

SCIENCE 2.0 – MAPPING EUROPEAN PERSPECTIVES

*Report on the General Stance of Organizations on European Commission's
Public Consultation on Science 2.0*

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Introduction

The European Commission's public consultation on 'Science 2.0: Science in Transition'¹ closed on 30th September 2014. Subsequently, the European Commission's Directorates-General for Research and Innovation (RTD) and Communications Networks, Content and Technology (CNECT) validated the outcomes at four workshops with key stakeholders like the League of European Research Universities (LERU) and Science Europe. Simultaneously, the European Commission released a selection of position papers of these stakeholders. Overall 26 single documents have been published whereas the Association of European Research Libraries (LIBER) and the League of European Research Universities are represented with a statement and the survey response. Others like OpenAIRE and the Confederation of Open Access Repositories (COAR) jointly produced a position paper thus in sum 26 organizations' statements are represented by the 26 documents.²

This paper tries to map the landscape of most valuable feedback by identifying thematic clusters on the basis of mostly discussed aspects within the position papers to provide the European Commission, national policy makers, the scientific community and the general public with a better understanding of the status quo. This helps on the one hand to avoid policy intervention where it is not needed and on the other hand to channel policy efforts into the right direction. This paper is divided into four chapters as following. Chapter 1 describes organizational points of view e.g. where there is common ground and need for policy intervention whereas chapter 2 shows our understanding of the organizations' general stance on Science 2.0. Chapter 3 provides a detailed overview of the position (if one) of the 26 organizations regarding the thematic clusters and lastly chapter 4 summarizes the topics that have not been addressed sufficiently in the consultation but which according to the organizations' perspective play a role within the context of Science 2.0.

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1 For the public consultation see http://ec.europa.eu/research/consultations/science-2.0/consultation_en.htm

2 Papers have been submitted by two global organizations, nine pan-European, and organizations from Belgium, Denmark, Germany, Portugal, Sweden, the Netherlands, the United Kingdom and the United States.

1. *Executive Summary of the Thematic Clusters*

- **Science 2.0:** The position statements indicate a variety of interpretations of what Science 2.0 means. The European Commission needs to clarify its understanding of Science 2.0 or change the wording. Nearly all commenters focus on Science 2.0 being a bottom-up process and that researchers are central. Only little policy intervention is welcomed. Except the Royal Society of Chemistry all see Science 2.0 or related issues as trend for science overall whereas there are differences in pace and impact between the disciplines.
- **Open Access:** Many commenting on Open Access and Open Data welcome Science 2.0 but some show concern that an un-regulated publishing framework will bring a flux of publications and research data which may lead to the problems of information overload, low quality publications and journals, and less strict quality assessment. Thus this can take impact of Science 2.0 trend towards negativity. Clear regulation for ensuring the person integrity, privacy and no data abuse is needed via consultation of major stakeholders.
- **Research Data:** Most of the commenters agree that for a proper realization of data intensive science it is important to adjust the fragmented EU copyright law. By not doing it, Europe could lag behind other parts of the world. In its ongoing efforts to review and modernize the EU copyright legislative framework, it is important that the European Commission considers creating an exception to allow researchers to apply text and data mining (TDM) techniques for scientific research (as already suggested by the European Commission's own Expert Group on copyright reform.), when the purpose of that research is to benefit both individuals and society at large. Techniques such as TDM allow broader exploitation of the already available knowledge and have the potential to lead to new and faster scientific discoveries.
- **Altmetrics:** Altmetrics only should supplement existing peer review but not replacing it totally. However, it is necessary to know about the limitations, value, and when and where to apply altmetrics. For example, a piece of research can be highly mentioned in the media and internet simply because it was wrong (e.g., the recent stem-cell scandal in Japan).
- **Social Media:** Some organizations show that Social Media is a player in dissemination of data. However, some organizations highlight that Social Media is privately owned and as an integral part of Science 2.0 the decisions of private service companies could increasingly affect the whole science system. Having public funded services or a strict policy framework could help to avoid negative effects.
- **Citizen Science:** The position statements indicate a skeptical trend concerning Citizen Science. Science might lose its independency if it becomes too responsive to external demands. Also, Citizen Science is only applicable in some scientific disciplines. Still, Citizen Science might be understood as a "societal contract" between science and society.
- **Crowd-funding:** All commenting on crowd-funding emphasize that it should be seen as an additional source and that public funding is central.

