

# Electronic Journals as Research Infrastructure

## *Aiming to Maintain Access to Electronic Journals*

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### 1 Introduction

Securing communalism for the knowledge that results from scientific research, and universalism, disinterestedness and skepticism across the entire scientific community encourage progress and are what makes science (at least academic science), science.<sup>[1]</sup> Papers are a medium for this; consequently, they are indispensable to science. Research interchange is important for generating excellent research outcomes, and papers provide a forum for undertaking indirect research interchange, so they should be acknowledged as an important research infrastructure (facility).

As a means of accessing papers, the importance of electronic journals is increasing and, in a survey by the Standing Committee for Research on Academic Libraries, the number of respondents who use electronic journals at least once a week was in excess of 80% in the fields of biology, chemistry, medicine, dentistry, pharmacology, mathematical and physical sciences, and agricultural studies, while it was approximately 70% in the field of engineering.<sup>[2]</sup> The increase in the number of titles (number of journals) that can be accessed as a result of their publication as electronic journals signifies their growing importance as the research infrastructure.

At the same time, the cost of purchasing electronic journals is rising and thus the proportion of research costs accounted for electronic journal purchase expenses increases, it will put pressure on research expenditure, it will be necessary to take steps to make the costs rationally suppressed. Looking at the situation from a macro perspective, at present, the cost of purchasing electronic journals per professor and associate professor is approximately 200,000 yen at national universities, and is just over 100,000 yen at public (prefectural and municipal) and private universities,<sup>[3,4]</sup> which appears to be a manageable

level.

The modernization of research infrastructure through the development of electronic journals should be welcomed if the cost can be maintained at the current level.

If we say that electronic journals form a part of research infrastructure, then, as an indicator of research outcomes, primarily, it is necessary to ensure that the cost of purchasing electronic journals per a research outcome should be adequate. Unfortunately, in the same way as other elements of research infrastructure, in reality it is difficult to clarify the causal relationship between research outcomes and purchasing costs of electronic journals. There are case studies supported by publishers, concerning the impact of the use of libraries on grants.<sup>[6]</sup>

At present, electronic journals are treated as though the number of titles that can be accessed as a result of being sold in packages was an indicator of their value as research infrastructure, but at the very least, it is necessary to look at whether or not they are actually being used in research. In order to do so, it is necessary to make information on the number of times a title or paper is accessed or downloaded open, and make it possible to check whether purchasing a title is a waste of money or not. As in the case of citation index and impact factors, figures for the number of times a title or paper is accessed or downloaded can be used as indicators for evaluating them. No ambiguous relationship has been observed there. However, even though the fact that there was a certain level of access to titles with no impact factors in the field of economy, political science or education, the quantitative relationship between impact factors and the number of times a title or paper was accessed differ according to the field.

