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「大学からの研究成果オープンアクセス化方針を考える」

ーハーバード大学, レディング大学, 北海道大学を事例にー

Evolution of the policy debate regarding open access overseas (with particular reference to America)

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Abstract

As well as reporting on the various trends in open access overseas with particular reference to America, I will attempt to analyze the differences between Japan and America's open access initiatives from a variety of perspectives. In America it has been stipulated by law that research papers reporting the results of research carried out with the aid of funding from National Institutes of Health (NIH) must be available at NIH PubMed Central, but currently there is a debate about providing much wider access to research results, regardless of academic discipline, and whether or not this should be enacted through law. While reviewing the policy debate in America about open access, I will introduce various stakeholder opinions. I will then consider the possibility of further developments for open access in Japan, taking account of each stakeholder's perspective.



Satoru Endo

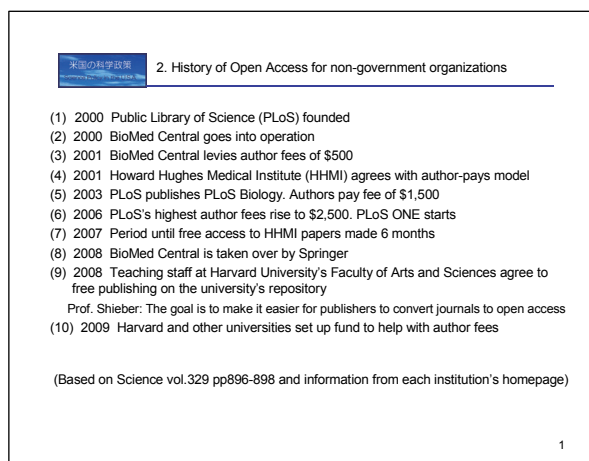
Prof. Endo was employed by the Japan Society for the Promotion of Science (JSPS) in 1981. As an employee of the organization until June 2009 he held posts such as Assistant Director of the JSPS Washington Liaison Office, Assistant Head of Policy Planning Division, Administration Department and Head for Administration at Research Center for Science Systems. He has been employed in his current position at Tokyo Institute of Technology as a Planning Officer in the International Office since July 2009, and has been in charge of business relating to international research and education activities. His field of expertise is science and technology policy, and from 2000 has continued his research into trends in science policy, with a particular focus on America. From August 2010, he has taken an additional post as Visiting Researcher at the National Institute of Science and Technology Policy (NISTEP). He is a member of the Japan Society for Science Policy and Research Management, the Japanese Society for Science and Technology Studies and the Japan Association of Higher Education Research. His research results are published on the "Science Policy in the U. S. A." website.

(<http://homepage1.nifty.com/bicycletour/sci-index.htm>)

I think that my talk will offer a slightly different perspective from the people we have heard so far as my background is rather different from the other speakers. Until last year I was employed at the Japan Society for the Promotion of Science. In 2000 I also set up my own website about American science policy independently of my day job. In a sense, you could say that this website represents the ultimate form of open access. While not set out in the style of an academic journal, I have been using it to publish the results of my own research, and in doing so, have been contacted by a range of people from various quarters. I think that this may have even led to my having being employed at Tokyo Institute of Technology. Drawing on my personal experience, therefore, I would like to speak to you from several points of view; as an administrator, a private supplier of information, and as a researcher.

Open access on the National Institutes of Health's (NIH) PubMed

Firstly I would like to talk about the situation in America with reference to the NIH's open access initiative at PubMed Central. Open access began on PubMed in 2005 with an embargo period of 12 months. The enacted 2008 Omnibus Appropriation Bill stipulates "The Director of the National Institutes of Health shall require that all investigators funded by the NIH submit or have submitted for them to the National Library of Medicine's PubMed Central an electronic version of their final, peer-reviewed manuscripts upon acceptance for publication, to be made publicly available no later than 12 months after the official date of publication." According to testimonies given at Congress in July 2010, as a result of this



(Figure 1) History of Open Access for non-government organizations

legislation 2 million papers had been submitted and an average of 420,000 users accessed 740,000 papers every day. In America, therefore, there are open access initiatives which are being mandated and implemented by the government.

