Infrastructure Development for Strengthening the Capacity of International Scholarly Communication [Overview]

(Science Information Infrastructure Working Group, Research Environment Infrastructure Group, Subdivision on Science, Council for Science and Technology, July 2012)

1. Development of Scientific Information Infrastructure and Strengthening of Japan's Scholarly Communication

a. Background

○   An improved infrastructure for scholarly communication is indispensable for the promotion of science, in researchers' sharing their research results, increasing efficiency of research activities, disseminating research results in society, implementing educational programs to make use of research results, and passing research results to future generations.

○   With the rapid development of computer and network technology, scholarly communication has been generally digitalised. While, electronic journals are already the mainstream in natural science, the transition to electronic journals is yet to come in the humanities and social sciences.

○   Open access, which makes necessary research materials freely available on line, is at the focus of immense international concern for the purpose of further improving scholarly communication.

b. Current Status

○   Although Japan's research produces results that are ranked at the world top level in a large number of scientific fields, the number of the journals that are known worldwide are small. As a result, about 80% of papers written by researchers in Japan are published in journals published abroad. Japan has failed to promote journals as a platform for its researchers to take the initiative in scholarly communication.

○   The promotion of the journals originating in Japan that will be internationally influential is essential in order to increase Japan's intellectual presence, followed by quality submissions from overseas, and leading to the country's status as the centre of excellence in the relevant research areas.

○   In developing a future-oriented infrastructure for scholarly communication, it is hoped to accelerate a variety of initiatives that include conversion to digital online communication and appreciation the ideal of open access, with a view to the construction of "knowledge infrastructure" proposed in the Fourth Science and Technology Basic Plan.

c. Challenges

○   As we try to foster internationally influential Japanese journals, JSPS's Grants-in-Aid for Scientific Research, which has been limited to covering the publishing expenditures of print-based journals, is hoped that improvements will be made to help strengthen the capacity of international scholarly communication.

○   We should make proactive efforts to make open access possible. Along with the publication of open access journals, it is also beneficial to utilise institutional repositories that are launched and operated at universities and other institutions.

○   In order to accelerate the promotion of institutional repositories, which disseminate and distribute the results of education and research conducted at universities and research institutions, it is necessary to further penetrate the recognition that development and strengthening of institutional repositories are important for the institutions which account for themselves in terms of their educational and research activities.

○   In strengthening Japan's scholarly communication infrastructure, direct grants to the publishing project by the Japan Society for the Promotion of Science (JSPS) will be complemented for the improvements of the environment by the Japan Science And Technology Agency (JST), the National Institute Of Informatics (NII) and the National Diet Library (NDL), and these institutions are expected to cooperate and share responsibilities.

2. The Remodelling of the Section for the Grant-in-Aid for Publication of Scientific Research Results (Scientific Periodicals)

a. An overview of the subsidy for research by grants-in-aid

○　Grants-in-Aid for Scientific Research (KAKENHI), has a section called "Scientific Periodicals", henceforth "GiA-PSRR-SP", which was established as part of the Grant-in-Aid for Publication of Scientific Research Results, henceforth "GiA-PSRR", which is designed to assist financially with expenditures related to the publication of research results. The provision of subsidies under GiA-PSRR-SP, has been under operation to support periodical scholarly journal publishing by societies, or society groups which run the publishing enterprise jointly for the purpose of facilitating international scholarly communication.

b. Challenges Facing Grant-in-Aid for Publication of Scientific Research Results (Scientific Periodicals)

○　The current screening process of GiA-PSRR-SP has allowed good journals to stably receive support through GiA framework. This has led to the criticism that, GiA-PSRR-SP apparently has come to lack sufficient competition. While the GiA budget is generally increasing, the allocation for GiA-PSRR-SP has been diminishing to roughly a third of that in its peak. The drastic budget reduction has discouraged applicants, resulting in a reduced number of applications.