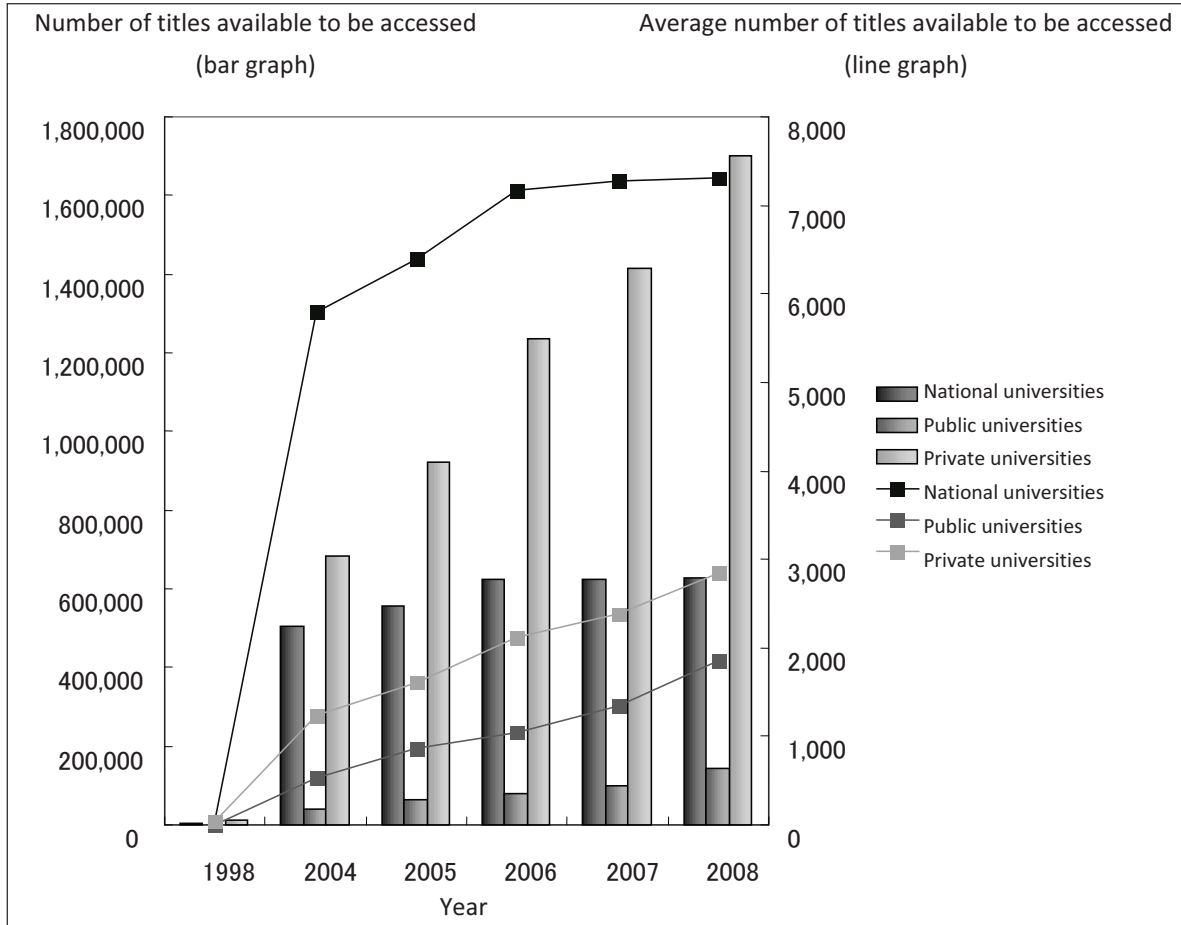
This article focuses on research in the fields of science, technology and medicine (referred to as STM). Differences in approach may exist within the

**Table 1:** Electronic Journal Purchase Expenditure at National Universities

Unit: 1 million yen

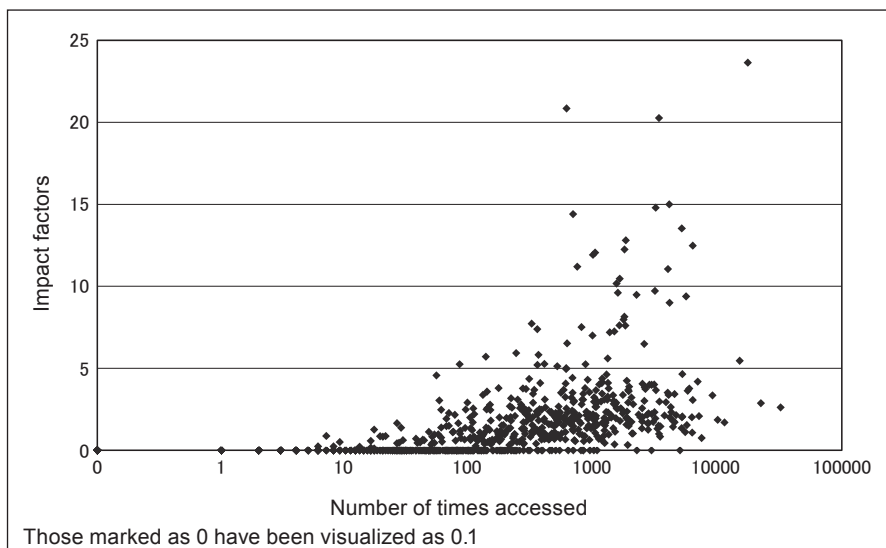
University A	University B	University C	University D	Average for national universities
5077	1377	1383	487	97

