The 9th Funding Agency Presidents' Meeting (FAPM)

Date & Time	Monday, 8 October 2018, 10:20-12:40 (see Annex II for the full programme)
Venue	Kyoto International Conference Center
Co-Chairs	**Michinari Hamaguchi, M.D., Ph.D.** President, Japan Science and Technology Agency (JST)
	Prof. Roland Fischer Vice President, German Research Foundation (DFG)
	Dr. France A. Córdova Director, National Science Foundation (NSF), USA
No. of participants:	48 from 48 organizations from 24 countries and regions (see Annex III for the full list of participants)

The Funding Agency Presidents' Meetings (FAPM) bring together the heads of research funding organizations worldwide on an annual basis within the framework of the Science and Technology in Society (STS) Forum in Kyoto. The 9th FAPM focused on Open Science and looked at the topic from a holistic point of view, which ranged from the opening of research data, results and methods to the opening of research processes like peer review and strategy setting. After opening remarks and an introduction to the topic by Dr. Hamaguchi (JST), Prof. Fischer (DFG) and Dr. Córdova (NSF), Prof. Marc Schiltz (FNR/Luxembourg, Science Europe) gave a tone-setting presentation on the role of funding agencies in the transformation towards Open Science. Participants then discussed the topic at 8 roundtables with 5-7 representatives from different types of funding organizations. The table chairs at each roundtable presented the discussion results to all participants (see Annex I). In his concluding remarks, Dr. Hamaguchi proposed "science and society" as topic for the next FAPM at its 10 years anniversary in 2019.

The prospects of Open Science

Prof. Schiltz (Science Europe) set out describing Open Science as a constitutive element of the research process. The research process lived from the fact that researchers shared their data and results in order for other researchers to reproduce and build upon these findings. The current organization of the science system where research results were hidden behind paywalls with no incentives for data-sharing would hamper science. Increased access to research data and results would benefit researchers themselves and those policy-makers and entrepreneurs who needed to access knowledge in order to further technological progress and innovation. Other FAPM participants added that the transformation to an Open Science system could enhance the quality of research, for example by accelerating research on rapidly emerging problems such as epidemics, enabling larger samples, avoiding duplication, enhancing interdisciplinarity and eventually

promoting the publication of negative results. Some FAPM participants stressed that Open Science presented a better way to demonstrate to society how its investments into research yielded something valuable in return.

Lack of incentives for researchers to foster Open Science

The FAPM participants discussed that there was still a lack of incentives for researchers to engage in Open Science activities. Continued reliance on the journal impact factor for the assessment of research careers would make it difficult for researchers to publish in Open Science journals. Moreover, the science system does not necessarily encourage researchers to share the data they accumulated through years of collection. While cultures of data collection had developed in botany, zoology and paleontology for example, other disciplines provided few incentives for researchers to share data. On the contrary, some scientific processes were still kept secret in order to avoid or delay competition or to accrue a future economic benefit.

Quality assurance in an Open Science system

The FAPM participants also discussed that Open Science would not change science practice as such. However, the traditional science system had quality assurance mechanisms to ensure good scientific practice, which had to be transposed into a science system which was increasingly based on openness. In order to ensure high trust in research data and results as before, an open science system needed to secure the continued production and dissemination of high-quality papers in Open Access journals. There also needed to be adequate standards for data organization and management.

Open Science and market mechanisms

The FAPM participants believed that research stakeholders needed to be aware that Open Science did not exist beyond the commercial world, but created a different market with the potential of shifting the power of stakeholders in the science system. This made it necessary to study financial models of publishing in depth. Moreover, openness in science and openness in innovation could not be treated the same. Demands for Open Research Data would be in contradiction with the proprietary use of data in research contexts where results were expected to result in commercial exploitation. Some participants thought that “open innovation” needed some kind of intellectual property rights or a temporary embargo on openness in order to enable research organizations to enter the world of commercialization.

Which role for funding organizations?

