YEAR Consultation on Science 2.0

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Main author Michela Vignoli, *AIT Austrian Institute of Technology (AIT)*, michela.vignoli@ait.ac.at

Contributors Clara Lujan, *Asociación de Investigación y Cooperación Industrial de Andalucía (AICIA)*, cilujan@us.es

Alexis Sevault, *SINTEF*, Alexis.Sevault@sintef.no

Karlijn Jans, *Netherlands Organisation for Applied Scientific Research (TNO)*, karlijn.jans@tno.nl

Yoko Dams, *Vlaamse instelling voor technologisch onderzoek (VITO)*, yoko.dams@vito.be

Petri Pipatti, Tiia-Maria Tenhunen, *Technical Research Centre of Finland (VTT)*,

Petri.Pipatti@vtt.fi, Tiia-Maria.Tenhunen@vtt.fi

Disclaimer: *The presented results reflect the personal views by the participating young researchers and do not represent the position of the research organisations they are affiliated with.*

Executive Summary

The present document summarises the results of the consultation on young researchers' views on Science 2.0 conducted by YEAR[1]. This consultation was carried out upon suggestion by the European DG Research and Innovation to deliver additional input from the perspective of young researchers for on-going policy work. Section 1 includes information on the applied methodology and process. Section 2 and 3 summarise the results of the survey and local debates. The main conclusions and recommendations are highlighted in Section 4.

The results of the consultation suggest that a majority of the young researchers involved in the online survey and debates approves Science 2.0. The participants agree that Science 2.0 can have a positive impact on the whole research system and offer a number of advantages for individual researchers.

However, next to the general positivity there are a number of insecurities and doubts, which are especially reflected in the output from the local debates. The most important challenges identified during the debates are addressing quality control of e.g. research results published in blogs, and raising awareness on Science 2.0. Another highlighted challenge is adapting the current research system and culture to support Science 2.0.

In conclusion, the YEAR network issues the following recommendations: To reach more stakeholders it is recommendable to break down the Science 2.0 concept to concise, clear aims and to define a roadmap towards reaching those goals. In parallel, young researchers should be trained to implement Science 2.0 practices into current research workflows. Moreover, the impact of Science 2.0 on innovation research and on industrial research partners is an important aspect, which should be addressed. Finally, appropriate Science 2.0 infrastructure as well as a framework for supporting Science 2.0 policies should be considered by the European Commission.

1. Introduction and Methodology

Online Survey

The aim of the survey was to generate input on young researchers' views on Science 2.0 triggered by young researchers at YEAR's member organisations. The questionnaire of the Public Consultation on Science 2.0 recently conducted by the European Commission (EC)[2] served as a basis for this survey. A goal was to gather input from as many young researchers as possible. As the questionnaire by the EC is rather detailed for people without much background knowledge on the topic the YEAR Board decided to create a simplified, shorter questionnaire that could be filled in in about 15 minutes.

[1] http://www.year-network.com/

[2] http://ec.europa.eu/research/consultations/science-2.0/consultation_en.htm (accessed on October 24, 2014)

Local debates at YEAR member organisations

The YEAR Board members organised local debates on Science 2.0 within their own organisations. The aim of the local debates was, on the one hand, to raise awareness of Science 2.0 among the young scientists and to introduce the topic to them. This incentive served to prepare the young scientists to answer the online survey as well[3]. On the other hand the local debates had the purpose to generate additional qualitative input to be added to the evaluation of results.

The Board members agreed on a common structure to organise the local debates: giving an introduction to Science 2.0 and gather a group of young researchers to discuss the topic. The Board decided to organise the local debates individually in order to find an appropriate format to reach as many young researchers within the YEAR member organisations as possible. The bigger organisations SINTEF, TNO, and VTT organised larger lunch debates and a seminar with 20+ participants. AIT and VITO set up working groups with about 10 participants, and AICIA held a more informal meeting to discuss the topic. Two organisations, AIT and VTT, invited external experts to the debate.

2. YEAR online Survey: Young researchers' views on Science 2.0

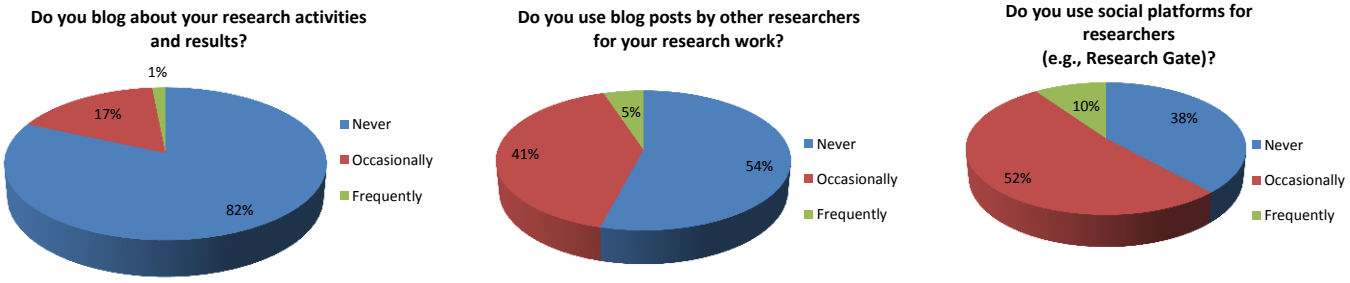
Questionnaire

The questionnaire for the survey was created by the YEAR Board based on the questionnaire of the Public Consultation on Science 2.0 by the EC[4]. Most of the questions included in the survey were directly taken over from the EC's questionnaire (questions 8 - 15). A few more general questions were added to those (questions 1 - 7). The questionnaire contained a set of 15 questions (plus the option to add an additional comment) and is included in the Appendix (p. 10).

Results

In total 196 young researchers replied to the online survey, 190 of them from YEAR member organisations and 6 from other organisations. The answers to the questionnaire show that a vast majority of the survey participants is not actively practising Science 2.0 in terms of using Web 2.0 services for research purposes (see Fig. 1).