Source: References<sup>[5]</sup>



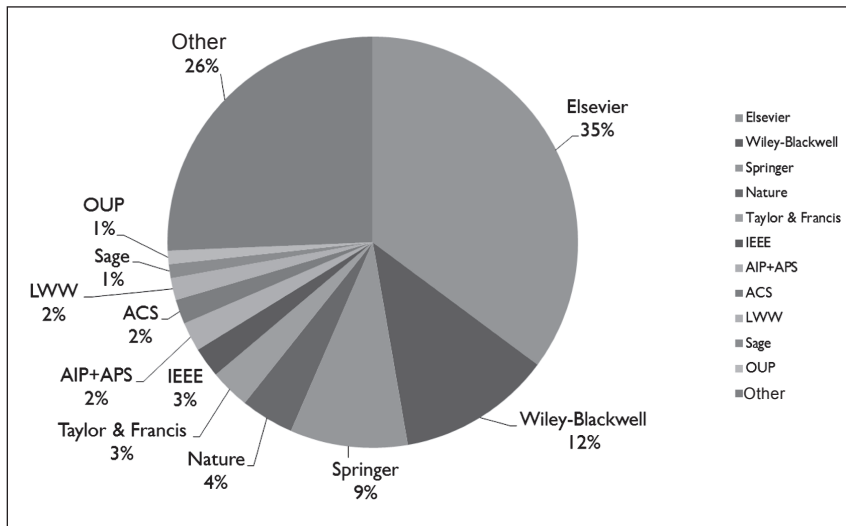
**Figure 1:** Number of Electronic Journal Titles available to be Accessed

Source: References<sup>[3]</sup>



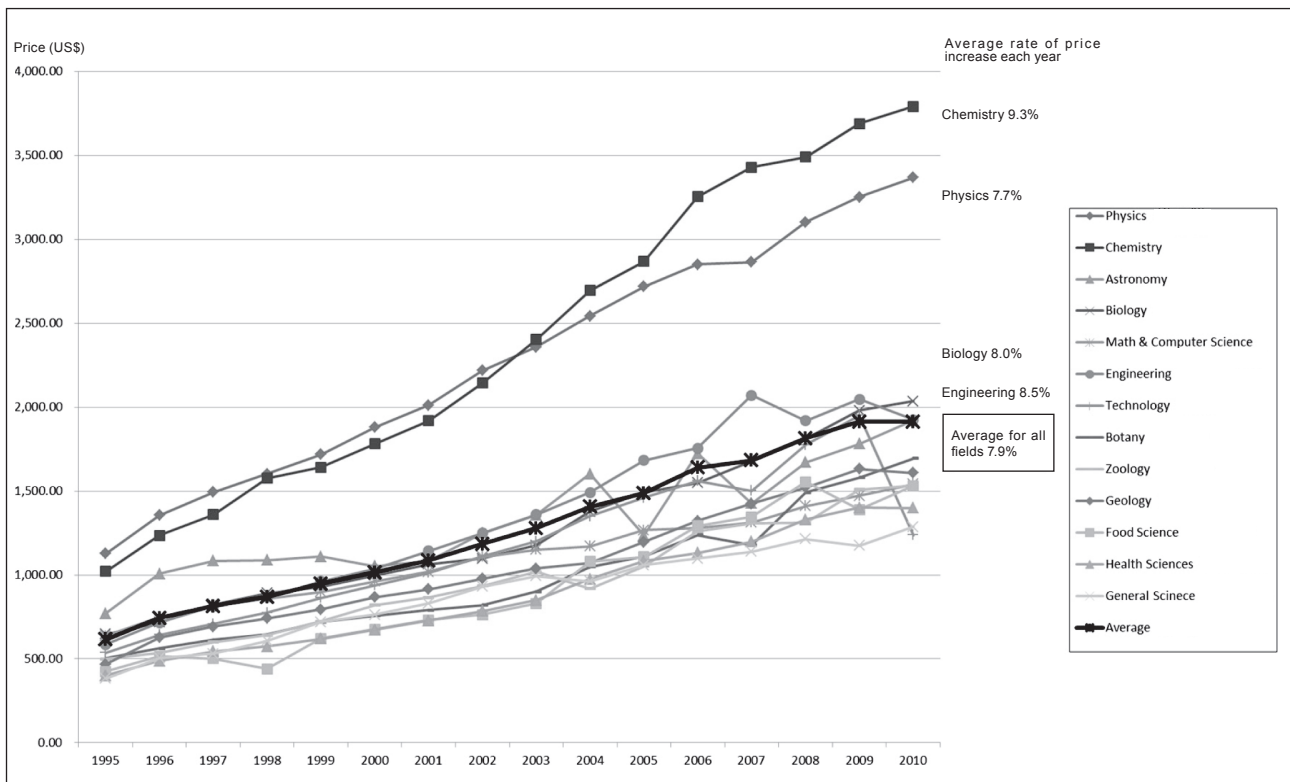
**Figure 2:** Impact Factors and Number of Times Accessed (Example of Elsevier at a Certain Large National University)