○　In formulating the kinds of expense GiA-PSRR-SP covers, the assumption has been that journals are published in print so that the subsidy must be used for the direct publication costs, to the result of failing to accommodate the growing trend of digital publishing. Other types of expense that are essential to journal publishing, such as those for refereeing and editorial assistance, cannot be covered by the grants, either.
　The screening process for the GiA-PSRR-SP basically consists in the reviews of academic value by experts, and people who are actually engaged in journal publishing have not participated in the reviewing as peers. As a result, the screening system is not capable of adequately evaluating efforts to improve publishing practices.

c. A Course of Actions for Improving Grant-in-Aid for Publication of Scientific Research Results (Scientific Periodicals)

○　From the perspective of strengthening Japan's contribution to scholarly communication, we need to encourage the kind of journal publishing which ensures the diversity of research interests and thereby substantially advance scholarly and scientific research. To achieve these goals, it is important for GiA-PSRR-SP to give consideration such a way that the funding will enhances international competitiveness.

○　The following is the Working Group's proposal for the course of actions which is necessary in remodelling GiA-PSRR-SP. The Working Group hopes that the proposal will be discussed internally more in detail by the Japan Society for the Promotion of Science, which operates the processes of screening applications and allocating grants in this category, along with the examination of the impact of the improvement.

(Providing grants for expenditures necessary for the publication of journals)
・　With regard to the eligibility of projects, the aid needs to be made available for project proposals that are designed to strengthen the contribution to international scholarly communication. In addition to programs implemented by individual academic societies, new initiatives which coordinate and consolidate communities of researchers in specific research area to start a new online journal in the area.

・　With regard to the types of expense to be covered by the grant, funds should flexibly cover such project expenses as strengthen the capacity of international scholarly communication as well as the direct costs of publishing conventional print journals.

(Revision of the application guidelines to evaluate efforts to strengthen the capacity of international dissemination of information)
・　It is to be desired to arrange the format of proposal in the way that the applying society itself sets goals for its own project as well as specifies the yearly progress plans for the entire period so that the review committee can review the application as a whole, together with an explicit statement prior to the application that the committee will prioritise the elements in the proposal which concern the improvement of journals. With regard to the length of project period, the shift from the current practice of giving the grant primarily on a single-year basis to the framework in which the grantee can show the results from the project which can be evaluated.

(Support for open access initiatives)
・　To promote open access journals, we should give a thought to installing a new focus category and simultaneous multi-category applications should be permitted to encourage open access journal initiatives towards the publication of new open access journals other than conventional subscription-based journals.

(Other important matters regarding the improvement of Grants-in-Aid for Scientific Research)
・　The structure and composition of the review process should guarantee the appropriate evaluation of the proposed projects in terms of their contributions to improved scholarly communication. It should be so arranged that a special consideration in the process of reviewing is to be given to those proposals which are based on a plural number of societies' collaborative efforts.

・　The upper limits on the amount of requested grant should be reconsidered, allowing for the possibility of removing the limits, from the perspective of ensuring the provision of necessary support at an appropriate scale.

・　The change from the title of "Grant-in-Aid for Publication of Scientific Research Results (Scientific Periodicals)" should also be considered.

3. Establishment of Open Access to Results of Research Funded by Grants-in-Aid for Scientific Research and Other Competitive Funds

a. Necessity of Open Access

○ Results of scientific research are preferred to be shared as intellectual assets of all humankind in the first place. In particular, the results of publicly funded research should be widely accessible and available by the public. On this recognition, the current global trends are towards the promotion of open access that makes research results accessible, arguing against the situation where journal articles are increasing hard to have access to on account of ever more expensive subscription fees and ever stronger copyright protection. The establishment of open access are also promoted in the Fourth Science and Technology Basic Plan.

b. Ways of Establishing Open Access

○ There are two main ways of making research results open access. One is to publish papers in open access journals; the other is for researchers themselves to make their papers accessible online with the permission from the copyright holders, themselves included.

(Publication in open access journals)
・ There are still only a limited number of open access journals in Japan, given that to make open access possible, researchers have to be strongly motivated to submit and publish their articles in spite of the burden of publishing fees and that such a situation is naturally anticipated in which some journals might cease to be able to guarantee the quality and quantity of published articles in the consequence of changing the business model from subscription to open access.

・ However, the fact that there are online journals such as the mega-journals like PLoS ONE, published in the US, has led the Working Group to propose that, in the remodelling of the GiA-PSRR-SP category, a special provision should be made to promote open access journals.