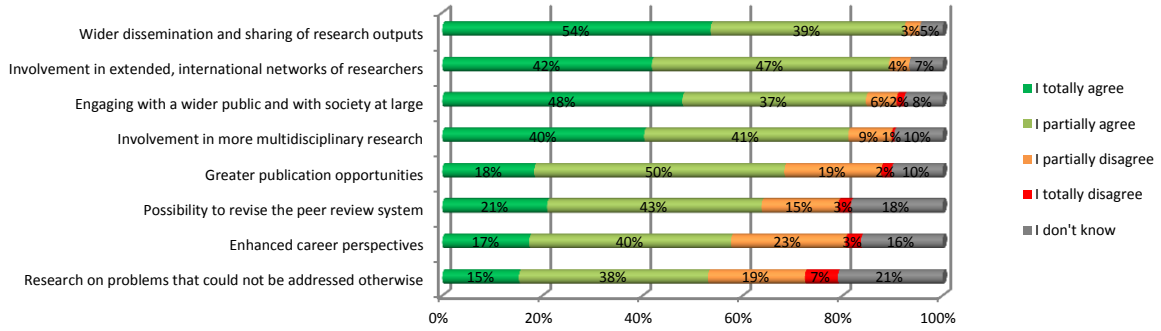
Fig. 1: Personal involvement in Open Research



82% of the respondents never blog about their research activities and results, and 54% of them never use blog posts by other researchers for their own research work. 41% of the respondents use blog posts by others occasionally, and 17% occasionally blog about their research work. Only 1% of the respondents frequently blogs about their research, and 5% frequently use blog posts for their research work. In terms of social platforms for researchers (e.g. Research Gate), 52% of the respondents confirmed that they occasionally use such platforms, whereas 38% do not use them at all.

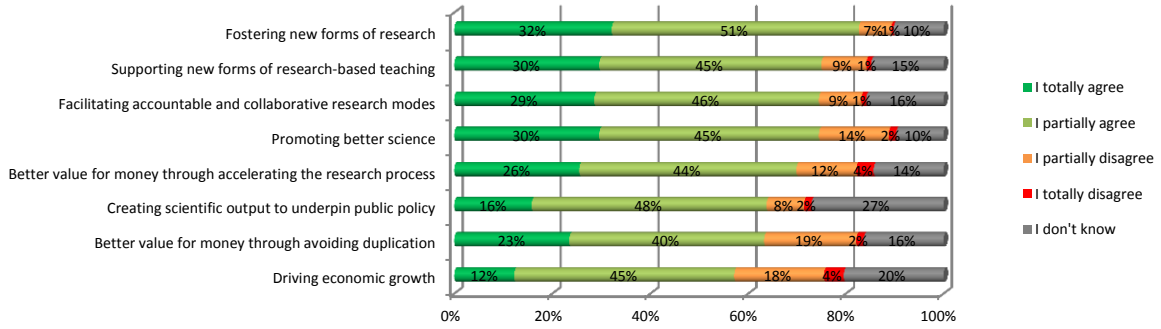
[3] Note that more people replied to the online survey than attended the local meetings.
[4] http://ec.europa.eu/research/consultations/science-2.0/questionnaire.pdf (accessed on October 24, 2014)

Fig. 2: Opportunities of "Science 2.0" for individual researchers



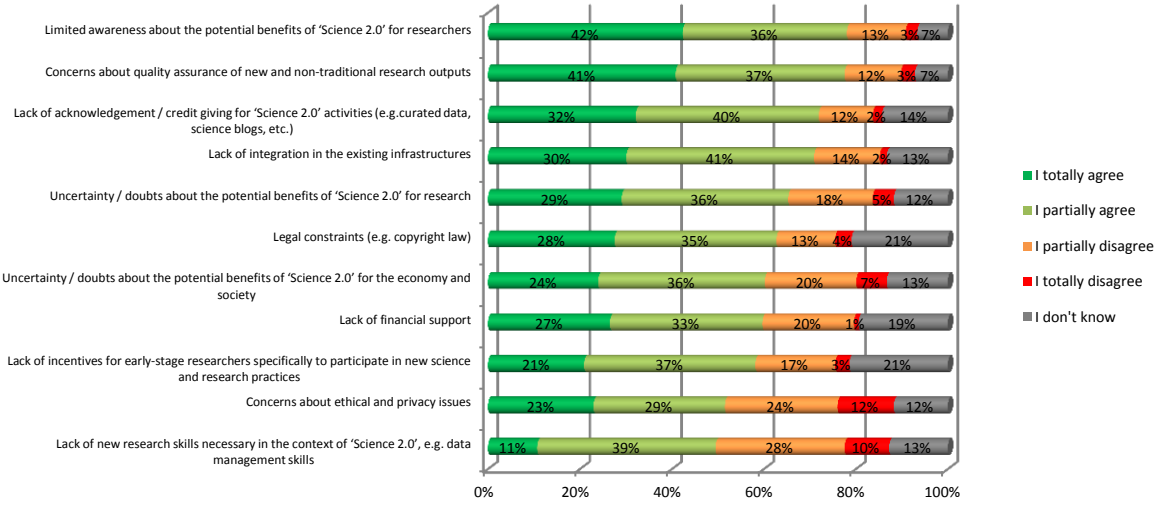
Science 2.0 may imply a number of opportunities for individual researchers (see Fig. 2). The answers by the survey participants show a trend towards *wider dissemination and sharing of research output* and *engaging with a wider public and with society at large* to be seen as the most prominent opportunities. Other high ranked opportunities are in*volvement in extended, international networks of researchers* as well as *in more multidisciplinary research*. The other listed opportunities, i.e. *greater publication opportunities*, and *possibility to revise the peer review system* are still seen to be important by over 50% of the respondents. The same applies to the opportunities *enhanced career perspectives* and *research on problems that could not be addressed otherwise*. However, over 25% of the respondents partially or totally disagree with the significance of these two opportunities.