Prepared by the STFC



**Figure 3:** Share of Foreign Titles in Japan

Source: Japan Association of National University Libraries Survey of Contracts (fiscal 2009)



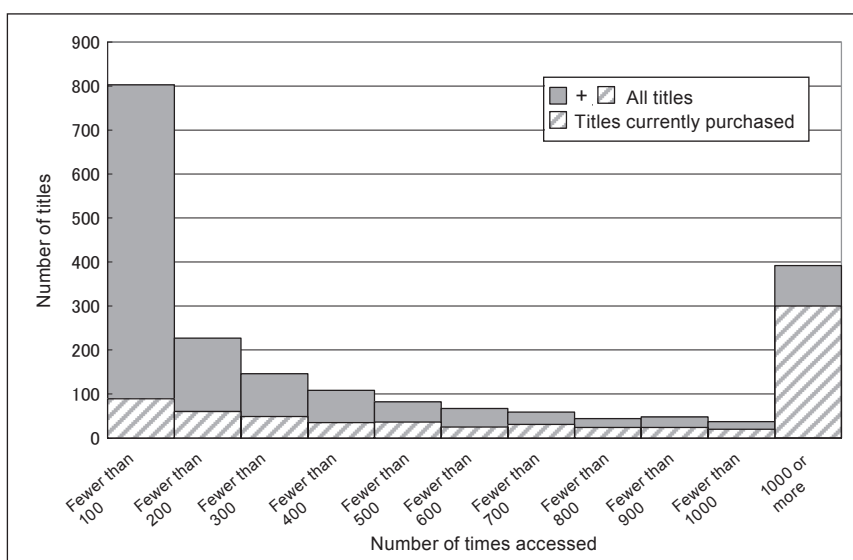
**Figure 4:** Trends in Average Price for Foreign Titles

Source: Source: Library Journal Periodical Price Survey, 1996 - 2010

STM fields; furthermore, in the social science and humanities, dependence on electronic journals as research infrastructure should also differ considerably. Moreover, we have not explicitly touched upon electronic journals as educational infrastructure, but the subject is discussed on the basis that education and research are indivisible at research universities.

## 2 | Forms of Electronic Journal Purchase

At present, electronic journals are sold as a package, in a form which is called a “Big Deal.” More specifically, by paying an additional fee on top of the initial fee based on purchase history (current spend), it becomes possible for the users to access all of a publishing company’s titles, including titles other than



**Figure 5:** Share of all Titles by Number of Times Accessed Accounted for by Titles Currently (Example of Elsevier at a Certain Large National University)

Prepared by the STFC

those that one really needed. As a result of this form of contract, the contract cost for large universities, which have a high current spend, becomes higher than that for small universities. Even if the number of titles that can be accessed decreases, the price does not fall very much, and each university is compelled to adopt this form of contract.

Even in the case of usage pricing, where the price is determined according to the size of the purchasing institute and the actual number of times an article or title is accessed, rather than being based on purchasing history, publishing companies do propose the prices, but so far, no such agreement has been reached with a purchasing institute.

The publication of electronic journals is becoming an oligopoly, and, with no other escape route for the users, the price has been rising. The bundling of titles is being carried out as a supply-side initiative, and, as a result, there are problems in that it is driving up apparent demand.

It is true that Big Deal contracts are the right option from the perspective of minimizing the price per accessible title. However, terminating Big Deal contracts by means of additional payments in the event that the supplier (publishing company) will not compromise is perhaps something that will have to be considered in the future.