- **Curricula:** Most of the commenters acknowledge that there is a new modus operandi for the entire scientific process thus it makes no sense to ignore Science 2.0 activities in the recruitment practices of research performing organizations. It is important that training courses for the early level researchers and data scientist are offered and it has to be ensured that appropriate reputation management systems are in place.

2. General Stance of Organizations on Science 2.0

We would like to emphasize that this section shows our understanding of the general stance of the respective organizations on Science 2.0 and highlights statements we consider to be of great importance.

- **The Danish Council for Research and Innovation Policy** doubts that Science 2.0 will bring science forward in a coherent way. The trend of openness in science may backfire and could take an opposite direction thus there is need of regulation on Gold Open Access and Social Media. To tackle information overload problems and to ensure quality of data and journals quality control mechanisms have to be improved.
- **Fundação para a Ciência e a Tecnologia (FCT)** from Portugal fears that if science becomes too much responsive to external demands through Citizen Science and crowd-funding external (non-scientific) interests may influence the outcome of the scientific work.
- **The Initiative for Science in Europe (ISE)** demands policy interventions in the fields of data protection, long-term preservation and usage, and calls for non-profit service providers in Social Media to ensure that commercial decisions will not affect the science system.
- **Netherlands Organisation for Scientific Research (NOW)** supports Science Europe's view that policy development needs a strong basis and should be realized in close consultation with research communities. NOW invites the European Commission to follow its Open Access path of 'encourage Gold, require direct Green', i.e. strive for an embargo period of zero months.
- **The Royal Society of Chemistry** doubts that Science 2.0 is a direction for science as a whole already. As the uptake of Science 2.0 varies between different disciplines it is far too early for policy interventions thus the process should stay community-based.
- **The Royal Society** observes a paradigm shift in the way that science is being conducted and communicated. Open Data is a corner stone in Open Science and universities and research institutes should see it as the default position. Therefore, appropriate incentives have to be ensured.
- **Science Europe** recognizes that the impact of Science 2.0 is systemic and strongly emphasizes that Science 2.0 should stay researcher-driven. Thus policy needs to take into account the diversity of disciplines and should focus on building an enabling environment.
- **The Young Academy of Sweden** discusses solely the issue of Open Data highlighting the differences between disciplines and the challenge of earning reputation through data.

- **The Association of European Research Libraries (LIBER)** states that Libraries have an important role to play as Libraries are uniquely placed to advocate for Open Science policy and practice at institutional level and beyond, and to increase the visibility of Open Science outputs. They have also been at the vanguard of Citizen Science engagement e.g. via crowd-sourcing of content and metadata. LIBER also points towards the fragmented European copyright policy which is not fit for the digital age and has negative effects in data intensive science thus policy intervention is needed.
- **The European Technology Platform for Software and Services (NESSI)** observes that Science 2.0 has received high attraction as low-cost (bottom up) digital technologies have become available for the research community at large as well as for the citizens. From the technological point of view, opportunities are immense, with IT tools and services that enable efficient collaboration among people from anywhere in the world.
- **OpenAIRE and Confederation of Open Access Repositories (COAR)** jointly encourage the European Commission to play a vital role by incentivizing good practice or monitoring policy implementation. At the same time, a careful balance between top down policies and the needs of different contexts, disciplines and bottom-up practices has to be found.
- **The Public Library of Science (PLOS)** argues that policy action is merited as collective action problems and cultural change need external framing to create the overall incentives that drive large scale change.
- **Reed Elsevier** highlights that there are no legal barriers impacting the bottom-up process called Science 2.0 thus policy interventions are hardly needed.
- **The European University Association** emphasizes the importance of policy intervention for sustainable new Open Access business models which could cover the ever-rising costs of maintaining and up-grading university libraries, journal subscriptions and digital resources publication costs.
- **The EuroTech Universities Alliance** stresses that Science 2.0 is occurring in a general environment of public mistrust and concern about invasion of privacy which must be taken in policy making thought process. Additionally, Science 2.0 with its vision could become relevant to neglected research domains. It could facilitate collaborations with regions which are less well performing in terms of research.
- **The Flemish universities** stress that Bibliometric assessment, as well as other kinds of quantitative criteria, could be important tools, but run the danger of turning into goals in itself rather than means. Hence, quantitative criteria should not be directly implemented in financing systems, but should rather form an element in more complex assessment, complementing quantitative criteria with qualitative assessments.
- **The International Consortium of Research Staff Associations (ICoRSA)** recognizes the trends happening in Science 2.0, but they also emphasize the effects of this new paradigm on the careers and work conditions of researchers, particularly early career researchers.