Fig. 3: Opportunities of "Science 2.0" at the institutional level



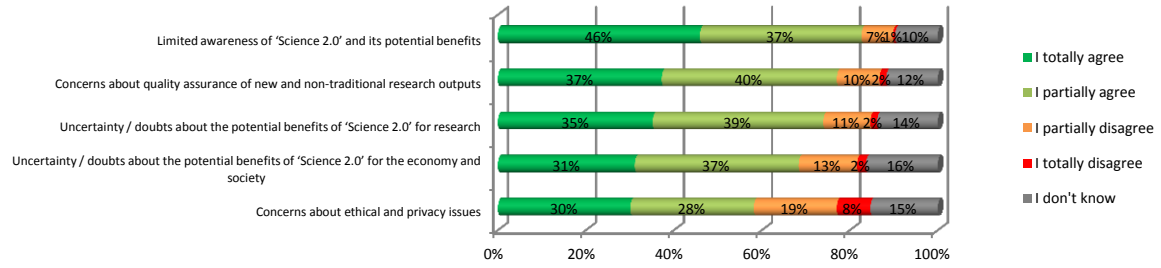
In terms of opportunities at the institutional level a bare majority totally or partially agree that *fostering new forms of research* is an important opportunity (see Fig. 3). Other high ranked opportunities are *supporting new forms of research-based teaching*, *promoting better science*, *facilitating accountable and collaborative research modes*, as well as be*tter value for money through accelerating the research process*. The remaining listed opportunities, i.e. *creating scientific output to underpin public policy*, *better value for money through avoiding duplication*, as well as *driving economic growth* are seen to be important by over 50% of the respondents as well. However, over 20% of the respondents only partially or not at all agree with the latter two aspects to be considerable opportunities.

Fig. 4: Barriers to "Science 2.0" for individual researchers



There are a number of barriers to practising Science 2.0. The barriers at level of individual scientists to which most of the respondent totally or partially agree to are *limited awareness about the potential benefits of Science 2.0 for researchers* as well as *concerns about quality assurance of new and non-traditional research outputs* (see Fig. 4). Other high ranked barriers are *lack of acknowledgement / credit giving for Science 2.0 activities (e.g. curated data, science blogs, etc.)*, *lack of integration in the existing infrastructures*, as well as *uncertainty / doubts about the potential benefits of Science 2.0 for research* and *for the economy and society*, *legal constraints*, and finally *lack of financial support*. *Concerns about ethical and privacy issues* and *lack of new research skills necessary in the context of Science 2.0 (e.g. data management skills)* are seen as a considerable barrier by about half of the respondents. However it needs to be mentioned, that a notable amount of respondents consider the latter two points to be only partially or not at all barriers to Science 2.0 (nearly 40%).

Fig. 5: Barriers to "Science 2.0" at the institutional level

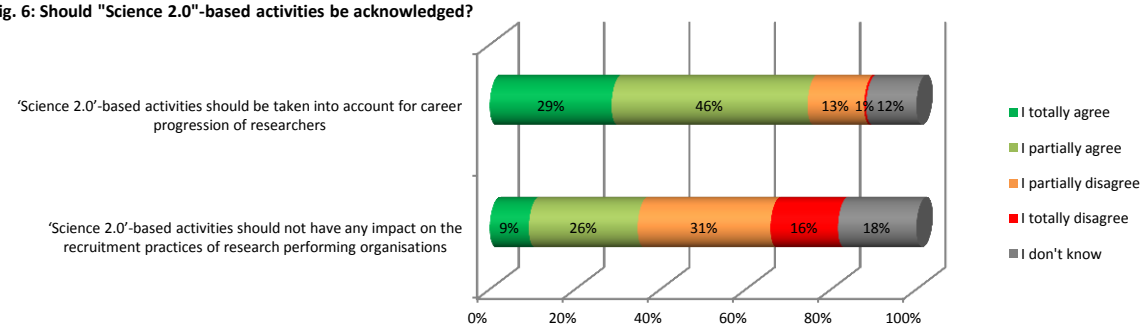


In terms of barriers at the institutional level a bare majority of the respondents totally or partially agrees that *limited awareness of Science 2.0 and its potential benefits* is a major barrier (see Fig. 5). All other listed barriers, i.e. *concerns about quality assurance of new and non-traditional research outputs*, *uncertainty / doubts about the potential benefit of Science 2.0 for research* as well as *for the economy and society*, and *concerns about ethical and privacy issues* are deemed to be important barriers by more than half of the respondents as well. It is worth mentioning that an outstanding amount of respondents partially or totally disagree with the latter barrier to be substantial (more than 25%).

Most of the respondents totally or partially agree that S*cience 2.0 activities should be taken into account for career progression of researchers* (see Fig. 6). Over 40% of the respondents partially or totally disagree that

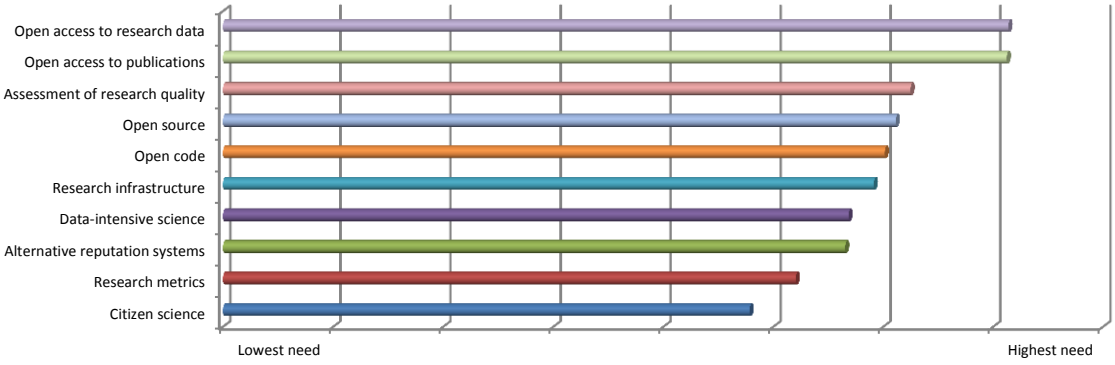
Science 2.0 activities should not have any impact on the recruitment practices of research performing organisations. However, it should be mentioned that about 25% of the respondents partially agree with the latter.

Fig. 6: Should "Science 2.0"-based activities be acknowledged?



In terms of policy interventions, a distinct majority of survey participants see the most urgent need for intervention for *open access to research data*[5] and *to publications*[6], followed by *assessment of research quality*, *open source*, *open code*, and *research infrastructure* (see Fig. 7). According to the results, the far least urgent aspect in terms of policy intervention is *citizen science*[7]. Interestingly also *research metrics* are valued not to be of a high priority[8]. However it needs to be mentioned that about 10% of the respondents did not indicate a rank for the last two points.

Fig. 7: On What specific issues within "Science 2.0" do you see a need for policy intervention?



According to a majority of about 80% of the respondents the most effective channels for awareness-raising of Science 2.0 are its *integration in research training* and *funding of specific actions by research funding organisations* (see Fig. 8).