・ It is important for the funding agencies to unequivocally inform researchers, with the intention of discouraging them from avoiding submission to open access journals, that the financial costs incurred on the part of researchers, including publication fees, can be paid with the funds they award them. Incidentally, such payment for publication for research results is explicitly allowed in the current practice of GiA, and described in the Handbook and other documents and manuals.

(Publication on the internet)
・ Ways in which researchers make their publication public are characterized by the combinations of the elements in the three following viewpoints:
   (1) Place
   ・ On the website of the funding agency that awarded the grant which made the relevant research possible
   ・ On the website of the institution the researcher is affiliated with
   ・ On the website the researcher hosts
   (2) Timing
   ・ At the time point when the result is published for the first time
   ・ No later than after a certain period of time determined by the publisher since its first publication of the results.
   (3) Content
   ・ Content finally accepted and officially published by the journal (publisher's version, or the version of record)
   ・ The author's final draft and other drafts

・ In Japan, it is considered to be realistic to take advantage of "institutional repositories" as a vehicle for shifting to open access, owned by universities and other institutions.
   Negotiation should take place with society and commercial publishers who hold copyrights with a view to making the timing as early as possible and the content as close as the version of record. It is also important to encourage researchers to actively take part in open access.

c. Other General Improvements

○ Funding agencies should require researchers to report to them the method of access to the results of the funded research, including it open access availability, as they need to in control of the relationship between funding and its consequences.
   The research results report form of a Grants-in-Aid for Scientific Research has fields in which researchers fill with the web addresses and DOIs of their research articles. The registry of this information should be strongly encouraged so that research results could be widely available through the links from within KAKEN (Grants-in-Aid for Scientific Research Database).

4. Strengthening Information Dissemination Capacity through Utilisation of Institutional Repositories

a. Roles and Meanings of Institutional Repositories

○　A wide variety of intellectual outcomes produced at universities and other institutions are the core element in the construction of "knowledge infrastructure," which is purposed in the Fourth Science and Technology Basic Plan.
　It is universities and other research institutions wanting to meet the needs of society that are primarily responsible for the accumulation and dissemination of such intellectual outcomes with their institutional repositories to be recognised as important means for fulfilling such social obligation, and to be developed and strengthened accordingly. This statement is consistent with the idea of the increased transparency of education and research at universities which was described in relation to the plan of the tentative "University Portrait," as described in the "Execution Plan for University Reform" (June 2012).

○　At universities and other institutions, the institutional repositories play a wide variety of roles, not limited to open access, which provide better environments for research, and teaching and learning.

b. Current Status of Institutional Repositories

○　Institutional repositories have been created and maintained by universities and institutions through librarians' voluntary efforts. Currently, institutional repositories have been serving at about 250 national, public, and private universities. In addition to the institutional repositories run by individual universities and other institutions, cooperative repositories are being actively started through institutional cooperation in various communities and regions. JAIRO Cloud, which launched by NII and provides a shared repository system for universities and institutions, is expected to accelerate the establishment of institutional repositories.

○　In effectively utilising the system of institutional repositories, coordination and system-wide data analysis across repositories are essential. Tools that make it possible have been already started and operated.
　According to JAIRO, a tool for searching across institutional repositories installed by NII, there are about 510,000 bulletin articles, about 160,000 science journal articles, and 40,000 theses out of the roughly 1,000,000 content materials which are deposited in institutional repositories. Those materials are most accessed from within Japan.

c. Challenges and Considerations in Enhancing the Functions of Institutional Repositories

(Reinforcing content registration)
○　As the challenges in the development of institutional repositories, the most important task is the increase of deposited content. The content is deposited primarily by library staff with cooperation from departments and researchers, and the deposit of content is basically done by each researcher who exercise the right of "self-archiving". Universities and other institutions have devised various ways of reducing the burden of researchers. One example is a system in which library staff handles the rest of the work on behalf of researchers. Other examples include linking of research results to a researcher database published by the university. It is also important to share these systems.