History of open access for non-government organizations

In addition to initiatives by non-governmental organizations, there have also been a number of open access initiatives by organizations such as the Public Library of Science and BioMed Central (Figure 1) and these have largely been developed around the author-pays open access model. In terms of university-led activities, Prof. Shieber's efforts during 2008 and 2009 can be said to be one of the major epochs of open access.

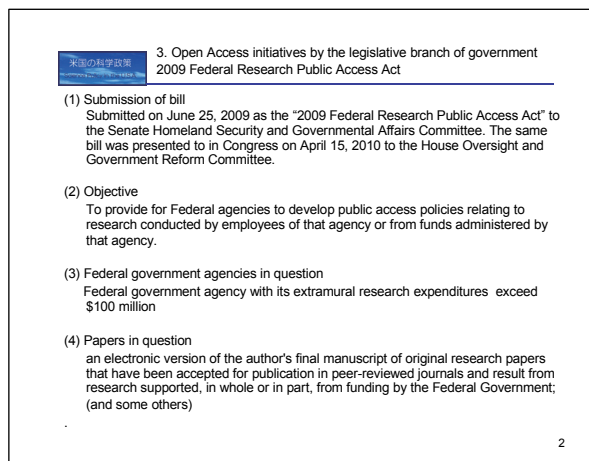
Open access initiatives by the legislative branch of government

I would like to look again at policy of federal government, but firstly from the point of view of the legislative branch of government. I think the fact that open access was even discussed in Congress is a point of contrast with Japan, and in 2007 another

piece of legislation entitled the America COMPETES Act (America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act) included a section in relation to the results of funding by National Science Foundation (NSF), which is in a different field to the NIH. This stipulated that the results of projects that had received funding from the NSF should be published openly. What was meant in this case, however, was that citations of final project reports and research papers should be made available in whole or in part in a timely manner, so this represents a slightly looser definition than that which is generally considered to be open access.

On the other hand, there are bills currently being debated by Congress that oppose open access. Many more bills get submitted to Congress than are passed. One that was discussed by the federal government but which did not eventually get enacted was a bill entitled "Fair Copyright in Research Works Act". This sought to hamper the practice of open access by making it illegal to demand the transfer or relinquishment of copyright. One of the key pieces of legislation that was drafted with the intention of promoting open access was the "Federal Research Public Access Act". This was submitted to the Senate in June 2009 and the House of Representatives in April 2010. The basis of the legislation was that there was a perceived need to create a public access policy with regards to research funded by federal government agencies; in other words research paid for by tax money. The act defines how the final peer-reviewed papers should be published and applies to all the main government funding organizations (Figure 2).

This act has been debated by a wide range of people in America, and particularly by people in the



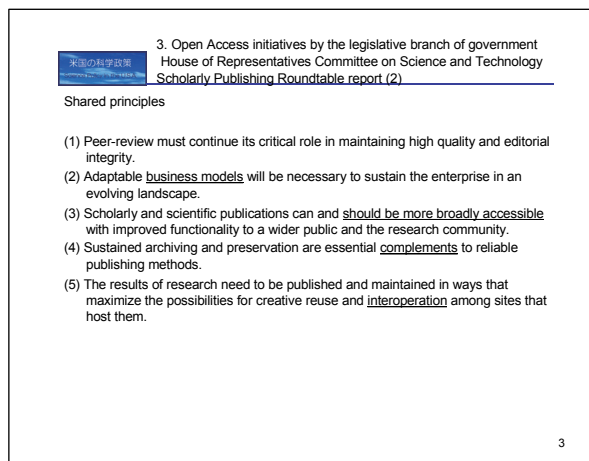
(Figure 2) Open Access initiatives by the legislative branch of government 2009 Federal Research Public Access Act

legislative branch of government. In November 2009 41 Nobel Prize winners published an open letter that stated that while "broad dissemination of research results is fundamental to the advancement of knowledge", "too often, research results are not available to researchers, scientists, or members of the public," and that they believed that "Congress can and must act to ensure that all potential users have free and timely access on the Internet to peer-reviewed federal research findings." It is perhaps worth pointing out that the very existence of the Alliance for Taxpayer Access website where I got the content of this letter demonstrates just how conscious American citizens are of the taxes they pay and how they are spent.