A majority of the respondents totally or partially agrees that Science 2.0 will help reconnect science and society, will result in faster and wider innovation in science, and will make science more efficient (see Fig. 9).

[5] 23,98% ranked this 10 (highest priority)
[6] 28,06% ranked this 10 (highest priority)
[7] 20,41% ranked this 5 (medium priority); 9,18% did not indicate a rank
[8] 21,94% ranked this 5 (medium priority); 10,71% did not indicate a rank

Fig. 8: What are the most effective channels for awareness-raising of 'Science2.0'?

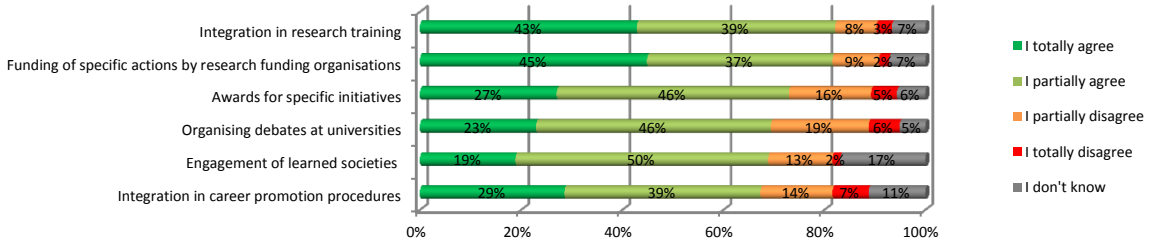
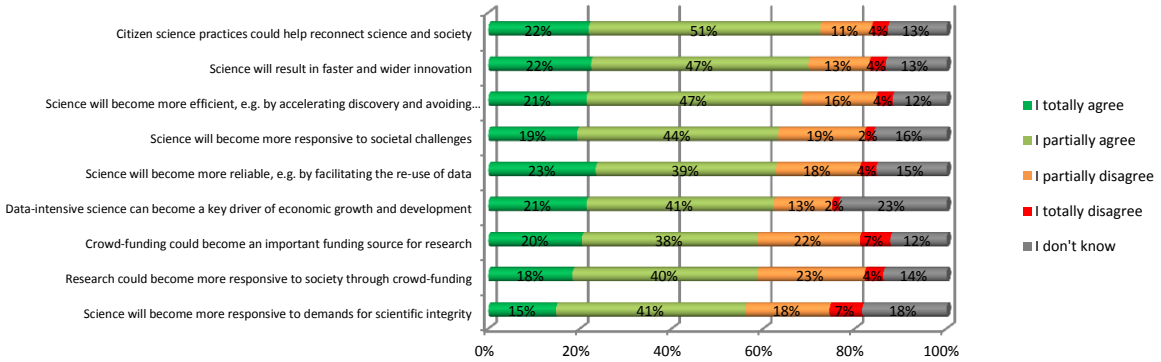


Fig. 9: Implications of "Science 2.0" for society, economy and research system



3. Local debates

Quality of the output

A short overview of the local debates' discussion highlights can be found in the Appendix (p. 13). As the local debates were not of the same nature and took place in different contexts, the outputs of the discussions are quite diverse. Another reason for that is that the individual discussions did not all have the same focus. The topic Science 2.0 is rather broad, and the local debates did not all cover the same aspects. This makes it difficult to compare the results directly. However the discussion outputs give a diverse insight into current visions and insecurities related to Science 2.0 from the perspective of individual groups of young researchers.

Please note that the following overview of the discussed points does only partially cover the topic. Some aspects and implications of Science 2.0 remained untouched in the discussions.

Conclusions from the debate output highlights

From the debate outputs reported below (p. 13) it can be concluded that a majority of the involved young researchers think that Science 2.0 can have a positive impact on the whole research system and offer advantages for individual researchers. However the debate results make clear that next to a general positivity regarding Science 2.0 there are a number of insecurities and doubts about some aspects of Science 2.0, which need to be addressed.

Quality of Science 2.0 Output

Various discussants mentioned mistrust in the quality of research results published on-line as a barrier to turn to Science 2.0 practices. One group of discussants stated that quality of research will not be undermined by Science 2.0, but that this depends on how Science 2.0 approaches are set up (p. 15). The considerable mistrust in reliability of data or results, which have not undergone some form of peer-review, cannot be neglected. Quality and quality control of scientific information published on blogs, on social networks, etc. should be

addressed by Science 2.0 strategies. Science 2.0 should at any rate enforce reliability and tangibility of research.

Open but regulated?

Some discussants expressed their concern about the inexistent control over / regulation of scientific information being published on blog posts or social networks. This is also the case for research data, especially when personal or sensitive data in terms of security is included. One of the debating groups stated that yes, (publicly funded) data and publications should be open, but that this should somehow be regulated and controlled (p. 15). This view does not comply with the vision of an open, rather self-regulated on-line research community, but reflects existing concerns about and mistrust in Science 2.0 sources. Strategies to help overcoming these should be thought of.

Awareness of Science 2.0 and its aims

A majority of the discussants were inexperienced or not familiar with the concept of Science 2.0 at all. The concept is rather new and for a number of researchers it causes insecurities and doubts. This may be aggravated by the fact that Science 2.0 covers many aspects of a more open science and implies a number of great visions and yet unknown risks for the future of research. This means that especially for inexperienced researchers it is rather difficult to get the big picture. Many of the young researchers clearly see the potential of this trend; however it is important to gain a clearer vision of where this trend should lead to and what the purpose of the innovation is.

A recently published study by Bernstein Research deducted that the slow progression of Open Access is due to a lack of focus within the community[9]. In order to avoid that it is important to agree on concrete aims of Science 2.0 and to actively lead the innovation of the research system towards them. One of the debating groups suggested that a roadmap to tackle specific challenges would be a good start to feed the transition process (p. 15).

Discrepancies with current research system

The output of the local debates generally confirms that most of the attending young researchers are currently not practising Science 2.0, which reflects the results of the online survey[10]. This has a number of reasons, which have been gathered from the various debate outputs reported below (p. 13):

- Currently there are no direct benefits attached to Science 2.0 activities for individual researchers in terms of improving one's CV or chances of promotion. Almost without exception the key factors for a scientific career remain the number of publications and the Impact Factor of the journals where they are published. The main Science 2.0 actors are individuals, who decide to put effort into that.
- Science 2.0 activities cannot easily be aligned with the requirements and constraints imposed by the current academic career system in place.
- Science 2.0 practices are not part of the curriculum of a scientist (yet).
- Lack of instructions and laws supporting Science 2.0 activities.
- High protection of data hinders access and re-use of existing data, and in some cases it makes difficult to make research data public (e.g. sensitive data, exploitation plans).

