unprecedented level of openness in Government”. The Obama administration reversed previous policy from the Reagan and Bush administrations of the 1980s, as open government at that time was viewed as an economic resource, not as a public good (McDermott, 2010).

In a series of high-level documents, the European Commission has committed itself to a form of open government characterised as eGovernment. Milestones of this development are the first European eGovernment Action Plan (European Commission, 2006), the Ministerial Declaration on eGovernment (2009), the Digital Agenda for Europe (European Commission, 2010a), and the European eGovernment Action Plan 2011-2015 (European Commission, 2010b). Transparent processes are also of pragmatic use given the complex policy landscape of the EU with relevant stakeholders across

many sectors and 27 (after Brexit) member states. Transparent processes allow for stakeholder input, compromise and legitimation.

Over time, key policy concepts and ideas are changed, sometimes with complex effects on a range of policy agendas. Such shifts can be described as exercises of ideational power (Baker 2013; Carstensen and Schmidt 2016). In the case of open science, what is at stake is not merely a shift toward a trendy concept with synonymous meaning as the preceding one but a shift with considerable ramifications for shaping European research in the 2020s. Citizens, research institutions and scientists of the EU should expect exercises of ideational power to be transparent.

Consultative processes are vital for the EU policy process to establish input legitimacy (Majone 2002; Schmidt, 2013). Input legitimacy, sometimes called process legitimacy, concerns good and acceptable policy to be produced by broad consultations across nations and stakeholders, establishing public consensus through participation. In the case of European science policy, there are tens of thousands of relevant research institutions which means that any consultation must be selective. Given that, process legitimacy must be attained through optimising transparency.

Armstrong (2005) suggested that three different complementary concepts are useful in discussions on public administration: integrity, transparency and accountability. There can be no real transparency without accountability and vice versa. Transparent practices also demand institutional integrity, involving impartiality, honesty and fair practices. Research, such as is presented in this article, plays an important role in such processes.

Background

Open science is a complex and contested concept with various meanings. Given that, open science, used as a policy concept, can serve as legitimation for a wide variety of different policy agendas. Of particular concern is “open to policy” which would enable new forms of evaluation processes. Therefore, it is of interest to scrutinise when and with which arguments open science becomes used as a policy concept.

Early in the 2010s, the European Commission embraced the concept *science 2.0* to discuss transformative aspects of research practices (Burgelman et al. 2010). That concept was associated with research in various ways being transformed by digitalisation. Particularly, the focus had been on the development of open access publications. In 2014 a process was initiated to, among other things, more clearly establish the concept of science 2.0 as a useful policy concept (European Commission 2015b). However, the process turned into something else, leading to *open science* replacing science 2.0 as a core policy concept.

According to the official narrative, this shift was pushed by stakeholders and not by EU officials. Furthermore, it was maintained that no ideational shift was involved as the concepts of science 2.0 and open science could be seen as synonyms. As open science carries so many meanings, this statement was surprising. What really happened when the European Commission, in charge of the world’s most extensive research funding program (Horizon Europe) started using this multi-layered concept? Was it the outcome of a deliberative process with research policy expertise? Or was the outcome determined through interaction with lobbying organisations? Was it science policy experts at the European Commission that orchestrated the change? Such questions should be knowable as the EU deliberative system is committed to a high standard of transparency.

When the Council of the European Union (2016) summarized the transition towards an open science system it detailed the context of various parallel policy streams. The European Commission published

two key documents in 2012 (a, b). Both of these were concerned with access to and preservation of scientific information, detailing an aggressive push toward open access to scholarly literature. These ideas were to some extent implemented in the gigantic framework program Horizon 2020, initiated in 2013.

Several policy initiatives were introduced during the years 2014 and 2015, including the one investigated in this article. The notion of a European Research Area was heavily strengthened by the Council of the European Union (2015). This signalled increased interest in open data. The main idea was to create a thriving European academic union where data could travel freely across the 28 member states. Research was characterized as data-intensive and highly networked. Open research data would serve as a driver for faster innovation. This also connected to another policy stream about the promotion of a single digital market (European Commission 2015a). These different policy streams therefore pushed for open access to scholarly publications and open research data with an expectation of economic growth from digital innovations that would measure up to US development.

The policy stream closest to that of the conceptual shift was the development of the European Open Science Cloud (EOSC). This was established in a parallel process in the mid-2010s. Much of the nitty-gritty work on that process is known through the retelling by Burgelman (2021), together with additional comments from other insiders (Herczog, 2021; Manola, 2021; Mons, 2021; Strawn, 2021; Wittenburg, 2021). These accounts also supply some tidbits about the open science process. According to this narrative, the main problem identified by DG research officials around 2014 was that the European science community and industry had missed the digital innovation boat. The starting point was work done by EU Joint Research Center, led by Jean-Claude Burgelman (Burgelman et al., 2010).

Consequently, European science needed to regroup so that Europe did not miss the next wave of digital innovation. The key idea promoted by these officials was the establishment of open research data as a resource for data-driven science. The EOSC was to provide a hub for data-driven science. While not explicitly stated in these recollections, the shift to the open science concept was also likely born out of these discourses. Burgelman (2021) argues that the main problem identified by DG research officials was to bring along the European science policy leadership and the slow-moving European bureaucracy into these ideas as quickly as possible. For that purpose, it was crucial to portray the EOSC as something pushed by the European science community, not by DG research officials. Again, these narrative elements are likely to have played similar roles within the process leading to the shift. That said, such is not the official narrative. Nonetheless, the crucial parallel claim was that scientists and science organisations pressed forward both the EOSC and the shift.

The shift

The shift has substantial ramifications that may grow in the years to come. The process leading to the shift ended with the publication of the project summary in February 2015. Thereafter, open science was quickly adopted as a core policy concept. Once the shift had been made, several activities were initiated to explore the issue: now that we have decided on open science, what does it mean?