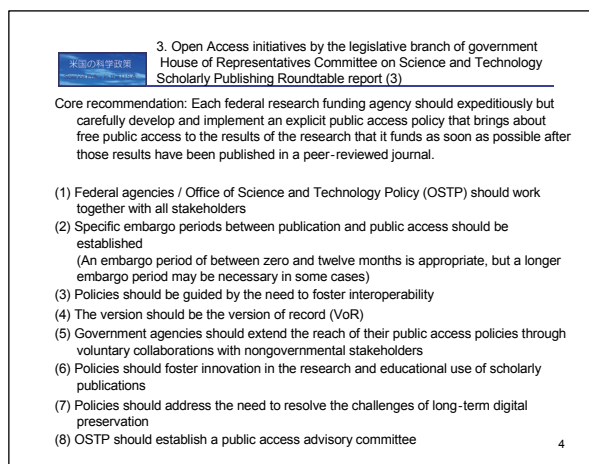
While this debate was going on, the House of Representatives Committee on Science and Technology was working together with the White House to examine a variety of issues. From June 2009 roundtable discussions were held to which stakeholders, including universities, university libraries, commercial publishers, learned societies, and author-pays publishers were invited to participate. In January 2010 a document entitled "Report and Recommendations from the Scholarly

Publishing Roundtable” was published. This contained 5 shared principles (Figure 3). The first of these raised the issue of quality as a point of order with the statement, “Peer-review must continue its critical role in maintaining high quality and editorial integrity.” The other key issues that were examined and reported alongside this included the need for a sustainable business model, as well as technical issues – namely that access should be as broad as possible, that archiving and preservation are activities that are complementary to reliable publishing methods, and that interoperability should exist between sites that host research results.

The core recommendation of the report also stipulated that government agencies should take a proactive approach to open access policy, and that specific embargo periods should be established between publication and public access. Of course, there are many people who believe that publication and open access should occur simultaneously, but this is a view that is not necessarily shared by people on the publishing side, and so the report was drafted in such a way as to accommodate this. In addition to the technical aspect mentioned above the report identified the need for cooperation between the government and hosts of external repositories in order to ensure interoperability. It also stressed the need to distinguish carefully between the preprint and final versions of papers, the need for voluntary cooperation with non-governmental stakeholders in order to contribute to research and education about open access policy, and the need for long term preservation of research material. The report also stipulated that the government should set up a committee (Figure 4).



**(Figure 3) Open Access initiatives by the legislative branch of government
House of Representatives Committee on Science and Technology Scholarly Publishing Roundtable report**



**(Figure 4) Open Access initiatives by the legislative branch of government
House of Representatives Committee on Science and Technology Scholarly Publishing Roundtable report**

To give a clearer picture of this multi-faceted debate, I would just like to list the types of people who gave testimonies at the Congressional public hearings. At the hearing on the “Fair Copyright in Research Works Act”, legal experts as well as representatives from government agencies, learned societies and the Scholarly Publishing and Academic Resources Coalition (SPARC) participated and made statements, while at the hearing on “Public Access to Federally-Funded Research” the participating

stakeholders also included members of the general public represented by patient group spokespeople, as well as a representative from a venture-type company.