- **The League of European Research Universities** calls on the European Commission to re-assess European copyright frameworks by introducing an exception for text and data mining.
- **The Leibniz Research Alliance Science 2.0** argues that Science 2.0 is already taking place with or without policy interventions. Any policy intervention should respect the bottom-up character of the Science 2.0 movement.
- **Netherlands house for Education and Research (Neth-ER)** encourages the European Commission to harmonize European Open Access policy.
- **Universities Denmark** argues that legal constraints might hinder the uptake of Science 2.0 and welcomes political initiatives in processes such as Open Access to publications and data and funding of research infrastructure.
- **Universities UK and UK Higher Education International Unit** jointly call on the European Commission to introduce ‘fair use’ exceptions to copyright law that allow text and data mining.
- **The European Federation for Science Journalism** upholds that transition of science will finally lead to a new ‘social contract’ between science and society. Especially for the two pillars – out of three – research for industrial competitiveness and research to meet the Grand Challenges and to a lesser extent for basic science, a permanent dialogue is needed to formulate an effective research agenda and to put research results in an economic, political, moral and/or cultural context. For this democratization of science and technology independent science journalists are needed that are able to link the different subsystems in our society: science, policy, economics, culture, morality.

3. Thematic Clustering and Individual Organizations

This section gives a structural overview of the important aspects that are majorly discussed in the organizations’ responses to the public consultation on Science 2.0. While investigating the 26 organizational responses to the public consultation, we witnessed diversified answers. Subsequently, it was important to visualize the responses in a most simple way for a better understanding thus a thematic clustering on the basis of mostly discussed aspects is realized in this table. An “X” in a box indicates that an organization did not make a statement to the respective topic

Institution	Science 2.0	Open Access	Research Data	Altmetrics
Danish Council for Research and Innovation Policy (DFIR)	Skeptical/regulation needed on Gold Open Access and Social Media	Skeptical/information overload/quality control needs to be improved	Skeptical about ownership of data	Skeptical as research are often provided by companies
Fundacao para a Ciencia e a Tecnologia Portugal (FCT)	Bottom-up process/emergence and sustainability owes much to public investments and initiatives	Must be first priority of European Research Area	Must be first priority of European Research Area	Supplement peer reviews may have unsatisfactory quality must be encouraged
Initiative for Science in Europe (ise)	Open approach improves scientific advances/differences between disciplines/avoiding loss of data protection and all private spaces	X	Research institutions need to provide framework conditions for research with sensitive data	Skeptical as altmetrics provided by private companies
Netherlands Organisation for Scientific Research (NWO)	Strong focus on Open Access and e-infrastructure	Encourage Gold, require direct Green thus strive for an embargo period of zero months	Open Data should be default/zero embargo period/proper incentives for metadata and data management	X
Research Council of Norway	Open Science/bottom-up	Green: systems for self-archiving plus link to national and international systems Gold: costs paid by research institutions plus funding organizations finance it through project overhead costs	Incentives for data sharing/funding organizations should consider costs for data archiving and usage as project costs	X
Royal Society of Chemistry	Skeptical/Open Science no direction for science as a whole, yet/bottom-up/no policy interventions needed	X	X	Skeptical
Royal Society	Open Science/paradigm shift	X	Open Data should be default position and on the same scale as journal articles	X
Science Europe	Science 2.0 is systemic/should stay bottom-up/policy removing obstacles	Ensure quality of journal publications, pre-prints etc.	Funding in supporting research infrastructure	New Outputs (Bibliometrics) in peer altmetrics
Young Academy of Sweden	Focus on Open Data/differences between disciplines and types of data	X	Metadata, due credit, confidentiality issue	X
Association of European Research Libraries (LIBER)	Open Science/roles and responsibilities in this new paradigm need to be clearly defined among the stakeholders	EC Copyright laws are fragmented/funders need to mandate Open Access to publications, research data and tools, as well as the use of interoperable licenses such as CC-BY and CCO	Open Data must be underpinned by clear and interoperable policy frameworks	X
European Technology Platform for Software and Services (NESSI)	Science 2.0 is very important/data intensive service/low-cost and bottom-up with immense potential	Author integrity and no data abuse is essential	Data privacy and trust need to be assured	Peer review and open review
OpenAIRE/COAR	Open Science/bottom-up	Open Access to all types of research output, (including software)/legal clarity/using existing open licenses (no new ones needed)	Training of research data management	Should include social media, traditional as Social Media and current system of