The FAPM participants acknowledged their responsibility for financing and providing suitable infrastructure for the transformation towards Open Science such as Open Access journals,

repositories or cloud. Funding Article Processing Charges (APC) for Open Access publications was considered particularly important. The FAPM participants also agreed that Open Science practices such as data collection, curation and sharing needed to be incentivized and rewarded. Moreover, funding organizations should think of introducing replication studies in order to check the reproducibility of already published results. The FAPM participants also believed that new ways of assessing researchers had to be found. Moreover, researchers needed to be trained in order to better understand the publication process and the consequences of renouncing ownership rights. Last but not least, it would also be crucial to define good standards for Open Science practices such as data management plans and open access policies and to engage other stakeholders to discuss their implications.

A need for differentiation and alignment

A lot of FAPM participants emphasized the difference of scientific ecosystems, which would need to be taken into account in the transformation towards Open Science. They believed that a single model for open data was probably impossible, as there were diverse forms of data depending on scientific areas. Other FAPM participants stressed that Open Science was easier to implement in disciplines such as mathematics or physics than in medicine, where a huge amount of data was connected with personal information. Therefore, fields like mathematics, physics and computing science, had naturally more advanced towards Open Science.

At the same time, the FAPM participants also emphasized the importance of concerted efforts towards Open Science in order to avoid competitive distortions between research ecosystems that opened their data and publications on the one hand and research ecosystems on the other hand that kept them behind paywalls. Some FAPM participants stressed the responsibility of funding organizations to align Open Science strategies and set common standards. Prominent efforts that were mentioned were the cOAlition S, the Brazilian Scientific Electronic Library Online SciELO and the Public Knowledge Project.

cOAlition S for the Realisation of Full and Immediate Open Access

The cOAlition S was discussed as a prominent, bold and recent example for a concerted effort towards Open Science. Its members intend to mandate Open Access to all publications resulting from research they fund by 2020. A more detailed implementation plan will be submitted before the end of 2018. Members of the cOAlition S argued that funding organizations were allowed to mandate Open Access to research results as they considered it an equally fundamental norm of science as other ethical norms and standards of quality. Other FAPM participants highlighted potential negative side effects, which needed to be taken into account. In the end, the discussion manifested itself in a question, which will remain the starting point of many discussions on the

transformation towards Open Science still to come: Can we achieve open science through evolution, or do we need revolutions?

Annex I: Summary from the roundtable chairs

Table 1

- No one is against the idea of openness in science, but we need a practical way because of the cost, difference of the period, and progress in each country.
- Fields like mathematics and physics are easy to open, while it is not the case with medical fields, where we have huge amount of data somehow connected with personal information.
- If we are to establish systems, a system for medical fields and another for mathematics will be different.
- We should start with practical fields, then make a model case to collect lessons on how to establish the openness in science.

Table 2

- Openness in science and openness in innovation are not the same. We have to make a distinction when intellectual property comes into play.
- The transformation to an Open Science system with its multi-faceted aspects could make the science system better and more sustainable; it can for example enhance interdisciplinarity and lead to more negative results being published.
- Quality control and assurance will remain an issue in Open Science. A rapid transformation will have side effects, which need to be taken into account.
- Open Science creates a new kind of market. Open Science does not exist beyond the commercial world, it is a part of it with the potential of shifting the power of stakeholders in the science system.
- As funding agencies, we have certain expectations with regard to good scientific practice, which should be ensured. We want to have our funds invested in researchers who adhere to good scientific practice. The traditional science system has methods to ensure this; these need to be transferred to an Open Science system.

Table 3

- Open science is important in principle as it democratizes results and data, and taxpayers only pay once, not twice, for the results.
- All countries represented agree that their Governments are pushing in the direction of open science.
- There are many complications to open science, including producing quality papers, trust in results and trust in data by those reading the papers. One might envision a world in which there are no more journals, everything is published in the cloud, and we have a global peer review, with thumbs up and thumbs down, a science publication treated like an Amazon product.

- There are also privacy concerns for those working with companies that have proprietary rights.
- A single model for open data is probably impossible, as there are so many diverse forms of data, depending on the scientific field.
- A funding model for open access is needed, and this is not easy. We need to know how the money flows? from funding agency to the university to the library to the journal, and how the publishing financial models work.
- Many publishers produce for the public much more than journals.... some produce conferences, science education products, policy work, future leaders programs.
- The problem now is that taxpayers cannot access knowledge that they pay for. And the world deserves to access knowledge to further the progress of science. This is the real challenge.