Late in 2015, the European Commission published two separate studies where the concept of open science was taken for granted (Salmi, August 2015; Adams, December 2015). The Netherlands acted as the Presidency for the Council of the European Union during the first half of 2016 and held a Presidency conference on “Open Science – From Vision to Action” in early April. The Council of the European Union (May 2016, p. 1) strategically talked about a “transition toward an Open Science System”. Also, in May 2016, DG Research and Innovation published its vision document, declaring open science to be the second of three conceptual pillars (European Commission, 2016). The other two are similar in character: *open innovation* and *open to the world*.

Furthermore, open science is highlighted as the key concept of one of the three pillars for the €94 billion Framework program Horizon Europe (2021-27). Finally, the influential European Research Area created a standing working group called open science and innovation. It held its first meeting in June 2016. As open science has become a portal concept in European policy so quickly, science policy studies should scrutinise the process underpinning the shift.

Science 2.0 is a fairly neutral and descriptive concept roughly understood by the Commission to mean “science in transition” (European Commission, 2015b), referring to the obvious renegotiation of institutions and practices of research in the context of digital transformation. Open science involves some similar general ideas but, in addition, adds broader normative notions concerning research policy, scholarly practices, and transparency. In addition, open science includes normative ideas regarding the benefits of open access and open research data.

Open science: a complex concept

The concept of open science is often said to be coined by Canadian inventor Stephen Mann in 1998 (Fecher and Friesike, 2013). However, the notion of science being unnecessarily closed has been a reoccurring point of discussion for centuries. The innovation of the scientific journal, the establishment of the peer review system and the evolution of a popular science press have all been launched as enduring solutions to problems of science being too closed. In the works of Robert Merton, predominantly regarding the norm system of science (Merton 1942/1973; science was thought of as part of the public domain and that “Secrecy is the antithesis of this norm; full and open communication its enactment”. Cf also Chubin, 1985, who specifically argues that “[O]penness” in science “is an interest-bearing idea; it cannot be settled with the recourse to fact or logic. It is a matter for political debate, not scientific judgement alone” (Chubin, 1985, 80). Ideas about open government have also been highly influential; such notions were developed by Karl Popper (1945).

Open science is a difficult concept with multiple meanings (Fecher and Friesike, 2013). Furthermore, the concept is underpinned by numerous connotations and motives (Mirowski 2018). It can also be connected to a wide range of different transparency movements where the three basic genres are open content, open code/software and open data (Nolin, 2018). Finally, it can also be viewed as a specific type of open government.

During recent decades open science has primarily been connected to open access and open research data. However, once the open science concept has been established as a “pillar”, it can easily signal normative values. It becomes possible to add many more notions such as open methods, open peer review, open citations, analytic methods transparency, research materials transparency and design transparency (cf. Nosek et al. 2015). As already noted, the Commission added and highlighted the specific concept European Open Science Cloud in a parallel process (European Commission, 2018). This involves the ambition that all European researchers upload their data to this particular cloud technology to be accessible by any other scholar. The introduction of the notion of “pillar” into the discursive work of European institutions is an additional ideational element of great importance in itself. It is a signal that policy work will be based on a few distinct ideas. This constrains future policy and implies a certain trajectory of how European research should be steered. Ideas that are not clearly seated on the foundation provided by the pillars may not receive a fair hearing.

Vicente-Sáez & Martínez-Fuentes (2018) suggests that open science involves considering different types of knowledge being opened to various degrees:

- transparent knowledge,
- accessible knowledge,
- shared knowledge or

- collaborative-developed knowledge.

Open science as an umbrella concept seemingly invites a multitude of different interpretations and demands upon Academia. How should researchers act to comply with all these demands of open science? Building on a broader literature review, Fecher and Friesike (2015) deftly articulate a conflict between five different schools of thought on open science: democratic, pragmatic, infrastructure, public and measurement. The last of these is particularly interesting as a school of thought concerned with evaluating science, i.e. as an object of scrutiny fully transparent for policy evaluation. Indeed, traditional forms of evaluation can become considerably more effective with more data. However, metrics can also feed into an overly managerial and audit-driven research landscape, impeding progress. After the science 2.0 process, many EU commentators promoted a rosy-eyed view of open science with only upsides. For instance, in his report, commissioned by the European Commission, Adams (2015) links open science to a beneficial and continuing cultural shift toward more open research practices, allowing for new opportunities.

Although a descriptive concept was replaced with a normative term with multiple meanings, the core document of the shift argued that open science simply meant the same thing as science 2.0. Not only were science 2.0 and open science seen as similar in character, they were seen as having *precisely* the same meaning. This is emphasised in bold text within the opening of the core document of the shift (European Commission, 2015b, p. 6), explaining that all the data collected in the consultation, including survey questionnaires, *was on the concept science 2.0* but, nevertheless:

In this document, we will use the term ‘Open science’ from this point forward. (Bold in original)

Therefore, all the survey responses on science 2.0 were simply assumed to be data about open science. There appears to be no recognition in that document that such a shift had policy implications. The approach of viewing the two concepts as synonymous in a seemingly unproblematic way creates a confusing narrative. For instance, four figures which illustrated the statistical results of the survey became awkwardly renamed. Figure 1 is entitled “Drivers of open science (Questionnaire responses to ‘What are the key drivers of ‘Science 2.0?’)”. The syntax is the same for all these figures, i.e. first a statement on the figure being about open science, followed by a parenthesis stating the actual survey question was about science 2.0. This practice is, in a sense, misleading in a transparent way.

Method

We have scrutinised documents and deconstructed the process leading to the shift from science 2.0 to open science. Therefore, the focus has been on documents made publicly available by the European Commission describing the procedures underpinning the shift. Full access to relevant documentation is required for this method. This turned out to be more difficult than initially expected as many relevant documents were removed from the web. It is difficult to understand this kind of “document shredder” approach to transparent government from a transparency perspective. It involves removing publicly available material once the process is over. Nonetheless, we have recovered many documents through the archiving function of the Wayback Machine (<https://web.archive.org/>). Additionally, some survey results are problematic. Therefore, some statistical data have been reanalysed.