In promoting the publication of information, it is necessary to have publishing companies demonstrate that they are playing a vital role in bringing forth research outcomes. As a result, it is conceivable that

this will give rise to competition among publishing companies in terms of the form of sale.

From the perspective of protecting personal information, at present, only publishing companies can reach the details of each access to each title. The research institutes, which are the purchasers, do not have an understanding of the current situation. It would be preferable for research institutes with responsibility for upgrading the research infrastructure to be notified by publishing companies of which papers were accessed, how many times and by researchers in which field; moreover, this may be inevitable, so that research institutes can decide upon rules concerning appropriate cost burdens.

There have already been cases in which research institutes have terminated their contracts with specific publishing companies in response to price increases. Although there is potential for this to encourage competition between publishing companies, this is the result of negotiations between publishing companies and research institutes from the perspective of price, so it could result in a deterioration of the research infrastructure at the research institute that has terminated the contract, which would not be welcomed by the publishing companies, nor, of course, by the research institutes themselves.

### 3 The Relationship of Researchers and Research Institutes to Electronic Journals

With regard to printed formats, there were those a research institute (primarily its library) was responsible for purchasing, and those the individual researcher was responsible for purchasing. With regard

to the latter that were purchased successively based on responsibility for a major course or faculty, it is likely that it was rare for researchers to have a sense that they have developed the stock of titles on the basis of individual responsibility. However, as titles have been published in electronic form and sold as a package, they have exceeded the cost boundaries that would enable them to be purchased within the purchasing authority limits of a researcher, and a unified point of