Table 4

- We want more engagement of citizens and the public in science and innovation in the future, with increasing public awareness, public influence, and public impact.
- However, Open Science will not change the science practice as such.
- Already existing challenges in science that we need to handle include the following:
  - Too many publications, lack of quality, problems of reproducibility
  - Quality in all journals, including increasing retractions as one indication
- Open science is not the solution to the above. It requires appropriate culture and incentives that align with solving these challenges.
- Challenges related to openness include connecting open science for mankind to open innovation for specific interests/companies.
- Intellectual property is an issue, and needs to be taken into account.
- Today some of the scientific processes is kept secret to avoid/delay competition or to accrue parts of the benefits.
- Sample sharing is limited today - open science makes us handle emerging problems more quickly, e.g. epidemics. Another example is rare diseases where we need to collaborate to have sufficient number of patients/data points.
- Need for find a balance when it comes to benefit sharing
- FA's role in the transformation towards Open Science include improving the quality of research, for developing countries, and for all.
- It is a challenge that current ranking of journals is based on impact factor.
- We need to secure quality of OA journals.
- Funding APC for OA publications and considering Plan S/cOAlition S
- SciELO in Brazil
- Data sharing policies and requirements
- Japanese AMED has started to monitor level of sharing in common databases

- Need to incentivize and reward data collection, curation and sharing
  How we evaluate proposals and project delivery is also to be discussed. Only assess a limited number of papers, assess also the impact of the research, etc.
- Can we achieve open science through evolution, or do we need revolutions?
- Build from scratch, or will the big publishers transition in an efficient
- Some fields have cultures for open science / open data / open access, like mathematics, physics, and computing science.
- Repositories are needed where all research outputs are shared, including data.

Table 5

- Very rich discussion coming from different countries and organizations bringing different perspectives.
- Dr. Gross presenting the archives in physics – a new open (and cheap) way of disseminating research results.
- In the end boiling down to power and resources
  - Today too much power in the hands of a few big publishing companies. They are making a lot of profit on work mainly done within universities and by researchers, collecting a lot of data, and have indirect influence on who will be promoted or get a grant as both universities and funding organizations are using indexes assessing researchers.
  - Different countries have different ways of distributing resources.
  - In some countries subscription fees and article processing charges (APC) come from different ministries or budget. Difficult to change.
  - Some funders include APCs in the grants.
  - Associations journals or learned societies publications were raised
  - Profit going back to science and used for scholarships etc. A fear that if the associations and learned societies only should rely on public money they would lose their independence.
- Today is publication in prestigious referee journals important assessing different scientists, where different indexes are used as proxies for Quality.
- We have to find new ways of assessing researchers – crucial for promotion and getting research grants.

Table 6

What kind of science and innovation do we want?:

- Focus on Global challenges – like SDG - science usable for humanity
- Different targets and impacts: produce new knowledge (fundamental science), social progress and innovation (economic impacts), with a very open approaches (cross sectors)
- Access of information – avoid duplication, more efficiency

Role of Ourselves towards Open Science:

- Differences stakeholders with different roles: government (policies makers), agencies, universities, national labs (regulations, standards, producers, researchers, etc.) - Engage stakeholders
- Role of public policies: define strategy, define goals to public agencies, unify approaches
- Role of agencies: finance open access initiatives like SciELO (Brazilian Scientific Electronic Library Online), define good practices and data management plan for researchers, define open access policies, diffusion of a culture of open access and open data, etc.
- Issue: finance – role of agencies – different approaches – because in many countries universalities and libraries are responsible for subscriptions and data infrastructure
- Create sustainable business models for public and nonprofit organizations

How implement Open Access and Open Data:

- Promote international collaboration – consortiums, joint initiatives – as SciELO preprint server system with Public Knowledge Project, and Plan S, etc.
- Engage other stakeholders: specifically to discuss innovation, privacy, IP, ethical, private data, moving with careful
- Innovation – translation to the market: role of IP in a more complex process – data has value – even open innovation require some kind of IP or data protection, etc.
- Open Access is more useful to fundamental science and it will be necessary to make clear the impact of open access on innovation