Three documents serve as the backbone of the official narrative, in practice legitimising each other. Notably, no other authorship than the European Commission is mentioned in connection with any of these texts. However, web resources belonging to RAND Europe claim they were commissioned to do most of the work. The three documents are:

- *Background document Science 2.0: Science in Transition* (European Commission, no date, hereafter the “Background document”),
- *Validation of the Results of the Public Consultation on Science 2.0: Science in Transition* (European Commission, 2015, hereafter the “Validation document”), and
- *Open innovation Open Science Open to the World – vision for Europe* (European Commission, 2016, hereafter the “Vision document”).

Initially, these documents were read in order to gather information about the shift. Specific questions pursued were:

- When in the process did this idea appear?
- What arguments were used and who made them?

As it became difficult to find these answers, more focus was directed toward inconsistencies within and between the documents. This spiralled into a further search for more documents, retrieving a redacted webpage. Furthermore, following up on the inconsistencies, we reviewed whatever empirical material was available for the public consultation, involving:

- a questionnaire form (basically quantitative with some free-form spaces),
- 332 identified and 152 anonymous, together 484, questionnaire responses (according to the Validation document there should be 498).
- the Background document, and
- 27 “position papers”.

The documents made several references to the *four workshops*. The Validation document (European Commission, 2015b, p. 6) contained a general statement that open science was “discussed during the workshops as the most viable alternative”. However, as all material regarding the workshops was removed when the website was deleted it was not possible for us to review any data regarding this claim.

According to the Validation document as well as the Vision document, the shift emerged bottom-up from the public consultation. We found it difficult to pinpoint the source of the shift. The Background document is an input to the consultation so it cannot provide part of the validation. Nonetheless, nothing in the Background document suggests a shift as it is focused on the concept of science 2.0.

Findings

Stakeholder consultations have routinely been performed in the European Union since the late 1990s. Such processes were formally established and enhanced in the early 2000s (European Commission, 2002). Hagendijk and Irwin (2006) describe public consultations as a form of deliberative democracy to attain stakeholder consensus. However, given fundamental conflicts of interest, public consultations become power struggles, in effect arenas for establishing winners and losers.

So-called “public Internet-based consultations” or “open consultations” are a particular form of public consultation with specific benefits and problems. The European Commission (2002) established general principles and minimum standards for such processes. There is also a portal for all consultations (https://ec.europa.eu/info/consultations_en). Nonetheless, various DG use open consultations in different ways (Quittkat, 2011). The one at hand was run jointly by DG Research and Innovation and DG Connect.

The public consultation on science 2.0 appears to have been dominated by interactions with lobbying actors, and organisations registered in the EU Transparency Register. This is not surprising given Brussels' high density of lobbying activity (Berkhout and Lowery 2010; Wonka et al. 2010). However, as this is the case, documentation of public consultations must be as transparent as possible. The Commission has limited expertise resources but needs extensive input from diverse stakeholders from as many European countries as possible. For such reasons, broad consultations and long-standing ties with interest groups become necessary (Coen and Katsaitis 2013).

At the same time, naturally, lobbying actors, on their part, utilise various forms of agenda-setting strategies (Princen 2011; Klüver et al. 2015). Therefore, the strong dependency on lobbying actors is metaphorically a kind of double-edged sword (Arras and Braun 2018). At its worst, public consultations can lead to "lobby regulation" (Greenwood and Halpin 2007). Notably, despite the term "public consultations", ordinary citizens are rarely involved in consultations (Haverland et al. 2018).

The official narrative of the public consultation leading to the shift is outlined within two paragraphs of the Vision document of DG Research (European Commission, 2016).

The European Commission's 2014 public consultation on '*Science 2.0: Science in Transition*' sought the views of major stakeholders to gain a better understanding of the full potential of 'Science 2.0' and to assess any need for action. Stakeholders preferred the term 'Open Science' to describe the transformation of scientific practice. (p. 35)

This signals a bottom-up revolt against the science 2.0 concept and stakeholders firmly pushing the concept of open science.

The Validation document opens with a description of two separate parts of the consultation process. *First*, an open consultation gathering opinions of a broad range of stakeholders (including universities, research funding organisations, academic libraries, and scholarly publishers) between July and September 2014. This was in the form of an online questionnaire as well as 27 position statements. The process of collecting the statements is not described in any available text. Insights regarding these are only gained by reading them individually (available at the consultation website). We have summarised key data regarding the position statements in

Table . The *second* part of the consultation process was four stakeholder workshops held between October and December 2014 in Leuven, London, Bucharest and Madrid.

At a glance, this appears robust, satisfying demands for input legitimacy. However, closer scrutiny quickly reveals numerous problems.

We found five general problems of transparency when scrutinising the documentation of the process. These were:

- The process was driven by a lobbying actor whose broad and influential role was unacknowledged.
- Documentation of the process was performed in such a way that scrutiny became difficult.
- The main documents do not faithfully represent the content of each other, referencing each other in erroneous ways. We described this as similar to a Chinese Whispers game. This meant that some key statements from the main documents could not be trusted. Crucially, the two key concepts, science 2.0 and open science, were used interchangeably in a misleading way.
- The questionnaire is in many ways lacking in scientific rigour. Furthermore, the way it was interpreted is questionable.
- The principles of collecting the position papers were not presented. They represent a skewed selection of the 28 member states. Moreover, they, too, were used in a questionable way.

These will be discussed, in turn, below.

RAND: the silent partner

The input to the process is the Background document. A substantial amount of ideational power is drawn upon what is put forward in that text. However, there is no authorship attributed. Most readers will therefore take it for granted that officials working at the European Commission penned it. However, that is not the case.