Cultural change within science is needed

The discussants agreed that there is the need for a cultural change within science. Currently the application of Web 2.0 tools is not very prominent in science. However, one of the debating groups stated that today being

[9] Claudio Aspesi, Helen Luong, Reed Elsevier: Goodbye to Berlin -The Fading Threat of Open Access (Upgrade to Market-Perform). 2014

[10] A vast majority of the survey participants is not actively practising Science 2.0 in terms of using Web 2.0 services for research purposes. See Results p. 2.

active in social media regarding your work might already have a positive impact for getting hired (p. 16). That is why it is really important to boost the usage of Web 2.0 within science. This cultural change should be driven at an early stage of the researchers' careers (p. 13). It is fundamental to include required research data management skills into the education of researchers.

However, the cultural change is not only about new tools and skills required for practising Science 2.0. Science 2.0 basically demands a change towards opening up the whole research process, while keeping up good scientific practice. This demands a re-thinking of the whole science making process; at least in terms of documenting, communicating, and assessing scientific output. Further changes are also needed in terms of addressing the discrepancies with the current research system listed above. The following list of needed cultural changes has been gathered from the debate outputs reported below (p. 13):

- Scientists need to change their view on Web 2.0 tools and accept their usage within science.
- Good scientific practice and Science 2.0 strategies will need to be aligned.
- Currently scientific success is mainly seen in the light of (mainly successful) scientific results. In terms of opening up the whole research process, it is necessary to move from this focus to the research process as a whole, including methodology, research data, and negative results.
- An important step towards Science 2.0 is changing the reputation system for researchers. The currently prevailing measures for scientific achievements, i.e. number of publications and the Impact Factor of the journals they are published in, need to be changed.

Frictions with industrial sector

In the university context, where the overlap with the industrial sector is lower, this aspect may be less crucial. However, for research institutes such as YEAR member organisations it is very important to address potential frictions with industrial project partners coming along with Science 2.0. E.g. fully open deliverables might scare industrial partners (p. 14).

Missing infrastructure

One of the debating groups identified a current gap of efficient tools and framework for scientific collaboration on-line (p. 14). Some commercial solutions exist, e.g. Academia, Figshare. However, according to the opinion of another group, these solutions will not have the power to convince researchers or to generate important incentives (p. 15). Only an independent and highly qualified instrument will be able to achieve both. Therefore they suggest the ideation of a platform, e.g. initiated and funded by the EC. This platform would serve the purpose to virtually meet other researchers, to exchange views, as well as to arrange a qualified peer review process.

Suggestions for policies at EU level

A list of suggestions gathered from the debate outputs reported below (p. 13):

- New policies should carefully take into account identified barriers.
- The policies should be concentrated on widening public support and creating a basis for research and science.
- Impact on the role of research in innovation and industrial support should thoroughly be assessed.
- Requirement for more open deliverables from EU projects.
- Requirements by research funders will have the greatest impact, which means that current and future research funding programmes by the EU will be important trend setters.
- Including e.g. open science tools, methods in EU project applications should be taken more into consideration for the evaluation of project proposals.
- The EC could support building public awareness of Science 2.0.

- It is necessary to create a framework supporting the policies, e.g. through funding.
- A new legislative framework is needed to address the lack of instructions and laws as well as the high protection of data.

4. Conclusion and Recommendations

In general the results of the online survey and the local debates suggest that a majority of the participating young researchers approves Science 2.0. They think that Science 2.0 can have a positive impact on the whole research system and offer a number of advantages for individual researchers. However, next to the general positivity there are a number of insecurities and doubts, which are especially reflected in the outputs of the local debates.

The missing quality control of research results published in e.g. blogs, social media results in a mistrust in Science 2.0 outputs. Quality assurance is an essential aspect to be addressed in that context.

Many researchers expressed uncertainties about meaning and implications of Science 2.0. On the one hand this highlights the need for more initiatives for awareness rising on Science 2.0. On the other hand, as the concept of Science 2.0 is rather broad and complex, it is recommendable to define concise and clear aims/goals of Science 2.0 as well as a clear roadmap towards reaching those. Breaking down the concept can help the stakeholders to better understand the topic and its implications, which is an important step towards acceptance.

Discrepancies with current research system & culture, especially in terms of metrics and related reputation systems, are preventing young researchers from actually practising Science 2.0. Creating incentives and adapting the current research system will help boosting Science 2.0 activities. Another important step is training; especially on strategies to tackle Open Access / Open Research Data and on how to integrate those in current research workflows.

Another insecurity expressed by the participants is that industrial partners might be reluctant to contribute to open science projects and activities. It is crucial to assess the impact of Science 2.0 approaches and policies on innovation research and on industrial research partners.

Finally, currently missing or insufficient infrastructure as well as a framework for scientific collaboration on-line is another inhibiting factor identified by some of the young researchers. A trusted and independent platform for collaboration, publication, and peer-review initiated by the EC may be a solution. Another important step is creating a framework supporting the policies, e.g. through funding or legislation.

a. Appendix

1. Questionnaire Online Survey

	Questions	Answer options
General questions	**1) Company/organisation**	• YEAR member organisation • Other
	2) How many years have you spent working in research?	• 0-2 years • 3-6 years • 7 years and more
	3) How many journal papers have you already published in your career?	• 0-5 • 6-10 • 11 and more
	4) How many peer-reviewed conference papers have you already published in your career?	• 0-5 • 6-10 • 11 and more
Online platforms	**5) Do you blog about your research activities and results?**	• Frequently • Occasionally • Never
	6) Do you use blog posts by other researchers for your research work?	• Frequently • Occasionally • Never
	7) Do you use social platforms for researchers (e.g., Research Gate)?	• Frequently • Occasionally • Never
Opportunities for "Science 2.0"	**8) What are your opportunities for "Science 2.0"?** ➢ Wider dissemination and sharing of research outputs ➢ Greater publication opportunities ➢ Involvement in extended, international networks of researchers ➢ Involvement in more multidisciplinary research ➢ Enhanced career perspectives ➢ Possibility to revise the peer review system ➢ Research on problems that could not be addressed otherwise ➢ Engaging with a wider public and with society at large	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know
	9) What are the opportunities for "Science 2.0"? (at the institutional level) ➢ Driving economic growth ➢ Facilitating accountable and collaborative research modes ➢ Promoting better science ➢ Better value for money through avoiding duplication ➢ Better value for money through accelerating the research process ➢ Creating scientific output to underpin public policy ➢ Fostering new forms of research ➢ Supporting new forms of research-based teaching	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know