	Social Media	Citizen Science	Crowd-funding	Curricula
Research metrics dominated by private	Skeptical as Social Medias are privately owned	Skeptical	Skeptical	X
Peer review/almost-seen drawbacks/insured	X	Skeptical/science might become too responsive to external demands	Supplement conventional funding schemes	Science 2.0 activities should play a role in the recruitment practices
Metrics are often made by private companies	Skeptical as decisions of private companies increasingly affect the whole science system	X	X	Education on research integrity, proper anonymization of data where relevant, and measures on data security
X	X	X	X	Training and education of data management should be supported by the Member States and the EC
X	X	X	X	X
X	X	X	X	X
X	X	X	X	Focus on skills for managing data
Logs, pre-prints, review through	X	X	X	X
X	X	X	X	X
X	X	Open collaborative and interoperable infrastructure is key to Citizen Science	X	Development of new skills, curricula and investment is crucial for the development of support services to help researchers
Open science community	Wider dissemination of research results/getting feedback	Strengthen proper collaborative tools, incentives and cooperation models between professional and amateur researchers	Bridges the gap between society and research	Science 2.0 skills in career path
Scientific publications as well as open access and replace the current impact factors	X	X	X	Institutions should provide tools and training for practicing Open Science (text and data mining etc.)

Institution	Science 2.0	Open Access	Research Data	Altmetrics
Public Library of Science (PLOS)	Networked Research/policy action is merited to create overall incentives	X	X	Altmetrics should
Reed Elsevier	Networked Research/policy action is almost not needed/ no legal barriers are impacting Science 2.0	Open does not mean free of costs	Open does not mean free of costs	Supplement traditional review
European University Association	Policy intervention for sustainable Open Access business models needed/in universities trends outside the research cycle like MOOC and demand for digital e learning systems need to be connected with Science 2.0 trends	Structured dialogue with major stakeholders like universities, researchers, publishers etc. needed to decide on scientific recognition systems(impact)	Encourage development and adoption of good practice and information sharing guidelines/ adequate infrastructures and financial support are needed for favorable environment/EU copyright legislative framework to be remodeled for data intensive science	In addition to traditional review/frameworks specify and then Science 2.0 activities
EuroTech Universities Alliance	Science 2.0 is occurring in a general environment of public mistrust and concern about invasion of privacy/in universities trends outside the research cycle like MOOC and demand for digital e learning systems need to be connected with Science 2.0 trends	X	Data availability and access pose challenges/Open Data needs quality control mechanisms	X
Flemish universities	Science 2.0 must offer an alternative for rigid implementation of bibliometric evaluation criteria/ individualist, career-focused culture is negative for quality of the education system, scientific output and the societal relevance of the research	X	X	Skeptical as bibliometric evaluation with other alternative criteria could be used, but run the risk of turning into goalposts rather than means
International Consortium of Research Staff Associations (ICoRSA)	Emphasis must be on the effects of this new paradigm on the careers and work conditions of researchers/an open dialogue with the scientific community is needed	Open Access (to codes, software, publications and data) must be at the heart of any paradigm/all research grants should include Open Access publishing fees for publications	X	Altmetrics along with traditional systems are not done by publishers/rating agencies, experts in the field should assess true quality and not just a piece of research
League of European Research Universities	Open Science/bottom-up/policy interventions should focus on research infrastructure	Institution-based publishing	Re-assess European copyright frameworks by introducing exception to facilitate text and data mining	Skeptical
Leibniz Research Alliance Science 2.0	Science 2.0 is systemic/should stay bottom-up/building a Science 2.0 Community/European infrastructure to avoid storage in the US	X	X	X
Netherlands house for Education and Research (Neth-ER)	Neth-ER prefers wording Science in Transition instead of Science 2.0	Harmonized European Open Access policy	Harmonized European Open Access policy	X
Universities Denmark	Involve research communities/ policy action for funding of research infrastructure and examining the legal constraints that hinder uptake of Science 2.0	X	X	In addition to existing review and peer review
Universities UK and UK Higher Education International Unit joint	Best term describing EC's position: Open Science	'Fair use' exceptions to copyright law allowing text and data mining	'Fair use' exceptions to copyright law allowing text and data mining	Altmetrics should be used for public funding, review best options for open access convention
European Federation for Science Journalism	Strong independent science journalists needed	Improve quality control	X	X