The Validation document, which summarises the results of the process holds even greater ideational power. Nonetheless, there is no authorship attributed. Most readers will therefore take it for granted that this, as well, was written by officials at the European Commission. However, completely different authorship of both documents and hands-on work with the consultation process emerged when the lost website (scienceintransition.eu) was accessed through the archive of the Wayback Machine.

Here it is stated that the “website is part of a project by RAND Europe on behalf of the European Commission”. This information raises two vital questions. First, why did the Commission not perform this process itself? Second, given that the Commission delegated the project to what can be described as a lobbying organisation, why was this not clearly stated in the key documents?

There is only a single mention in footnote (3) in the Validation document: “DG RTD is grateful for the services RAND Europe provided during the validation process and for the support of the workshops (*Sic!*)”. There is a jarring difference between the project being *performed* by RAND Europe compared to the *services provided*. Again, it should be emphasised that according to the EU Transparency Register, RAND Europe is a lobbying organisation. However, formal registration was not made until June 2015, a few months after the publication of the Validation document. RAND Europe is part of the larger RAND Corporation with headquarters in Santa Monica, California. Similar to many other lobbying organisations, it describes itself as an independent and nonprofit think tank.

The website of RAND Europe (more specifically <https://www.rand.org/randeurope/research/projects/science-2dot0-validation.html>) clarifies that their contribution was substantial in the whole Validation process:

RAND Europe analysed the consultation's outcomes and helped organise a series of workshops across Europe with representatives from different stakeholder groups. Our researchers also facilitated an interactive website for participants and interested individuals and organisations. The website allowed them to follow and comment on the validation process of the consultation.

The last sentence likely refers to collecting what in the key documents was called "position statements". We have found no other description of how these statements were collected. Obviously, RAND Europe played a major part not only in connection with the workshops but also in actively collecting position statements as well as constructing, processing and analysing the questionnaire responses. The website of RAND Europe also lists eight of their experts constituting the project team. The study has found no other named people in any other documentation surrounding the Validation process.

Scrutiny became difficult

Scrutiny of these seemingly transparent processes came to be difficult for various reasons—*first, source fragmentation*, which manifested itself in different ways. For instance, the relevant documentation was published on two different websites. Another example is the lack of key data and documents as an appendix to the Validation document. This means that anyone attempting to scrutinise the various claims of the Validation document needs to visit several different web resources.

The Background document is an important foundation for the whole work, the ubiquitous starting point for the questionnaire, and is relatively short. Why is it not included as an appendix to the Validation document? As will be discussed more closely below, the various claims made in the Background document are in many ways misrepresented in the Validation document, most fundamentally in the implication that most data collected is about open science. However, these various forms of misrepresentation become less evident to the reader as the two texts became unattached to each other.

Another example of source fragmentation involves the questionnaire, which should reasonably have been included as an appendix to the Validation document, ideally with easy access to summations of the results. The questionnaire is only accessible on the website, together with questionnaire responses in zip files. Summaries of the different questionnaire queries are not available even though some are presented in the Validation document and a conference presentation (Burgelman et al. 2015).

Second, scrutiny became difficult due to *source redaction*. Initially, the various material was divided on two different websites. Thereafter, one of these, maintained by RAND Europe, was deleted. This led to the loss of all workshop documentation and a wealth of other material produced in connection with the process. A possible explanation for this procedure would be that RAND Europe maintained the deleted website and that it, as a non-governmental actor, was not bound by EU transparency standards. However, if that was the case it would have been prudent to have established this as a RAND Europe website from the start. As it was, the deleted website was clearly labelled as an official EU website (<http://scienceintransition.eu>).

Reading only the Validation document, there is scant information about what happened during the four workshops held at Leuven, London, Madrid and Bucharest. A footnote within the Validation document states that the workshops' details and materials are available at the site scienceintransition.eu. Again, that site has been deleted and could only be accessed through the Wayback Machine. Despite some successful recovery, all links to pdf documents have been lost, not even archived by the Wayback Machine. The first indexed version of the site is found at

<https://web.archive.org/web/20141115190138/http://scienceintransition.eu/>. It consists of an introduction page that describes the web page, together with five other pages:

- Position papers
- Validation workshops
- Draft policy brief for Science 2.0
- Fact sheet for Science 2.0
- Validating the ‘Science 2.0’ consultation

At the deleted <http://scienceintransition.eu> website the European Union logo is at the top, next to RAND Europe’s. As noted above, it would have been prudent to clearly acknowledge the work of RAND Europe in several documents, including the questionnaire itself.

Upon submission of this manuscript, it should be noted that even the Background document has become a victim of redaction. It is no longer available on any EU Commission Web Page (as verified by searches). Through Google, though, a copy of the document seems to be available through commercial repositories, as well as through Archive.org.

Third, scrutiny is also hampered by *mislabeled*. Those reviewing the data will be challenged. Numerous questionnaires are missing, and some appear to be misfiled. The so-called position statements involve mixing various types of documents and, to a certain extent, overlap with the quantitative survey.

Fourth, scrutiny is challenged by *haystacking*. This describes a transparency process where the most important documents for scrutiny are available but in such a way that actual engagement with data becomes overwhelming and cumbersome (cf Stohl et al. 2016). The questionnaire documents are provided in raw form in individual files and collected in zip files containing ‘position papers’, ‘identified responses’ and ‘anonymous responses’. Each set of documents has to be unpacked, opened and examined individually. Additionally, submissions are numbered, and the highest number identified is 1031. This is mystifying as this implies a total number of questionnaire responses twice the size of the official data set. The reason for not including the complete set might be spam, but even in the recognised set, there are questionnaires found with garbage text or the name “test” found as the respondent. In summary, scrutiny is made difficult by source fragmentation, source redaction, mislabeling and haystacking.

Chinese whispers game

The popular children’s game *Chinese whispers* consists of kids in sequence whispering a statement to each other and eventually marvelling at the differences between input and output. There are similarities in how accounts are twisted when moving from the Background document to the Validation document and finally landing in the Vision document. Several examples of this have been found in this scrutiny. As already noted, anytime there is a mention of public consultation results about open science, it is actually data concerning science 2.0.