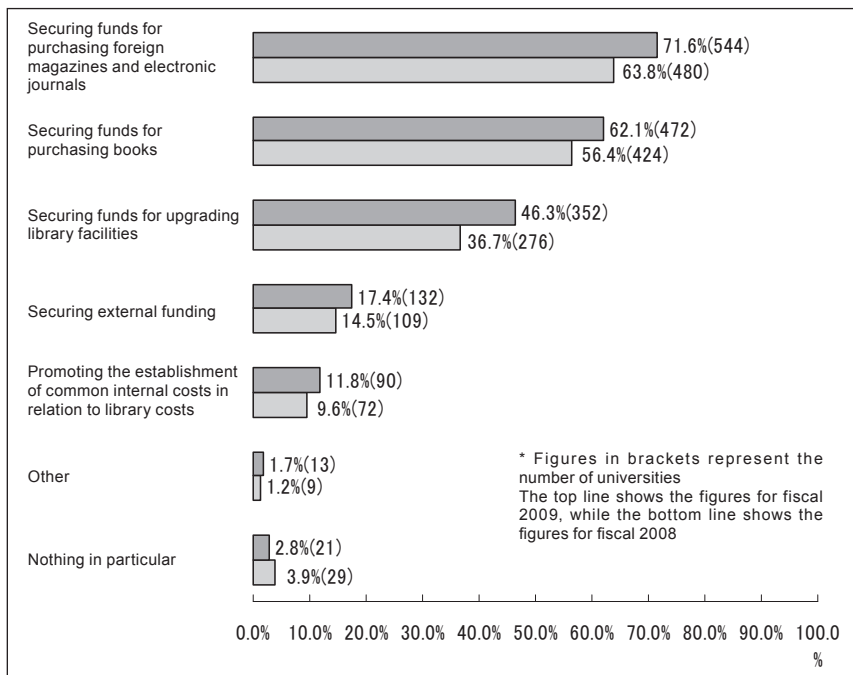


Figure 6: Financial Issues for Libraries

Source: References<sup>[3]</sup>

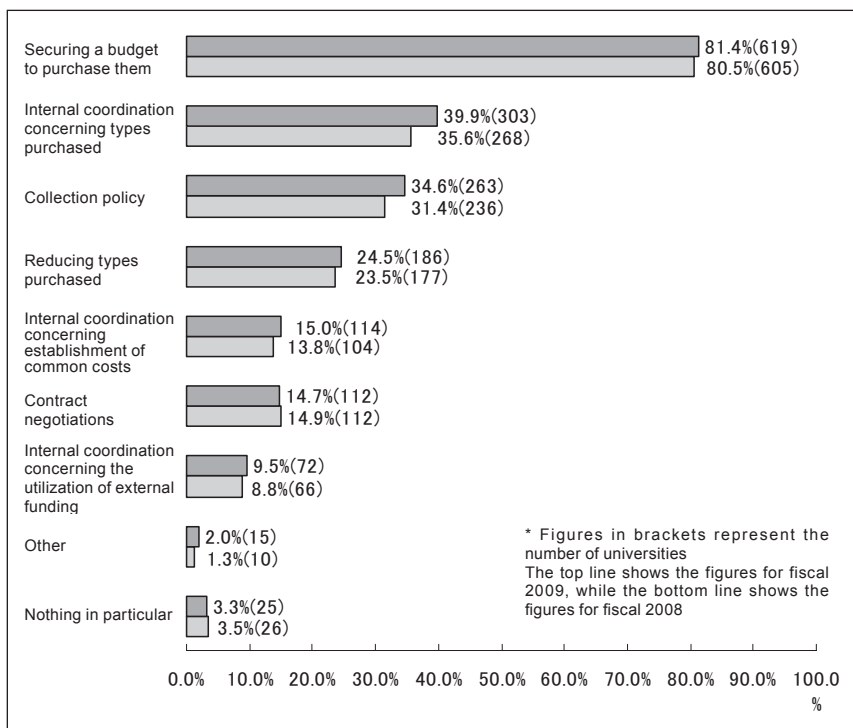


Figure 7: Challenges Relating to Electronic Journals

Source: References<sup>[3]</sup>

contact has become necessary, so research institutes have been compelled to shift to taking charge of negotiations and contracts with publishing companies.

At present, as well as the sources of revenue that existed hitherto, research institutes are appropriating the overhead<sup>[NOTE 1]</sup> of research grants and, after undertaking coordination with the researchers, they purchase electronic journals as a means of upgrading the research infrastructure common to all of the institute's researchers. In the same way as other high-cost equipment, electronic journals have reached the stage at which they have become research infrastructure that is developed by a research institute and used jointly by researchers. In the future, it might become necessary for researchers jointly using these titles to allocate part of their research grants as a source of funding.

One can say that there is a lull at present, but the cost of purchasing electronic journals is the biggest financial issue facing libraries, while securing a budget for the purchase of electronic journals is the biggest challenge that they face in relation to electronic journals. As this implies, it is conceivable that initiatives that differ from the approach taken hitherto will be required in the near future.

At universities, researchers exist as free agents within the research institutes. Researchers who have not purchased electronic journals at their own responsibility do not adequately understand the current situation, whereby it costs a considerable amount of money to purchase electronic journals in order to upgrade the research infrastructure. One can see that there are still few researchers who are aware that they need to indicate what kind of negotiations they would like their research institute to pursue with publishing companies and that they need to fulfill some responsibilities themselves in terms of the cost burden.

Small universities are forming joint negotiation bodies (consortia) with large universities at their core, thereby seeking to strengthen their bargaining power. These consortia are just for negotiation, and are not for joint purchasing. Irrespective of the scale of the university organization, and solely from the perspective of developing excellent research

infrastructure that generates excellent research outcomes, it is necessary to ensure that it is possible to negotiate with publishing companies.

National universities and public (prefectural and municipal) and private universities have already formed their own consortia, named JANUL (Japan Association of National University Libraries) and PULC (Private and Public University Libraries Consortium) respectively. In October 2010, the two bodies concluded a comprehensive agreement and, as well as engaging in joint negotiations concerning electronic journals, they are undertaking such initiatives as the development of backfiles (archives of title content).

With regard to bulk purchase by the state (national site licenses), Japan has judged that, "Due to aspects such as the cost involved, this is not appropriate."<sup>[7]</sup> However, fundamentally speaking, rather than the cost aspect, it is not appropriate for an organization, in the form of the state, to develop a uniform research infrastructure; rather, individual research institutes should take responsibility for what kind of research infrastructure they will develop, and it could be desirable for there to be competition among research institutes from this perspective.