	Social Media	Citizen Science	Crowd-funding	Curricula
Should be developed	X	X	Sceptical, no substantial component	X
Additional peer	X	Impact limited/restricted to certain disciplines	Sceptical	X
Additional peer work needed to assess quality of studies	Important role in dissemination of knowledge and knowledge transfer/privacy is a huge issue	X	X	Appropriate reputation management systems are needed/technical training for data management is necessary for researchers
X	Social Media on expense of public mistrust and concern about invasion of privacy/smart and reflexive policy measures needed	Citizen Science on expense of public mistrust and invasion of privacy/smart and reflexive policy measures needed	X	Educational curricula and training programs needed to teach Science 2.0 trends
Quantitative assessments of kinds of quantitative risks should be important indicators of danger of risks in itself rather	X	X	X	X
Works with other dependent on quality of papers by journals/assess the relevance of a	X	Needs good control on quality and accountability/establishing a funding portfolio that includes challenges defined by conversation between researchers and the public	X	New systems of research assessment should be carefully thought to ensure that contributions from all researchers are fairly recognized
X	X	In some disciplines Citizen Science has already become established but not in every field	Arts and Humanities are examples of crowd-sourced funded projects/ensuring trust is important	Education should embed Science 2.0 into scientific careers
X	Researchers are using it already because they benefit	X	X	X
X	X	X	X	Education and innovative (digital) skills are missing
Existing metrics	X	Helps reconnect science and society	Should not be an important funding source	Increasing information literacy
Should not be basis for funding, peer expert review/only supplemental metrics	X	X	Plays a minor role/no replacement for public funding	X
X	X	Strengthens 'social contract' between science and society	Enable young researchers to be more open and collaborative	X

4. Topics not Addressed in the Public Consultation

Science Europe calls for a Science Administration 2.0 not discussed in the public consultation. It may be a valuable service for researchers to provide rich data on available grants and position, and on their characteristics. The value of the data is multiplied if it is further integrated, analyzed, and visualized. This might be achieved by encouraging the creation of an ecosystem of public and private service providers who create value from the raw data. Similarly, as part of their administrative duties, research funding and performing organizations collect a wealth of data about research practices, individual researchers, scientific trends, and so on, to which ‘big data’ techniques could be applied to provide a better understanding of macro-level trends, such as changes in scientific priorities. Furthermore, if research-oriented social networks become mainstream practice, organizations could benefit from integrating their services into these platforms. For example, funding opportunities could be advertised more effectively, and calls could be tailored on the basis of research communities’ feedback and on international expert opinion, without the need for costly ‘on site’ consultations.

The European University Association and the EuroTech Universities Alliance recognize Science 2.0-related trends happening in universities such as the willingness for e-learning platforms and MOOC courses among students. These trends are outside the research cycle but are undoubtedly contributing to the transition of science thus it is important that these trends are well connected with Science 2.0 major trends. Therefore, universities must be eagerly consulted and included in the thought process of the European Commission over Science 2.0 policies.

Netherlands house for Education and Research (Neth-ER) emphasizes that an explicit mentioning of education and innovative (digital) skills is missing in the public consultation.

About the ZBW – Leibniz Information Centre for Economics

The ZBW – Leibniz Information Centre for Economics is the world’s largest information centre for economic literature. The institution holds more than 4.4 million volumes and enables access to millions of online documents in economics. In 2014 alone, 6 million digital full-texts were downloaded. In addition, the ZBW provides a fast-growing collection of Open Access documents. EconStor, the digital publication server, currently gives free access to more than 86,000 articles and working papers. EconBiz, the portal for international economic information, allows students and researchers to search among nine million datasets. The ZBW edits two journals in economic policy, *Wirtschaftsdienst* and *Intereconomics*.

The ZBW is a research-based academic library. Three professors and an international group of PhD candidates do transdisciplinary research on Science 2.0. Research at the ZBW is connected to international networks. The main co-operation partners are engaged in the Leibniz Research Network Science 2.0 and the EU project EEXCESS.

The ZBW is a member of the Leibniz Association and a foundation under public law. In 2011, 2012 and 2013, the ZBW was honoured for its innovative library work with the international LIBER Award for Library Innovation. In 2014, the ZBW received the German award “Library of the Year”.



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