A parallel issue involves key statements from the Background document being allowed to represent the outcome of the public consultation. This should not be the case as the Background document was written as an input to the public consultation. Nonetheless, the characterisation of science 2.0 in the Background document is allowed to represent the outcome of the public consultation for the concept open science. Here is how this plays out.

The Background document (p. 1) initially attempts a definition of science 2.0, stating:

'Science 2.0' is therefore understood as a systemic change in the modus operandi of doing research and organising science.

The Validation document thereafter misstates the Background document:

According to the Background document, 'Science 2.0' describes an on-going evolution in ways of doing and organising research (p. 4).

Finally, the European Commission Vision document misquotes the Validation document in two ways. First, by ascribing this definition to Open science, not science 2.0. Second, by attributing this to the consultation, not to the Background document.

...the public consultation described open science as 'the on-going evolution in the modus operandi of doing research and organising science' (European Commission, 2016, p. 35).

The European Commission draws legitimacy from the transparency-oriented concept *public consultation*. However, the Commission is actually referring to the Validation document, which, in turn, builds upon claims suggested in the Background document. RAND Europe has a notable presence in both these source documents. Again, the Background document was written before the stakeholders were consulted, intended as input. It is, therefore, problematic to represent that text as an output from the consultation.

Unscientific questionnaire

The narrative that open science was pushed upon the European Commission bottom-up through the consulting process was stated firmly in a reflection by leading officials at DG Research and Innovation (Burgelman et al., 2019, p. 1), arguing that the quantitative survey forced the shift upon the Commission.

The European Commission started using the term "open science" as a result of the public consultation on Science 2.0 Science in Transition in 2014... An overwhelming 42% (*Sic!*) of the nearly 500 respondents to this consultation (among which large scientific organisations or associations) preferred the term "open science" over alternatives such as Science 2.0. The European Commission respected this choice of the term.

According to RAND Europe, the questionnaire was designed and analysed by that organisation. However, arguably, it is fundamentally flawed as a research-based quantitative survey. This alone makes the argument about a specific share of preferring open science problematic (apart from the fact that it is mentioned as 43 per cent in all other documentation). There are three aspects to this.

First, it was open to anyone online. This does not allow for a controlled sample. Only those knowledgeable about the publication of the questionnaire and its importance would be able to respond.

Second, as it was possible to submit anonymously, those in the know could easily manipulate the results. 149 questionnaires were submitted anonymously, i.e. about 30 per cent of all responses. The survey involves a fundamental shift concerning overarching policy ideas. Therefore, there were substantial incentives for various actors to attempt to weigh in heavily. In practice, anyone wanting to influence could ask colleagues, friends and family to respond to the survey anonymously in order to beef up the quantitative indicators in one direction or another.

The use of an uncontrolled sample is more acceptable in the case of qualitative data collection. In such cases, data processing is a matter of learning from different perspectives "out there". However, although there were a few free text comments allowed, the questionnaire was basically quantitative.

Third, the interpretation of the 43 per cent must also be based on the design of the questionnaire query itself: 43 per cent of what? The Vision document (European Commission, 2016, p. 45) states that the major stakeholders in the context of the public consultation “preferred the term ‘open science’ to describe the transformation of scientific practice”. This narrative is presented more fully within the Validation document (European Commission, 2015b, p. 6):

The results of the consultation suggest that many stakeholders prefer using an alternative term to ‘Science 2.0’. ‘Open science’ appeared to be the most popular alternative term. It was selected from among six options by 43 % of respondents and discussed during the workshops as the most viable alternative.

Other suggestions made by questionnaire respondents included ‘participatory science’, ‘science highway’, ‘better science’, ‘open research’ and ‘open scholarship’ – the latter two were included as alternatives to the word ‘science’, which could be interpreted as excluding the humanities in some cultural contexts.

The two paragraphs quoted above are easily misunderstood. It is first stated that open science was one of the six alternatives. Thereafter, “other suggestions made by questionnaire respondents” led to the mention of five alternate concepts. Are, then, these the five concepts that open science competed with in the multichoice query? No. If they had been included, one would expect the concepts open research and open scholarship to have been quite successful. Instead, the competition for the concept of open science was with five other concepts:

- science 2.0
- open digital science
- networked science
- enhanced science
- digital science

Arguably, this is weaker competition than the five concepts mentioned in the quote. Granted, the quote taken from the Validation document can be read both ways. However, as the questionnaire itself is not included as an appendix, it will be difficult for the reader to notice/check this. Although the Validation document states that “Open Scholarship” was an option in questionnaire responses, this was not so. However, it remains an interesting option. The newly founded Open science unit at DG Research and Innovation appears to prefer open scholarship, stating that it has the same meaning as open science (Burgelman et al. 2019, p. 1).

Furthermore, not mentioned is that a seventh option was available, a free form “Other, (please specify)”. This data was not used at all. Crucially, when computing the 43 per cent in favour of open science, no data connected to other terms were included. According to our calculations, this was 12.6 per cent of the total data (see Figure 1 and Table 1).

The list of options for this multiple-choice question is actually absent in the Validation document. To find these, it is necessary to go to the questionnaire itself and, as already noted, the questionnaire is not among the three appendixes to the Validation document. However, the questionnaire is available on the consultation website. The statistical distribution of results is neither provided on the website nor in the Validation document. However, in a keynote presentation at the Second International Science 2.0 Conference, DG Research and Innovation officials presented some of the key data (Burgelman et al. 2015).

- Open science (43 per cent).
- Science 2.0 (22 per cent).
- Open digital science (19 per cent).

- Networked science (10 per cent).
- Enhanced science (5 per cent).
- Digital science (2 per cent).