(Enhancing awareness among universities and researchers)
○　Universities and other institutions need to assist researchers in understanding that registration of their research results in open access institutional repositories is beneficial to researchers themselves because it facilitates searches by domestic and international audiences, and assists distribution of information. At the same time, researchers should be reminded that making their research results open access leads to the fulfilment of the university's duty of returning scientific information to society.
　It is also important to clarify that the institutional repository is a function of disseminating information, which universities and other institutions need to make a concerted effort to improve.

(Incorporation into evaluation)
○　It is important to put effort into information dissemination via institutional repositories as a subject of evaluation in institutional certified evaluation systems, and to understand and publicise the status of such endeavours. It is also important to include information dissemination efforts as one of the evaluation points when universities evaluate achievements of individual researchers.

(Types of information to be registered)
○　It is important to pay attention to the uniqueness of information as the universities and institutions prioritise the content to be registered in institutional repositories, focusing on unique resources owned by each university and institution, as well as resources that are difficult to distribute through other systems. Based on information strategies and improvement policies, the universities and institutions should decide what types of content to cover intensively and comprehensively, as well as whether they should be open access as they try to enhance and disseminate the content.

(Courses of action for support)
○　It is necessary to urge academic societies to promptly consider and publicise their copyright policies. At the same time, it is necessary to enhance services that will help strengthen information dissemination capacities and operational systems, including the active deployment of the NII's shared repository, and sophistication and standardisation of the functions of the institutional repository software.

a. Purposes and Projects of Related Institutions

○   NII, JST, NDL, and JSPS are implementing support programs according to their own purposes concerning the strengthening of the capacity of scholarly communication. In order to efficiently and effectively implement their measures despite limited resources, it is vital to expand and reinforce the programs through promoting the coordination, cooperation, and task sharing among the related institutions, while understanding the content and status of the programs that those related institutions are implementing.

b. Current Status of Coordination and Cooperation between Related Institutions

○   Currently NII, JST, and NDL are individually collecting information according to their purposes and content of programs, and each of them has their own search site. Improvement is being made to promote coordination between them, so that the institutions can share and access each other's information.
   With regard to digitalisation of journals, division of responsibilities is being established, in which JSPS implements grant programs, JST provides platforms, and NII holds seminars for promoting internationalisation including digitalisation of journals. Progress is being made in the awareness and practices of coordination, cooperation, and division of responsibilities among related institutions.

c. Projects to be Promoted through Coordination and Cooperation among Related Institutions

(Assignment of DOIs by Japan Link Center)
○   Through the coordination of institutions, we need to promote standardisation of science information and international coordination in order to facilitate international distribution of scientific information. It is important that the Japan Link Center, which was launched under joint management in April 2012, should promptly get the project of assigning DOIs (an international identifier for scientific information) under way.

(Sophistication of the electronic journal distribution functions through J-STAGE3)
○   J-STAGE3 was launched in May 2012, shifting the format of the database to the international standard (XML) and making improvements in submission and review systems. Further promotion of electronic journals in Japan and popularisation of the platform in other countries are also significant challenges. It is necessary to continue to maintain close cooperation with related institutions and the Science Council of Japan to enhance the program as a platform for electronic journals originating in Japan.

(Promotion of internationalisation by information sharing through SPARC Japan)
○   In response to domestic and international trends, NII has been engaged in promotion activities in various formats, including seminars. These activities should be enhanced and strengthened as well as actively publicised as a platform for raising awareness of academic societies and university libraries and for sharing information.

(Further coordination of data and services between related institutions)
○   In addition to related institutions promoting the collection and dissemination of content according to their purposes, it is important that, through the coordination of related institutions, they achieve "standardisation" of metadata, paper identification methods, and author information, reinforce the "integrated search function" that facilitates access to more in-depth science information such as the entire text of papers, and enhance the "analysis tools and statistics functions" to capture usage data and perform other tasks.

6. Other

○   In the future, it will be necessary to provide better support for multimedia and other increasingly diverse non-text scientific information.
   It is also necessary to continuously collect and analyse statistics, since information on the use of electronic journals has not been shared.

○   Future discussion topics may include the distribution of big data facilitated by academic cloud and other technological innovations, and a discussion of how the science information infrastructure should be improved in light of the development and use of a nationwide knowledge infrastructure.