However, if the steep rise in the cost of purchasing titles continues in the future, establishing a joint purchasing body, like a mainframe computer center used jointly by universities across the country, enhancing public support and securing the funds for their purchase might be an unavoidable measure. In the same way as regional TLO(technology licensing office)s, it could be conceivably effective to establish a joint purchasing body around a core university.

Moreover, it is essential for a joint negotiation body to have personnel with the professional competence to be able to take charge of negotiations with publishing companies. As well as joint negotiation bodies, it is necessary for the libraries that function as a point of contact with the university to employ personnel capable of dealing with such matters; they should devise ways of providing technical expertise through such endeavors as formulating skill standards, as well as ensuring that decent work is provided on an ongoing basis. The formulation of skill standards

[NOTE 1]

Based on the 2<sup>nd</sup> Science and Technology Basic Plan (March 2001, Cabinet decision), 30% of research grant shall be allocated to overhead.

**Table 2: Consortia in Japan**

	JANUL (National Universities)	PULC (Public and Private Universities)
Year established	2000	2003
Operating & negotiating organization	Ad Hoc Committee on Reform of Scholarly Information Distribution (6 chief librarians, 8 divisional and departmental heads, others)	Meetings of leading universities (16) and plenary meetings
Number of participating institutes	91	375 (55 public, 319 private, 1 other)

Source: Extract from materials published by the NII

**Table 3: Consortia Overseas**

	Number of participating institutes (approximate)	Overview
Lyrasis (USA)	2000	Established in 2009. As well as electronic journal contract negotiations, it constructs union catalogs, undertakes ILL and implements research projects.
Joint Information Systems Committee (JISC) (UK)	200	Established in 1993. It constructs and develops digital materials.
Couperin (France)	200	Established in 1999. As well as electronic journal licensing contracts, it provides cooperation in state projects focused on digital materials.

Source: Extract from materials published by the NII

could be conceivably implemented as a project of a public body such as the National Institute of Informatics (NII), which has previously undertaken training courses aimed at university library staff. If it is difficult to employ staff with the relevant expertise on an ongoing basis, it might perhaps be a good idea to make use of retired teaching staff, utilize external personnel, or to give concurrent job assignments in this area to key personnel involved in industrial-academic cooperation.

In Germany, backfiles are purchased in bulk by the state. From the perspective of archives, it might be a good idea to consider the state taking responsibility for developing backfiles through an institute such as NII. If it were possible to set a short period for a current subscription, this would hold the potential to contribute to reducing purchasing costs, even if the Big Deal contracts were used.

From the perspective that electronic journals work as the research infrastructure specific to each university, the quality of access to electronic journals can become an incentive for people outside the institute to engage in joint research with that research institute.

## 4 | Issues for Consideration

What is important is for each research institute to discuss what kind of investment it is going to make in purchasing electronic journals in which model, in light of its objective of generating research outcomes, and to build a consensus. Based on this, negotiations should take place between the research institute, which is the consumer, and the publishing company, which is the supplier. However, price negotiations on a sly zero-sum basis should be avoided.

At each research institute, someone with the responsibility and skill to develop the research environment should be involved in operating the library, including the purchase of electronic journals. In the same way as the establishment of CIOs to develop the information infrastructure, someone in a purely honorary position, who leaves everything to their staff, should not be appointed to this post.

### 4-1 Open Access<sup>[NOTE 2]</sup>

In order to increase the bargaining power of research institutes and researchers, it is effective to keep a means of access to other papers that ensures that publishing companies have to compete with each other. As well as being important for researchers who

#### [NOTE 2]

There is a form called the “golden road,” which enables the paper itself to be read as a result of payments by authors, and a form called the “green road,” which enables the paper to be read through registration with a institutional repository.

find it difficult to obtain support from the research institute to which they are affiliated, science has come to have to rely on commercialized titles, and it will be necessary to secure open access in order to ensure a certain level of communality of knowledge in the future.

In order to ensure that open access does not stop at the provision of the minimal level of information, in the form of matters relating to research trends, but rather plays a role in contributing to scientific progress, it is particularly important to ensure that open access to peer-reviewed papers that have been exposed to skepticism is possible.

Open access that facilitates access to research trends is also vital from a completely different perspective: that of accountability to the public.