According to the Validation document, it is within the Background document that the alternative terms to open science were discussed. However, that is not the case which is demonstrated by reviewing the alternative concepts one by one.

Enhanced science is not present at all. *Digital science* is mentioned three times. However, two of these refer to a division of Macmillan Publishers which is named Digital Science. That the Background document ties this concept to a commercial publisher should in itself give the questionnaire designers some pause in making it one of the alternatives to science 2.0. The third time it appears is in the context of ongoing Horizon 2020 projects. Obviously, the connection to Macmillan Publishers should also disqualify *open digital science* which is also mentioned once. *Networked science* appears once in passing (“Researchers increasingly engage in a globally networked science” (p. 8)), not really highlighted as a concept.

Of the involved concepts, Open science and science 2.0 are the only ones that are defined. In the case of the former: “open science, i.e. access to scientific data as well as reliability of scientific discovery (e.g. access to methods, tools, data, and articles)” (European Commission, nd, p. 3). The stipulated definition of science 2.0 has previously been mentioned. It should be emphasised that the Background document in this way supplies separate definitions of these two concepts. Nonetheless, the Validation document disregards that and states that the two concepts are synonyms.

All in all, the Background document cannot serve as a foundation for informed choice about the six alternative concepts. There is a heavy emphasis on the science 2.0 concept. However, as 2.0 concepts overall could be seen as dated, the only alternative concept somewhat highlighted in the Background document is open science. Those working with the questionnaire received no other input from the Background document to allow them to choose another concept.

Figure 1. Word cloud illustrating concepts suggested as the most appropriate term in the questionnaire.

Again, it is problematic that one-third of the questionnaire data is in the form of anonymous responses, allowing lobbying actors in the know to skew results. A re-analysis of the survey responses might show some such tendencies between the anonymous and the identified respondents’ sets, see Table 1. Both the concepts of open science and open digital science are more favoured by the anonymous respondents. While the concept of open science share is 37.3 per cent among identified responses, according to our calculations, the number of responses among anonymous respondents was 2.2 per cent higher. More significantly, the share of science 2.0 is significantly lower among the anonymous responses at 15.1 per cent, instead of 20.8 per cent of identified respondents. It should be acknowledged that some of these variations could be due to differences in calculations (we did not fractionalise the data, meaning that if a respondent chose one term and suggested another term in the free form interface, each term is accounted for in full).

A sophisticated reading of the stated 43 per cent preference for open science is challenging. Not only are about 1/3 of questionnaire responses anonymous, but additionally, only 484 out of 498 questionnaire responses are accounted for. Granted, five questionnaire responses were misfiled as position statements, but nine questionnaires are still missing. A further difficulty in reviewing the outcomes of the “stakeholder choice” is that, seemingly, questionnaire responses were accepted even if

they did not respond to every query. Of course, albeit these difficulties, a share of 2/5 support for the chosen term, whether it is 43 per cent as stated or 38 per cent as calculated by us, is still a respectable figure, but it should be seen in the context of the Background document providing a clear bias toward open science. Similar bias may also have been introduced during the workshops.

The position statements

The “position statements” appear to have been influential for the Validation document as they are often referred to. However, there is no information in the Validation document regarding how position statements were collected and which respondents were allowed to submit them. Judging by statements on the deleted website, they were collected and uploaded by RAND Europe. Nonetheless, 27 unique documents (altogether 28, but one is a duplicate) labelled “position papers” are available on the homepage for the consultation.

When the Validation document initially described the data used, it was stated that “Respondents could also submit separate position statements on the topic” (p. 4). However, when we reviewed them, it became evident that they had not been submitted under such a label. Instead, some respondents to the questionnaire have simply reacted to the inadequacies of supplying input to the complexities of “science in transition”. Therefore, they felt the need to add a separate document. This is sometimes reflected in the “position statements” themselves. The joint statement by *Universities UK and the UK Higher Education International Unit* (2014, p. 4) complains that “the consultation’s tick box-format is slightly restrictive, this response is structured in a more open format that allows for more nuanced views”. *Universities Denmark* (2014, p. 1) is transparent about its strategy of encouraging eight Danish universities to respond to the questionnaire separately and themselves “not to answer the online questionnaire, but to highlight certain themes of importance for ongoing and future discussions”.

The Validation document claims that the position statements pushed for the shift (European Commission, 2015b, p. 6):

In position statements, stakeholders emphasised that Open science refers to multiple, related developments. For instance, LERU described it as ‘an umbrella term for a series of movements in research’ (p. 1). Science Europe said it is a ‘series of related practices’ (p. 2) and the Public Library of Science (PLOS) said it is a ‘system of related changes that must be considered in relation to one another’.

Science Europe identified three essential aspects of Open science: its relation to digital technology, the idea that it explores changing research practices and their impact on the research system as a whole, and the fundamental importance of “a certain vision of science as a community of practice” (p. 2).

It must be emphasised that all of these are misleading references to the position statements. All of the three actors mentioned talk about science 2.0, *not open science*. Granted, the League of European Research Universities (LERU) appears to suggest in the heading of their text that open science and science 2.0 may be synonyms. However, the rest of their text utilises the concept of science 2.0, including their statement cited above.

Another problem with the position statements is that there is likely overlap between the data coming from the questionnaire and workshops. Five of the 27 documents appear to have been misfiled as they are simply questionnaire responses.

Position statements are to a large extent written by lobbying actors. Discounting the five misfiled documents, 22 contributions remain. 17 of these stem from organisations registered in the EU

Transparency Register, i.e. declaring themselves to be lobbying organisations in some sense or another. Table 2 supplies an overview of the position statements. Only three of them actively mention the word “open science”. It is therefore difficult to claim that the position statements define and promote open science.