Open access initiatives in the executive branch of government

This is also something we have no examples of in Japan, but from December 2009 to January 2010, the Office of Science and Technology Policy (OSTP) undertook a campaign to source opinions on open access policy using emails and the OSTP blog. Some of the respondents answered each of the questions posed by the OSTP, while others voiced opinions on what they considered to be the pros and cons of open access. A combined total of around 500 responses were received via email or by the blog from across America. The opinions received via the blog did not contain much information about who they were from, so it was not possible to create a detailed breakdown, but there were dozens of posts from Stevan Harnad, whose name has already cropped up several times today. It seems that the people who are most passionately leading the way with open access are using these kinds of forums to further heighten the debate. The email responses offered much more in the way of information about the respondents, and from my own attempt to categorize them, I noticed that many of the opinions received were from people affiliated with libraries or learned societies. In general, those affiliated with libraries are strongly in favor of open access, and seem to have high expectations of the government. Commercial publishers tend not to be against open access in and of itself, but express concerns about how developments in open access may affect the quality of peer-review. There were

also several comments from learned societies that touched on peer-review issues.

Taking some typical examples of responses received, SPARC unsurprisingly came out in favor of open access, whereas the Institute of Electrical and Electronic Engineers (IEEE), as a learned society that funds research, spoke of the need to create a system that allows a return on their investment. The UK Society of Biology stated opinions about the need for a business model and BioMed Central posited the idea of a commercial business model based around author fees. Incidentally, among the responses received via the blog there were several that expressed what seems to be the opinion of the general public, that things paid for by public money should, as a matter of course, be freely available to taxpayers.

Open access model in the private sector and abroad

I would now like to talk about the open access model. Much of this has already been covered in depth by previous speakers, so to put it in simple terms, the first open access model was realized by a non-commercial organization made up of scientists and medics through the development of the Public Library of Science from 2000 onwards with the aim of publishing the world's scientific and medical academic papers. It is mainly financed through donations, but part of the publishing costs is covered by authors. These include costs associated with the peer-review process.

There are also many models like arXiv. There are different biases within the model depending on the particular field, but they all receive funding from organizations such as NFS. I believe that this kind of model offers good potential for development.

One other example from Britain is a private medical research funding agency called the Wellcome Trust, which is taking a leading role in promoting open access.

Points of contention regarding open access

When I tried to pull these together into 10 points, I realized that there is practically no one who fundamentally rejects the concept of open access. Learned societies often raise the issue of ensuring quality, but it can be argued that open access itself has no affect on this. I think this is an area which needs to be thoroughly examined. On a perhaps related note, academic research organizations also raise the question of how much time should elapse between when papers are published and when they are made available through open access, as this can have an impact on their financial bottom line. I think here the Compact for Open-Access Publishing Equity (COPE) offers a valuable example of how the costs associated with open access should be borne. From the perspective of national-level activity, in America we have already seen a move to the mandated submission of papers to the NIH, and the question of what other organizations should be doing with regard to open access is currently under debate. This is where I think there is a big difference with Japan. Aside from the NIH's activities, questions are also being raised as to what role organizations such as the National Science Foundation should be playing. Points of contention regarding open access are, of course, being raised by people opposed to it. For example, in government and learned societies there are debates going on over issues such as how to manage copyrights, how long the embargo period should be, which version of the paper should be made available

and how to facilitate interoperation.

Special characteristics of academic research activities in Japan and the meaning of open access

I would like to look at what it would mean for Japan if we were to accept the kind of situation that we have in America.

In 2010 a survey of 1,893 people from the National Institute of Science and Technology Policy's network of specialists was carried out (40% response rate). The majority responded that the digitalization of journals was "convenient" or "very convenient" for reading papers. Interestingly, 90% of researchers also thought that "digitalization of journals in their field of research was more advanced than in others." Statistically, you could perhaps say that this points to a lack of awareness of the situation, but three quarters of those people also said that "digitalization of journals will advance more and more in the future." Seventy five percent of all respondents said that they were "interested in the open access debate." I think it is fair to say, therefore, that open access in Japan is not just an issue being promoted by libraries, but one that is widely held in interest by researchers as well.

State policy relating to open access

If we change the perspective slightly and look at the Japanese government's initiatives to date, we can see that various open access policies have been taken up, such as the National Institute of Informatics' SPARC and the Japan Science and Technology Agency's J-Stage. Depending on your point of view, you could argue that the tendency to adopt more individual, detailed measures than America is an approach that is particular to Japan.