Barriers to "Science 2.0"	**10) What are your barriers to "Science 2.0"?** ➢ Lack of acknowledgement / credit giving for 'Science 2.0' activities (e.g. curated data, science blogs, etc.) ➢ Limited awareness about the potential benefits of 'Science 2.0' for researchers ➢ Concerns about quality assurance of new and non-traditional research outputs ➢ Lack of new research skills necessary in the context of 'Science 2.0', e.g. data management skills ➢ Lack of financial support ➢ Legal constraints (e.g. copyright law) ➢ Lack of incentives for early-stage researchers specifically to participate in new science and research practices ➢ Lack of integration in the existing infrastructures ➢ Uncertainty / doubts about the potential benefits of 'Science 2.0' for research ➢ Uncertainty / doubts about the potential benefits of 'Science 2.0' for the economy and society ➢ Concerns about ethical and privacy issues	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know
	11) What are the barriers to "Science 2.0"? (at the institutional level) ➢ Limited awareness of 'Science 2.0' and its potential benefits ➢ Concerns about quality assurance of new and non-traditional research outputs ➢ Concerns about ethical and privacy issues ➢ Uncertainty / doubts about the potential benefits of 'Science 2.0' for research ➢ Uncertainty / doubts about the potential benefits of 'Science 2.0' for the economy and society	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know
Implications	**12) Implications of "Science 2.0" for society, economy and research system** ➢ Science will become more efficient, e.g. by accelerating discovery and avoiding duplication ➢ Citizen science practices could help reconnect science and society ➢ Crowd-funding could become an important funding source for research ➢ Research could become more responsive to society through crowd-funding ➢ Data-intensive science can become a key driver of economic growth and development ➢ Science will become more reliable, e.g. by facilitating the re-use of data ➢ Science will become more responsive to demands for scientific integrity ➢ Science will result in faster and wider innovation ➢ Science will become more responsive to societal challenges	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know
	13) Should "Science 2.0"-based activities be acknowledged? ➢ 'Science 2.0'-based activities should be taken into account for career progression of researchers ➢ 'Science 2.0'-based activities should not have any impact on ➢ the recruitment practices of research performing organisations	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know
Policies and awareness	**14) On What specific issues within "Science 2.0" do you see a need for policy intervention?** ➢ Open access to publications ➢ Open access to research data ➢ Open code ➢ Open source ➢ Data-intensive science ➢ Citizen science ➢ Research metrics ➢ Assessment of research quality ➢ Alternative reputation systems ➢ Research infrastructure	• Ranking from lowest need (1) to highest need (10)

	15) What are the most effective channels for awareness-raising of 'Science2.0'? ➢ Organising debates at universities ➢ Engagement of learned societies ➢ Funding of specific actions by research funding organisations ➢ Awards for specific initiatives ➢ Integration in career promotion procedures ➢ Integration in research training	• I totally agree • I partially agree • I partially disagree • I totally disagree • I don't know

2. Additional comments by survey participants

➢ Institutional structures and accepted processes tend to be rather unflexible and conservative. This is why policy intervention is important. But also it is important that people within these systems accept and understand the changes. That is why it is not enough to install appropriate policies, but it is crucial to teach, explain and support Open Science strategies early on (e.g. at Universities), as well as to people used to work within the traditional system. The adoption of Open Science strategies begins with the people actually implementing them, that is why it is important to support them. Once more best practices and success stories are available it will be easier to convince more people. Until then I think that policy and supportive intervention is crucial.
➢ I think if Science 2.0 will be accepted, it must be accepted (and then taught) by professors to their students. If the current academics don't support it, then it will be hard to get younger researchers interested.
➢ Sciences also needs time for reflection and proper evaluation. I see a serious risk for good science when there is pressure to share results without the researcher having had the time to process them and think about their meaning themselves. Quality is essential, and noise can be distracting from the real problems. Sometimes less is more.
➢ The most important benefit to science would be to remove paywalls and make all published science searchable online. This is underway through Open Access initiatives, which some journals use to get even more money, and self-archiving, which shockingly few researchers know or care about, and which is limited by the often poor quality of institutional archives.
➢ I strongly contest that there is such a thing as science 2.0. All online content suggests that scientists doing 'science 1.0' are not willing to share their data, not willing to share their tooling and not willing to present their findings in open sources. Rather, the contrary is true and most scientists are more than willing to share. However, due to restrictions this is not always possible (e.g. privacy sensitive data, data obtained from private sources, etc.) and will not be possible, even if some science 2.0 law is to be installed. At the same time, many scientists collaborate on ideas and work together with scientists from other institutions. As scientists, we should stress that peer-review is essential for the quality assurance of scientific activity; and as such, publications are a likely result of these peer reviews. Also, as scientists we should make clear that not every bit of research is the same and not for every bit of research similar requirements can be put forward. We should also stress that not all research leads to immediate economic growth or exploitable innovations, and that this won't change by doing 'science 2.0'.
➢ I believe open innovation and sharing knowledge is crucial in achieving rapid progress and development, needed e.g. in solving current and urgent societal and environmental issues. However, I'm not familiar with the existing channels and opportunities for sharing.
➢ I have not heard of this tool before and know little about it. My inputs are therefore very limited.
➢ Why is there no mention of "reproducible research"? The new movement in this direction is very important; irreproducibility is one of the biggest issues with modern science. Note that "reproducible research" is different from "open source" etc.
➢ this form was not an easy task, as I'm pretty new to the 'science'-world (and certainly the 'science 2.0' world)
➢ Openness of science vs. safety of researchers? For example, climate scientists, researchers who need to use live animals, and many others already face harassment and threats with "science 1.0" in place.
➢ Never heard about science 2.0 before this questionnaire was sent to me. It sounds similar to open access journals. If I am already well distinguished professional I can use open access journals. If I am starting my career it doesn't provide the same impact as traditional journals.
➢ The options offered are vague. It was hard to answer because it was not always clear what the question or the options mean.
➢ What does policy intervention mean in this context?
➢ Quite often not clearly interpretable questions
➢ There will certainly be good things within the Science 2.0. ideas. More openness is in general better. However, there is probably a lot of idealism in the air, as people who may not have a lot of experience in research, are creating the "revolution", as mentioned in the internet pages. The cold hard facts are that 99% of researchers work to earn their living, and salary is needed as a medium for research. Science 2.0 seems to depend a lot on voluntary actions - it is difficult to pay for a job, if it is not clear who will do the work and who will get the possible credit afterwards. Some efforts will proceed well in the Science 2.0 way, while many others will not. I think that the idealistic Science 2.0 will not be a revolution but rather a fresh addition to the existing ways of doing.
➢ Very inspiring talk! Even though we usually are afraid of changes, they are inevitable and we must evolve with the times.Main ideas that come to my mind are infoxication (how do I choose the information, how reliable are the data?), IPR conflicts (I am not allowed to disclose more) and merit assigning fairness (in collaborative work does everybody get the same credit? Should we share merits evenly? Should we consider all 300 authors in a paper equaly?....).
➢ I am sorry, but I do not really know what Science 2.0 is all about! That's why so many 'I dont knows'!
➢ Data produced with public money in governmental institutions should be open for research unless there is a real reason to keep it closed.
➢ Enable new systems by opening up data and reducing administrative rules and hassle. Democratize science. Simplify. Don't fund established research organisations for this goal or anyone basically. Established research organisations will stick to status-quo and think inside the box. Good ideas will come up if they're good. This whole thing is already happening, remove barriers instead of pushing the dynamic.