A review of the 22 “position statements” (not counting questionnaires) also reveals an additional input legitimacy problem. There is an overrepresentation by then EU member UK (3) and Scandinavia (4, including non-EU member Norway). Only four countries beyond these are represented with one statement each: Belgium, Germany, Netherlands and Portugal. The remaining ten documents come from international or pan-European organizations. Pan-national stakeholders therefore seem well represented while there is a striking asymmetry regarding national representation as the material only includes six of the 28 member states. Major member states such as France, Spain and Italy are missing as well as any country from the former Eastern Bloc. It undermines input legitimacy that only those actors intimately knowledgeable about the process would be able to be aware of this opportunity to influence policymaking.

Such asymmetrical input into the process is also evident in the Background document which stated an ambition that the consultation process should be broad enough to include “all relevant European stakeholders and interested parties” (p. 1). There is, indeed, a section on “evolving debates and activities in the Member States of the European Union” (p. 11). However, this relatively brief section (half a page) only mentions debates in two out of the 28 member states: the UK and the Netherlands. As already noted, these countries are also overrepresented among the “position statements”. The strong but anonymous presence of RAND Europe in the process raises further questions regarding input legitimacy.

However, it is possible that the German “position statement” became influential as it is the only one that suggests a shift of concept. The Leibniz Research Alliance Science 2.0, despite having “Science 2.0” in its name, argued that the term was problematic and suggested instead “Open science” or “Research 2.0”:

With the possible addition of the previously noted text by LERU, this is the only explicit recommendation for making the shift by any stakeholder found in this scrutiny.

Discussion

We have attempted to understand a process leading to a shift that was not designed for that purpose. Conventional scrutiny of documents has been insufficient to establish where the idea of making the shift to open science came from. The most influential parts of the public consultation, the survey and the so-called “position statements” led to asymmetrical input among the 28 nation-states within the European Union. As roughly 1/3 of the questionnaire responses were anonymous, various stakeholders had broad opportunities to manipulate the survey results. Those in the know could also double responses through the questionnaire and the so-called “position statements”.

The process included a wealth of stakeholders in the form of lobbying organizations, but it has been challenging to establish which roles these played. Although RAND Europe often works with projects commissioned by different European policy actors, it is reasonable to expect their substantial contribution to be clearly acknowledged in all key documents.

Many relevant stakeholders were invited to the workshops (university organizations, academies, research funding organizations, citizen science groups and publishers) and to contribute to the questionnaire. However, as the concept of open science is contested, it would have been reasonable to invite relevant stakeholders and science policy scholars. The Commission has easy access to experts within public policy in general and research policy in particular. Apart from some domain-specific expertise within RAND Europe there appears to have been an absence of science policy researchers. The lack of such expertise is also evident in the design of the survey and the survey process.

We find that a shift in a fundamental concept, a pillar of Horizon Europe, is adopted without a process involving consultation with domain-specific experts. This is the opposite of what Seabrooke and Wigan (2016) identify as a pattern of “powering ideas through expertise”. Instead, this becomes a case of “policy masquerading as science” (Hartley, 2016). As noted initially, some domain-specific expertise was consulted after the public consultation, then with the concept of open science as a given (Salmi, 2015; Adams, 2015)

According to principles of “Better law-making” (the European Parliament, the Council of the European Union and the European Commission, 2016), “whenever broader expertise is needed in the early preparation of draft implementing acts, the Commission will make use of expert groups, consult targeted stakeholders and carry out public consultations, as appropriate” (L 123/6). Indeed, the formation of such expert groups is quite ubiquitous in European policy. However, the documents involved in the shift do not show any signs of consultation with specific experts within research policy studies beyond staff at RAND Europe. As already observed, the process led to a substantial ideational shift with an implicit understanding that the shift involved no policy, ideology or semantic consequences as the two concepts were seen as synonymous. Input from domain-specific expertise might have shown that the shift involved introducing and legitimating new policy ideas.

It is ironic that a shift to a concept such as open science involves problems of policy transparency. The process appears to have been insufficiently designed to produce appropriate levels of input legitimacy. The decision to make the shift was not in the instructions underpinning the process. There was nothing about the shift in the Background document. However, sometime after producing the Background document, the choice to make the shift was made ad hoc by one or several actors.

We consider it likely that the shift was orchestrated together with the parallel development of the EOSC. The same EU officials were involved in both processes, and the implicit aim was to create a framework for open research data and data-driven innovation to be explored by European businesses. Burgelman (2021, p. 10) referred to hundreds of scientists consulted during 2014-15 during the tiresome development of the EOSC, making it possible to claim that “EOSC was not an invention of some bureaucrats not knowing what to do, but responded to the desire of a large community about the future of European science (and not technologies)”.

In which ways, then, could future processes of this kind be improved? In our opinion, it is important that public consultations are used for advice, not legitimation, for policy change. Scholars and curious citizens who want to know what happened are directed toward the public consultation. Obviously, that is not where the shift took place. Instead, policy actors made the pertinent decisions before, during or immediately after the public consultation. The way that the material coming out of the consultation was treated amounts to a kind of cover-up.

Hopefully, future processes will be played out according to the mission stipulated initially and not be twisted into something else in the middle or after all is done. It is also important that independent science policy experts become involved in an early stage so that key concepts are sufficiently defined. The key notion that the concepts of science 2.0 and open science are synonymous is frankly absurd and should never have been the backbone of the analytical treatment of the questionnaire. Moreover, questionnaires such as this cannot be credible as long as the sample is uncontrolled and allowed to be

anonymous. Rather, there should be a comprehensive list of relevant stakeholders and these should be invited to take part in the survey.

Similarly, position papers should be broadly invited or not at all. The selection at hand for the process studied revealed a startling geographical bias. Furthermore, when the work of the public consultation is performed with substantial help from a major lobbying organization, such as RAND Europe, it should be clearly acknowledged, not merely dropped in a footnote. Finally, it is of great importance that the documents produced in the process such as this remain accessible. Redaction of a key website, as well as haystacking or mislabeling of documents should not occur in the context of open government.