Unlike in America, the mandating of open access through law has hardly been discussed at all in Japan. As a result of the debate about how to give citizens access to the results of research that has been funded with public money, however, the government has already initiated a public access measure with the National Institute of Informatics' KAKEN database. The NSF is, of course, trying to provide a similar service, but my feeling is that the KAKEN database is easier to use.

As for slightly longer term measures, I think it is fair to say that the government has shown its intention to further the development of open access by including pledges in the Fourth Science and Technology Basic Plan to support the construction of university repositories, digitalization of papers from learned societies, open access for library material, and further subscriptions for electronic journals from universities. However, one thing that concerns me is the gray area surrounding the government's pledge to support the "digitalization of learned society papers," which stops short of a promise to "make papers open access." This area may well become the focus of policy debate in the future.

Opinions of the general public towards open access

There have not really been any opportunities in Japan for public comment on this issue as there have been in America, so we do not have a very clear idea of the general public's opinion, but one thing that may provide somewhat of a reference in this regard is the public opinion that was sourced when the "Intellectual Property Strategic Program (provisional title)" was being drafted. One of the opinions expressed was that "there should be more

openness for the sake of people with diseases, as well as researchers at regional universities." Incidentally, the only public comments I could find regarding the Fourth Science and Technology Basic Plan was what the ministry had selected to publish, and there was nothing specific in there that could be taken to represent the general public's opinion towards open access.

In America the public seems to have a different way of engaging with these kinds of issues. In America there was a movie called "Extraordinary Measures" in which an ordinary member of the public with a terminally ill children sees a research paper relating to a possible treatment and then donates a huge sum of money to the development of a new drug. The difference in Japan and America's health insurance systems may be a factor in this, but I think this movie exemplifies a cultural difference that exists with regards to the general public's feeling of distance from academic research.

Possible consequences of open access

Here I will present some extreme opinions and hypotheses.

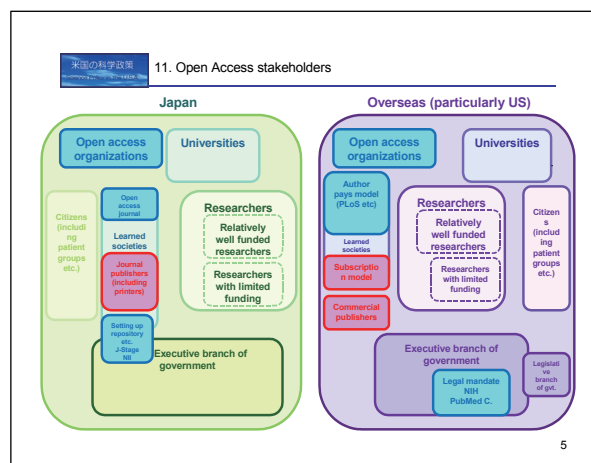
From a business perspective, one possible consequence of open access that is posited in America is that if you allow unrestricted access to academic papers, other countries will steal the intellectual property contained within them, which will cause America to lose its competitiveness, as well as a reduction in employment.

Another consequence that rather concerns me on a personal level is the possible affect of open access on academic research in Japan. In America, for example, papers funded by the NIH have already been made open access. If the results of research funded by government grants are not made open