Table 7

- Open Access for publications is gaining traction. There continues to be a tension between public funding and publishers. A balance would need to be achieved between open access and funding support, and this would require the cooperation of the funding agencies and research performing organizations.
- Open data is less developed. More is needed to address issues such as data collection, curation, preservation and data ownership. In some fields of disciplines, such as Botany, Zoology and paleontology, there is an established culture of data collection. However, in most other fields, there are little incentives for researchers to share data in a (re)usable form.
- Open Methods, practiced in machine learning and other aspects of computer science, have enhanced the quality of research in these fields. More open source software and algorithms are now made available for reviewers to validate data.
- Traditional publishers are starting to change and will build new business models on open data. There will be an issue of a new compact between publishers, funders and researchers.
- There needs to be an equivalent conduit on standards for data organization and management.
- Appropriate governance would need to be in place for open data access, in ensuring equitable

reciprocity by all parties leveraging on the data to benefit all mankind.

Table 8

- The table was strongly in favor of open access in science but recognized that different constraints applied for research in the private (‘for profit” sector, and in governmental agencies, where temporary embargo might be needed.
- It is important that all countries of the world participate, so as not to give unfair advantages to countries that keep data and publications behind a wall. We recognized that there were challenges to be addressed between more closed societies and open ones. So new ways of garnering international cooperation on these major issues of common relevance to all science should be developed.
- Funding bodies must consider how the infrastructure needed for open access of data in particular can be provided. The costs are large, and we pointed to the Global Coalition of Life Science Data Sustainability project as an example.

Annex II: Agenda and guiding questions

Programme:

10:20-10:30	Opening remarks	Greetings from Co-chairs
10:30-10:40	Introduction of Meeting Format & Discussion Points	Secretariat + Prof. Dr. Marc Schiltz (President, Science Europe / Secretary General, National Research Fund (FNR), Luxembourg)
10:40-11:40	Workshop Style Discussions	
11:40-11:50	Break	
11:50-12:20	Summary Report from each Rapporteur	3-minute oral summary from each table
12:20-12:30	Plenary discussion	Additional remarks from the floor based on the summary of group discussions
12:30-12:40	Concluding remarks	From Co-chairs

The following questions were proposed by the secretariat to guide the discussion:

- What kind of science and innovation do we want in the future?
- Which role do we see for ourselves in the transformation towards Open Science?
- How can Open Science be designed and implemented to achieve the outcome we wish?
- Will Open Science enable a different kind of science or innovation?
- What kind of funding are we going to do? How will Open Science be reflected in our funding decision-making processes?

Additionally, participants may want to address more detailed issues upon necessity, focusing on specific aspects of Open Science:

- ✧ Open Research Data: Where are we in terms of the establishment of research data management systems, which are indispensable for Open Science? How should such systems be aligned globally?
- ✧ Open Access: How should we incentivize open access in our funding regulations?
- ✧ Citizen Science: What are examples of involving citizens in research processes? Where does citizen participation start and where should it stop? What steps can be taken to increase the likelihood that citizen science will contribute valuable input to new scientific understanding and innovation?

Annex III: List of Participants, grouping, and rapporteurs

*table chairs/rapporteurs are highlighted in yellow

Group	Name	Title	Organization	Country
1	Dr. Michinari Hamaguchi	President	Japan Science and Technology Agency (JST)	Japan
	Dr. Michael Stampfer	Managing director	Vienna Science and Techno-logy Fund (WWTF)	Austria
	Prof. Jean-Pierre Bourguignon	President	European Research Council (ERC), European Commission	Belgium
	Dr. Roseann O'Reilly Runte	President & CEO	Canada Foundation for Innovation (CFI)	Canada
	Mr. Chuan Poh Lim	Chairman	Agency for Science, Technology and Research (A*STAR)	Singapore
	Mr. André Kudelski	Chairman	Innosuisse – Swiss Innovation Agency	Switzerland
	Dr. Rush Holt	CEO	American Association for the Advancement of Science (AAAS)	U.S.A.
2	Prof. Roland A. Fischer	Vice President	German Research Foundation (DFG)	Germany
	Dr. Michiharu Nakamura	Counsellor to the President	Japan Science and Technology Agency (JST)	Japan
	Mr. Javier Ponce Martínez	Director General	Centre for the Development of Industrial Technology	Spain
	Ms. Ethel Forsberg	Director General	The Swedish Research Council for Health, Working Life and Welfare (Forte)	Sweden
	Prof. Prasit Palitapongarnpim	Executive Vice President	National Science and Technology Development Agency (NSTDA)	Thailand
3	Dr. France A. Córdova	Director	National Science Foundation (NSF)	U.S.A.
	Dr. Angelo Volpi	Science Officer	National Research Council (CNR)	Italy
	Dr. Yoshimasa Goto	Executive Director	Japan Science and Technology Agency (JST)	Japan
	Prof. Janusz Janeczek	Chairman of the Council	National Science Centre (NCN)	Poland
	Dr. Andreas Göthenberg	Executive Director	The Swedish Foundation for International Cooperation in Research and Higher Education (STINT)	Sweden