Conclusion

Despite Burgelman (2021) providing the “untold story” about EOSC, something similar is lacking for the process leading to the shift. We can speculate about a similar agenda, i.e. that open science was made into a key concept in order to provide legitimacy for open research data and the EOSC. This article has identified anti-transparency activities within the framework of transparent government: source fragmentation, source redaction, mislabeling and haystacking. Lack of input legitimacy is always challenging in processes of consultancy. This is particularly the case in processes wherein fundamental insights are gained along the way that changes the trajectory of the process. However, building on the current scrutiny, it is impossible to identify how the shift was initiated, gained recognition, and became solidified as a new core policy concept. This is troubling as it is, at least, knowable that the public consultation involved a wealth of strong lobbying organizations and that one of them, RAND Europe, played an instrumental role. According to the account by Burgelman (2021), scientists were enthusiastically pushing for open research data. That might have been the case, but it is not visible in the material available. There is an obvious ambiguity in Burgelman (2021). He wants, and clearly deserves, credit for introducing both science 2.0 and open science into European policy, as well as being instrumental in elevating them into powerful policy concepts. At the same time, Burgelman characterizes himself as a middleman in the complex European policy processes with the community of European scientists backing his policy moves.

It is difficult to speculate why so many transparency problems are evident in the documentation of this process. An overarching problem for transparent public policy is that officials are likely to lack sufficient resources to fully live up to “Better law-making” principles. Transparent practices are difficult in national governments but even more so in European policymaking involving extraordinary complex conflicts of interest. As described earlier, a great many policy streams were ongoing in parallel to each other at the time, creating extraordinary challenges for a limited staff. The problems of transparency and procedure discussed in this article should be understood in the context of the overwhelming consultation challenges that the European Commission faces with limited funds for public consultations. Frequently, this leads to heavy dependence on lobbying actors. As this is the case, the great wealth of institutions within the 27 member states deserves high-quality transparency procedures. While this study points at transparency issues regarding the project at hand, it also raises more significant questions regarding any policy process in which science policy is developed.

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Table 1: The number and share of chosen and suggested terms among anonymous and identified respondents.

Term	Anonymous respondents (n=152)		Term	Identified respondents (n=332)		Term	Total respondents (n=484)	
Open science	60	39.5%	Open Science	124	37.3%	Open Science	184	38.0%
Open Digital Science	29	19.1%	Science 2.0	69	20.8%	Science 2.0	92	19.0%
Science 2.0	23	15.1%	Open Digital Science	45	13.6%	Open Digital Science	74	15.3%
Networked Science	15	9.9%	Networked Science	27	8.1%	Networked Science	42	8.7%
Enhanced science	9	5.9%	Enhanced Science	15	4.5%	Enhanced Science	24	5.0%
Digital Science	2	1.3%	Digital Science	5	1.5%	Digital Science	7	1.4%
Other terms	14	9.2%	Other terms	47	14.2%	Other terms	61	12.6%
Sum	152	100.0%	Sum	332	100.0%	Sum	484	100.0%

Table 2: Key data regarding the 27 position papers constructed by the authors based on material available on the consultation website. Organisations characterized as “lobbying” are registered in the EU Transparency Register (established in 2011). Five documents marked with *italics* are questionnaires that appear to have been misfiled.

Organisation	Type of organisation	Type of contribution	Open science mentioned	Nation
Association of European Research Libraries	Lobbying	Proposal of actions	Yes	Pan-European
Danish Council for Research and Innovation Policy	Policy agency	Comment instead of a questionnaire	No	Denmark
European Federation for Science Journalism	Lobbying	Comment instead of a questionnaire	No	Pan-European
European Public Health Association	Lobbying	Consultation	No	Pan-European
European University Association	Lobbying	Extended comments on questionnaire	No	Pan-European
Eurotech Universities Alliance	Lobbying	Comments	No	Pan-European
Flemish researchers	No Organisation	Reprint of a petition from 4000 academics	No	Belgium
Fundação para a Ciência e a Tecnologia	Funding agency	Additional comments on the questionnaire	No	Portugal
Initiative for Science in Europe	Lobbying	Adding issues	No	Pan-European
International Association of Scientific, Technical and Medical Publishers	Lobbying	Extended comments to questionnaire	No	International
International Consortium of Research Staff Associations	Lobbying	Extended to questionnaire	No	International
League of European Research Universities	Lobbying	Position statement + Questionnaire	Ticked	Pan-European
Leibniz Research Alliance Science 2.0	Lobbying	Recommendations	Yes	Germany
<i>Neth-ER</i>	<i>Lobbying</i>	<i>Questionnaire</i>	<i>No</i>	<i>Netherlands</i>
Netherlands Organisation for Scientific Research	Funding and policy agency	Endorsement	No	Netherlands
Networked European Software and Services Initiative	Lobbying	Proposal of actions + questionnaire	No	Pan-European
<i>Non-attributed</i>	<i>Unknown</i>	<i>Questionnaire</i>	<i>Ticked</i>	<i>Unknown</i>
OpenAIRE & COAR (joint)	Lobbying	Noting specific issues to consider	Yes	Pan-European
<i>Public Library of Science</i>	<i>Publisher</i>	<i>Questionnaire</i>	<i>No</i>	<i>International</i>
<i>Reed Elsevier</i>	<i>Publisher</i>	<i>Questionnaire</i>	<i>No</i>	<i>International</i>
The Research Council of Norway	Lobbying	Comments	No	Norway
The Royal Society	Lobbying	Response to consultation	Yes	UK
<i>Royal Society of Chemistry</i>	<i>Lobbying</i>	<i>Questionnaire</i>	<i>Ticked</i>	<i>UK</i>

Science Europe	Lobbying	Response to consultation	No	UK
Universities Denmark	Lobbying	Recommendation	No	Denmark
Universities UK & UK Higher Education International Unit	Lobbying	Extended comments to questionnaire	Ticked	UK
Young Academy of Sweden	Association	Noting specific issues to consider	No	Sweden