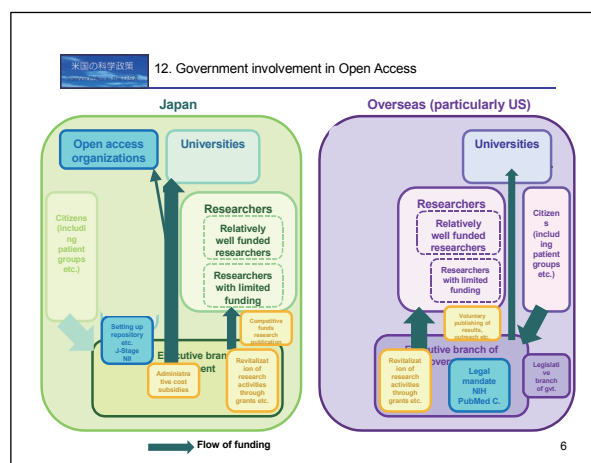
access in Japan, therefore, it follows that citations of Japanese researchers may decrease, and the presence of Japanese research papers is likely to reduce in relative terms. There are no factual grounds for asserting this, and currently nobody knows what kind of impact open access will have. However, this year Japan took a tumble in the world university rankings by Times Higher Education. When evaluating the possible reasons for this, the Times adopted a new assessment criteria, suggesting that it was potentially due to the way in which Japanese research papers were being published or cited, and how this differed from the way it was done in other countries. We should, therefore, probably take a closer look at this area.

Differences between Japan and America with regard to open access

With regards to stakeholders, one of the main differences between Japan and America is that in Japan there are a lot of small scale academic journal publishers, while large commercial academic publishers tend to dominate in America and Europe. Another key difference is the involvement in America of the legislative branch of government. If you represent that in diagram form, this is how it looks (Figure 5). The areas in blue relate to free access, whereas the red areas relate to paid access. Open access is progressing through initiatives such as repositories, and of course, SPARC. And then you have learned societies and the executive branch of government, as well as researchers right in the middle there, and the universities. As the impact of public opinion is relatively minor in the debate in Japan, I have used faint lettering to represent the citizen stakeholder group.



(Figure 5) Open Access stakeholders



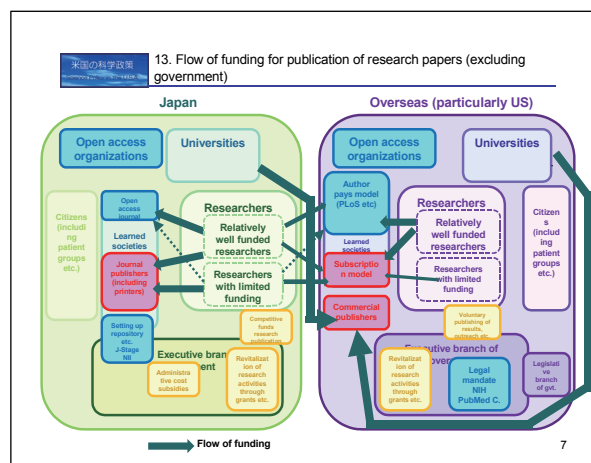
(Figure 6) Government involvement in Open Access

So, how is the government involved? In the case of Japan, the government has offered support in setting up repositories and been involved in open access initiatives such as J-STAGE and the NII's SPARC program. Research is also being supported through government grants. In the case of America, however, open access is being mandated through legislation passed by Congress. As a result of these differences, the system and flow of funding is different in Japan and America (Figure 6). The key area of difference is over subsidy for management expenses to universities. In America the researcher acts as an independent entity, and

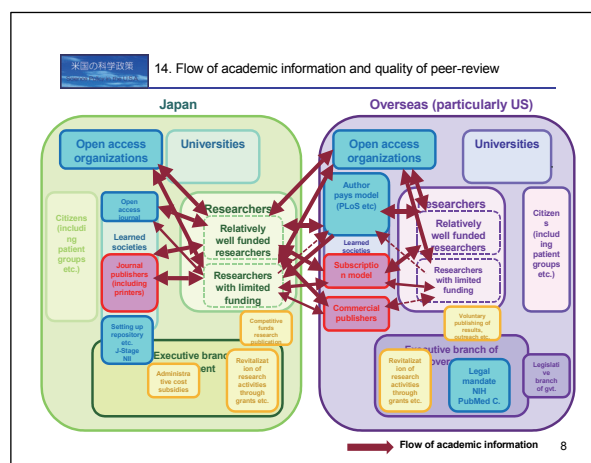
the learned societies are supported by author fees that the researchers pay. This works for the American funding model, but in the case of Japan, a large proportion of research funding is received through subsidy for management expenses to universities. This means that a much greater emphasis is placed on the role of universities than of individual researchers. The manner of government involvement is consequently very different.