- Dear YEAR team, I think this topic surely needs attention and your work and initiatives are totally positive.
  Nevertheless, I felt really hesitant in giving most of my answers.
  I am confused: I tried to document myself on what Science 2.0 is at today and where does it want to go, before starting the questionnaire, Still the aim appears vague. Could this be the case for other young researchers? I would have appreciated finding answers to (maybe naive) questions like: what is the difference between Science 2.0 and a network/portal where articles are openly published, there is a platform to discuss, maybe a blog where science is "popularised" and made accessible to non scientist, and eventually access to data and analysis code?
  In what way this is different from other similar examples already existing out there?
  I come from 5 years of research with and at CERN. Everything you propose/discuss/ask is already implemented by the CERN community, and I totally support it as a best case. Wiki's document progress on work and algorithms and (huge) amound of data on the Grid and code are open to all the CERN users. All articles are open also to non users (see http://arxiv.org/). So what are we adding here with Science 2.0? Are you trying to achieve the same but for all research fields? If so, I think the CERN model works perfectly as it is (open access to articles for everyone, to the code and data only if you have some approved goal by the internal community). And it works very well exactly because the "policies" are not established by policy makers but by experienced people that are making the community and the platform/software itself. At the same time, non of the other disciplines are much interested in what CERN people do, so there is not much need at today to extend it to "all sciences".
  Maybe I am confusing things here, if so I apologise. Otherwise I would be happy to discuss this point with you!

3. Local debates output

The following chapters contain a short overview of the discussion highlights of the local debates organised at YEAR member organisations. Please note that the represented views reflect the view of the young researchers involved in the debates and do not represent the position by YEAR or any of its member organisations.

AICIA Asociación de Investigación y Cooperación Industrial de Andalucía, Spain

A group of five people met to discuss their feelings about and previous experiences with Science 2.0. The group consisted of four engineers and a journalist, the latter mainly responsible for communication and dissemination in electronic engineering projects but also doing research in her field.

The group mainly discussed the usage of Web 2.0 tools within science as well as publishing scientific results on-line (e.g. in blogs or in Open Access journals). None of the participants had a real experience in using social media to disseminate the results of their own research. The journalist (remarkably having the least scientific profile in the group) was the only one being aware of the Science 2.0 concept and really understood its implications and possibilities before the discussion.

In general, the attendees are not convinced of the success of Science 2.0 as they do not trust scientists to provide trustable and complete information about their research. Information published on blogs or social networks does not necessarily undergo quality control and cannot be controlled easily. There is a general atmosphere of distrust in the benefits of Science 2.0 and the attendees do not see direct benefits for them in terms of CV or promotion. However, they see a benefit in terms of finding new partners for their research via the Web. The attendees identified the need for a cultural change in the way of seeing Web 2.0 tools in science. This change needs to be driven at an early stage of the researchers' professional life.

Some of the attendees were not totally aware of the implications of publishing in Open Access journals. Those who clearly see the benefits of Open Access journals nevertheless chose to publish their results in traditional journals so far – for economic reasons. It is worth mentioning that in Andalucía there is little awareness of the drawbacks of not having access to scientific information as public libraries (including those at public universities) are licensed to access the most important commercial journal online databases.

AIT Austrian Institute of Technology, Safety and Security Department, Austria

A working group of ten young researchers met twice at AIT to discuss their previous experiences in Science 2.0 as well as potential benefits of and current or experienced barriers to Science 2.0[11]. During the second meeting the attendees discussed the questionnaire of the Public Consultation on Science 2.0 by the European Commission with an invited expert form Austria, Dr. Michael Strassnig from Vienna Science and Technology Fund WWTF.

[11] A detailed report of the meetings is available here: http://open-research.ait.ac.at/confluence/display/AORW/Work+Group%3A+Young+Researchers%27+Views+on+Science+2.0

In general the attendees are convinced of the advantages of Science 2.0 approaches in terms of improving scientific results and making science more efficient. However most of the participants are currently not practicing Science 2.0 approaches at all because those cannot easily be aligned with the requirements and constraints of an academic career imposed by the system currently in place. The majority of the emerging Science 2.0 practices are not part of the curriculum of a scientist (yet). This should be changed in order to boost those practices (i.e. give researchers more space for these activities).

Key challenges identified by the working group are the missing (or currently rather scattered and not well established) infrastructure for scientific collaboration on-line, assessing and defining good scientific practice in terms of Science 2.0 outputs, and moving from the current focus on (mainly successful) scientific results to the whole research process (i.e. to think of science as an on-going process).