4	Dr. John-Arne Røttingen	Chief Executive	Research Council of Norway (RCN)	Norway
	Prof. Mario Neto Borges	President	National Council for Scientific and Technological Development (CNPq)	Brazil
	Prof. Antoine Petit	President	French National Centre for Scientific Research (CNRS)	France
	Dr. Makoto Suematsu	President	Japan Agency for Medical Research and Development (AMED)	Japan
	Prof. Maciej Zylicz	President and Executive Director	Foundation for Polish Science (FNP)	Poland
	Assoc. Prof. Pongpan Kaewtatip	Director for Industry Division	The Thailand Research Fund (TRF)	Thailand
5	Ms. Ingrid Petersson	Director General	The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas)	Sweden
	Prof. Søren Peter Fuchs Olesen	Director	Danish National Research Foundation	Denmark
	Dr. Adnan A. Shihab-Eldin	Director General	Kuwait Foundation for the Advancement of Sciences (KFAS)	Kuwait
	Prof. Karol Marhold	Vice-President	Slovak Academy of Sciences	Slovakia
	Prof. Francesc Xavier Grau	President of AGAUR	Ministry of Business and Knowledge (Government of Catalonia)	Spain
	Prof. Sirirurg Songsivilai	Secretary-General	National Research Council of Thailand	Thailand
	Dr. David J. Gross	Chancellor's Chair Professor of Theoretical Physics	University of California, Santa Barbara	U.S.A.
6	Dr. Carlos Américo Pacheco	CEO	State of São Paulo Research Foundation (FAPESP)	Brazil
	Mr. Jean-Eric Paquet	Director General	European Commission	Belgium
	Dr. Susumu Satomi	President	Japan Society for the Promotion of Science (JSPS)	Japan
	Dr. Joakim Appelquist	Head of International Cooperation	Swedish Governmental Agency for Innovation Systems (VINNOVA)	Sweden
	Dr. Walter G. Copan	Director	National Institute of Standards and Technology (NIST)	U.S.A.

	Dr. Pham Dinh Nguyen	Vice Director	National Foundation for Science and Technology Development (NAFOSTED)	Vietnam
7	Prof. Teck Seng Low	Chief Executive Officer	National Research Foundation (NRF)	Singapore
	Prof. Heikki Mannila	President	Academy of Finland	Finland
	Dr. Nakita Vodjdani	Representative of European and International Affairs	French National Research Agency (ANR)	France
	Prof. Wim van den Doel	Chair	Netherlands Organization for Scientific Research (NWO)	Netherlands
	Prof. Zbigniew Błocki	Director	National Science Centre (NCN)	Poland
	Dr. Paul Dabbar	Under Secretary for Science	U.S. Department of Energy (DOE)	U.S.A.
8	Prof. Warwick Anderson	Secretary-General	International Human Frontier Science Program Organization (HFSPO)	France
	Mr. Iain Stewart	President	National Research Council Canada (NRC)	Canada
	Dr. Masayoshi Watanabe	Executive Director	New Energy and Industrial Technology Development Organization (NEDO)	Japan
	Prof. Marc Schiltz	Secretary General	Luxembourg National Research Fund (FNR)	Luxembourg
	Prof. Ananda Jayawardane	Director General	National Science Foundation of Sri Lanka	Sri Lanka
	Prof. Sven Stafström	Director General	Swedish Research Council (VR)	Sweden