With regard to the importance of open access, based on the Budapest Open Access Initiative undertaken in 2002 (<http://www.soros.org/openaccess/read.shtml>), the Japan Association of National University Libraries published a document entitled *Statement on Open Access – Pursuing New Scholarly Communication* in March 2009. Moreover, the number of academic papers and theses held at institutional repositories at Japanese universities is growing,<sup>[3]</sup> and this expansion of sources of access is to be welcomed.

Overseas, universities and research institutes have been at the heart of proposals for a mechanism called COPE (Compact for Open-Access Publishing Equity) (<http://www.oacompact.org>), which is a mechanism for securing open access with financial support from research institutes. Moreover, although the fields involved are limited, the US National Institutes of Health's PubMed Central and arXiv which is maintained by Cornell University with support from the US National Science Foundation, are functioning and have become important sources as open access repositories. Nine Japanese institutes are currently providing funds to arXiv on a voluntary basis. Moreover, CERN (European Organization for Nuclear Research) has been at the center of an attempt to realize the "golden road" (see footnote 2) through SCOAP3 (Sponsoring Consortium for Open Access Publishing in Particle Physics).

Open Access involves research institutes and researchers in developing material to be provided for the use of external parties, so it is an example of an external economy (a true externality), and there are many cases in which official support should be sought.

In the case of activities in a limited field, it is desirable for joint usage and joint research hubs in Japan to cooperate. It is appropriate to provide official support for such activities as a part of a "large scale research project".<sup>[8]</sup>

The idea has been proposed for acquiring a competitive edge by developing a title that is not published by an oligopolistic publishing company, but this is rather a stale idea. This is because, in the first place, the problem is that, as a result of comprehensive contracts, research institutes even have to purchase titles that do not have a very large readership. Even if an excellent title emerged, it would be difficult to rely on this alone. If so, additional expenses would be required to purchase it. In order to secure access to excellent outcomes, it should be precisely open access and the development of institutional repositories for this that would seem to be desirable. It will be recognized that the cultivation of titles should be undertaken for the differing objectives of ensuring public ownership of Japan's excellent research outcomes and making an international contribution to qualitative improvements in the fields of science, technology and medicine.

#### 4-2 Inter-Library Loans (ILL)

From the perspective of preventing the scope of bundling expanding unnecessarily, and responding to the needs of researchers who wish to access literature for which there is low demand as a result, inter-library loans (ILL), for which demand has fallen as a result of being outpaced by electronic journals, should be utilized. Under the existing electronic journal purchase contracts, the interchange of literature between libraries is limited to the paper medium, which is an obstacle from the perspectives of cost and providing a prompt response. In the future, it is conceivable that ILL will increase in significance through the revision of contracts to permit interchanges of electronic media between libraries and the provision of the material to researchers in the paper medium by the portal library.

#### 4-3 Breaking Free of Big Deal Contracts

A consensus among researchers is yet to be required, but in the future, consideration should also be given to introducing beneficiary charges for researchers. This would lead to a rise in the unit cost of purchasing each paper, but consideration should also be given to the introduction into contracts with publishing



companies of a mechanism that would combine a basic charge with a pay-per-view charge for access in excess of this basic rate. In doing so, it is hoped that a discussion would be initiated at each research institute, concerning how the overhead of research grants should be used in the first place.

In order to move from the concept of papers that can be accessed, to the concept of papers that need to be accessed, it may well be necessary to introduce a mechanism to research institutes for levying a charge on researchers for each view, irrespective of whether or not pay-per-view system is introduced to contracts with publishing companies.

#### *4-4 Collaboration with the Overseas Research Community*

Negotiations have taken place between domestic research institutes and publishing companies that have expanded internationally. At present, we are finally moving from the stage of this being a problem for individual research institutes to the stage at which it is emerging as a problem for the research community in Japan as a whole, as can be seen from the formation

of joint negotiation bodies. The research community should also become more international, as in the case of COPE. It should cooperate with publishing companies that have expanded internationally and engage in discussions concerning the construction of a research infrastructure from which we can expect even better outcomes.

Moreover, it is conceivable that if Japanese researchers were to make a contribution not only as authors of excellent papers, but also as editors and reviewers, it would incidentally increase their bargaining power with publishing companies.

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## Profile

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