It is not clear if policy interventions on European level can substantially support changes towards implementation and acceptance of Science 2.0 practices. On the one hand it is fundamental to create a framework supporting the policies, e.g. through funding of specific activities. The attendees are of the opinion, that requirements for EU-funded projects towards Science 2.0 will have the greatest and most direct impact on the habits of researchers working in EU-funded projects. On the other hand uncertainty, concerns or limited awareness about Science 2.0 could lead to reactionary reactions. The adoption of new practices in the research environment needs a cultural change in the current research system. The European Commission could work towards building public awareness of Science 2.0 in order to support acceptance and uptake of Science 2.0 practices as well.

SINTEF, Norway

SINTEF organised a lunch debate to discuss about Science 2.0. Among the 20 young researchers wo attended the debate, 16 had a background in energy engineering and four in social science. After being introduced to the topic of *Science 2.0*, the young researchers discussed opportunities, barriers and policies needed at a European level.

Through open and free access to research information, Science 2.0 could lead to a quicker progression through all Technology Readiness Levels, i.e. from an idea to a (commercial) solution. The availability of more open deliverables would support that as well. Publishing research results openly on-line could lead to more and earlier opportunities for feedback. For the individual scientist Science 2.0 leads to higher visibility of one's research work. Alternative metrics could lead to a new reputation system for researchers considering other measures in addition to journal impact factors. Science 2.0 offers opportunities for research topics closer to the public needs as well.

A barrier discussed by the attendees is that fully open deliverables might scare industrial project partners. Therefore Science 2.0 may not be applied to all parts of research fields. Also the idea of "open" does not necessarily comply with our notion of intellectual property. Opening up research and communication of research results could lead to exploitation of own research ideas by others. Another barrier is mistrust in the quality of results published on-line. Finally, required research data management skills are another barrier which needs to be considered.

The attendees suggested a few ideas regarding policies needed at a European level. They advise to use the more common term Open Science instead of Science 2.0. The policy on open deliverables in EU projects should be strict: all deliverables should be made public whenever possible. New policies could support researchers in being more open by preventing others to get rewarded for someone else's ideas by enabling ownership recognition of research project ideas. Finally, the EU could help introducing new measures regarding the researchers' reputation system.

As the discussion finished, the young researchers were asked to take position, to see whether they were positive or negative regarding Science 2.0. None of them had a strong opinion on the matter. Most of them defended that, despite the cited opportunities, the new policies and measures should carefully take into account the cited barriers. They also underlined that prior to establishing any new policy related to Science 2.0, its impact on the role of research in innovation and industrial support should thoroughly be assessed.

TNO Netherlands Organisation for Applied Scientific Research, The Netherlands

At TNO YEAR teamed up with JongTNO[12] in organising a lunch debate on aspects of Science 2.0. A small group of young researchers prepared a few statements about their previous experiences in Science 2.0 as well as potential benefits of and current or experienced barriers to Science 2.0. These statements were used in the larger lunch debate and focused on whether research institutions should publish all research results (in detail) open and for free, whether the reliability of research results will deteriorate without peer-reviewing (in the traditional way of doing), and whether Science 2.0 will lead to new business models for research. Young researchers discussed barriers and potential new options.

In general the attendees are convinced of the advantages of Science 2.0 in terms of improving scientific results, making science more efficient, and offering the possibility to create new science opportunities. The majority agrees that (publicly funded) data and publications should be open. However this should somehow be regulated and controlled (concerning privacy and security sensitivities).

The researchers believe that the quality of research will not be undermined by the Science 2.0 way of opening up. This depends, however, on how this is set up. On the one hand, one cannot be sure of the reliability of the data or the results if they have not undergone a peer-review. On the other hand, having the data and results openly accessible can lead to more collaboration and feedback in the whole research process.

Crowd funding will provide new means of doing research. However, we should not rely on it for all research projects. It is important to engage citizens in science, to make its output understandable, and to show tangibility of research. Here the Commission could play its part in widening public support and creating a basis for research and science.

VITO Vlaamse instelling voor technologisch onderzoek, Belgium

Young VITO introduced the topic in a comprehensive presentation followed by a first discussion between young researchers. The meeting ended with the set-up of a working group. The working group met a second time to discuss driving forces, key questions, impacts, and a common vision of Science 2.0.

At the moment, Science 2.0 seems to focus mainly on digital technologies and globalisation of the scientific community. The working group confirmed the importance of both aspects. However, a clear vision of a broader picture is needed in order to lay a fundament for a true transition in science. A roadmap to tackle challenges such as the demand for a more responsive science as well as the need to urgently address complex societal challenges of our time should feed the transition process.

In our opinion, the science 2.0 process should attach great importance to quality and quality assurance. In order to guarantee both, the working group suggests a platform initiated and funded by the EC. This platform could serve the purposes to virtually meet other researchers, to exchange views, as well as to arrange a qualified peer review process. This platform should be used by all universities and research organisations, and should be unique, univocal, and shared. Instead of generating revenues from readers or publishers, the platform should be funded by a government in order to assure independency and clarity. Market-driven initiatives such as ResearchGate and Mendeley all use different standards. This heterogeneity could lead to a

[12] http://www.jongtno.nl/

lack of clarity and trust. To our opinion, only an independent and high qualified instrument can convince researchers and generate important incentives.

Currently, important obstacles are the lack of instructions and laws as well as the high protection of data. Here, a new legislative framework should be elaborated in order to guarantee a good basis for the transition.

VTT Technical Research Centre of Finland, Finland

VTT Young Professionals organised a seminar about Science 2.0. More than 40 young researchers attended the seminar. Mr. Jean-Claude Burgelman, Head of unit in European Commission, was invited to give an introduction to Science 2.0.

After his introduction, Mr. Burgelman asked the audience if they think that social media activity (e.g. blogging about own work, good ratings in ResearchGate) will affect the criteria for hiring somebody, as currently publications and the impact factor of the journals they were published in are being considered the most important factors when hiring a research scientist. The answer to that question was not unambiguous since work in research does not require researchers to be active (or even present) in social media. However, nobody could deny that today being active in social media regarding your work might have a positive impact for getting hired.

The attendees discussed whether taking into account open science tools in EU project applications should give the applicants an advantage. There was no clear answer to this, but according to the audience and the speaker this should somehow be taken into consideration for the evaluation of project proposals.

The attendees discussed thoroughly about the effects of the availability of more public research material. They agreed that being able to use previously produced research data for own research will speed up research work. Also, publicly available research results would ease finding errors from other people's research results. While this can have positive effects in terms of progress in research, it can have negative effects in terms of the reputation of the researchers in question.