There is one more funding issue that I would like to consider further. In America there is much debate about the COPE and author-pays model. This debate also involves the subscription model and commercial organizations, so the funding issue invites some fairly strong opinions relating to peer-review system. On this screen the green line represents the flow of funding (Figure 7). You will notice that Japanese money flows abroad, and I think this can be considered as an inevitable consequence of worldwide academic journal activity. The author-pays model that Prof. Shieber has been involved with, whereby authors pay just over a thousand or just over two thousand dollars, contributes to the funding and I think that examples such as COPE offer a viable model in America. The question is whether it is possible to create a similar model to support research in Japan and, if so, what form it should take. This is a key issue in the flow of costs.

This slide represents the flow of academic information (Figure 8). In the case of America, the author-pays model is getting ever increasing take up, as you might expect. This system enables simultaneous publication and open access. There is the traditional subscription fee model. In both cases I think it is necessary to consider how each



(Figure 7) Flow of funding for publication of research papers (excluding government)



(Figure 8) Flow of academic information and quality of peer-review

model enables the circulation of research costs. A further key difference between Japan and America to consider is that in America the government stores and publishes research papers itself through repositories such as PubMed Central. In Japan there is a tendency for researchers to try and publish their papers abroad, and consequently the flow of papers submitted to academic journals tends to be in one direction: from Japan to America. Learned societies in Japan also tend to have small, in-house publishing departments, and the society's annual membership fees are generally considered to be tantamount to a subscription to its journal.

While it is of course inevitable that open access journals will expand rapidly in the future, I think there is a need to consider what form the flow of academic information should take, in a way that takes into account the particular circumstances here in Japan.

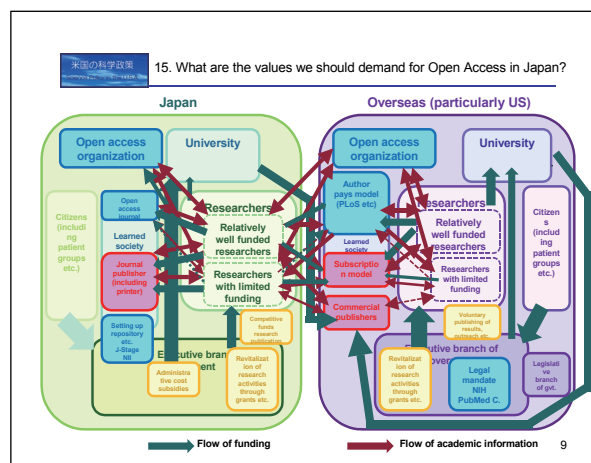
One thing I think we conclude for sure is that Japan needs to be a little more independent academically. This may seem a rather disrespectful to say, given that learned societies are continuing to thrive in Japan. It is my view, however, that another important aspect of independence is whether or not we are able to create a system that attracts the submission of outstanding research papers from overseas.

However, if you try and include everything relating to the flow of funding and academic information, you end up with an extremely complicated picture (Figure 9). If I am honest, therefore, I have to say that I am not really sure where to start the discussion on policy.

What are the values we should demand for open access in Japan?

If we take a basic line, I think this question can be answered by the following two points.

Firstly, the creation of open access for academic research results provided free of charge to a broad range of people, and secondly, the enhancement of Japanese academic publishing subject to high quality peer-review. While acknowledging that there are a number of differences between Japan and America, including those I have raised as concerns, I believe that we need to think about revitalizing Japan's academic publishing activities. This includes enhancing the quality of peer-reviewing in Japanese journals. I am not



(Figure 9) What are the values we should demand for Open Access in Japan?

directly involved with open access myself, but I think probably most of you who have come here today are involved in some way, so I would like to end my talk by wishing you all the best in your activities.