Survey of Publication of Articles in Open Access Journals

SPARC Japan Working Group on Survey of Publication of Articles in Open Access Journals

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Executive Summary

There have been increasing numbers of scholarly open-access journals and hybrid journals funded by article processing charges (APCs) paid by authors of articles. Outside Japan, some publishers have implemented or are considering implementing a model in which institutions cover the APCs of their researchers. In Japan, on the other hand, universities have not fully grasped the actual situations of APC payments made in their institutions, and are not ready to cover the APCs of their researchers.

Against such a background, the International Scholarly Communication Initiative (SPARC Japan) of the National Institute of Informatics (NII) conducted a questionnaire survey and an interview survey, with the cooperation of the Japan Alliance of University Library Consortia for E-Resources (JUSTICE), the Committee on Scholarly Information of the Japan Association of National University Libraries (JANUL), and the Standing Committee for Research on Academic Libraries (SCREAL).

The questionnaire survey was aimed at identifying the current status of article publications in OA journals by researchers in Japan, and asking researchers about their views regarding APCs and open access. The following results were obtained:

- The number of articles published in APC-funded open access journals has increased rapidly in recent years. The number of such articles authored by researchers in Japan has also been on the rise.
- A large difference was found between disciplines in the number of articles published in OA journals.
- In selecting an OA journal to submit their articles, researchers did not attach much importance to “open accessibility”. In Japan, it seems that an increase in the number of articles published in OA journals has been driven by the emergence of OA journals that satisfy the conventional factors influencing the choice of a journal, such as the journal’s reputation in the discipline, fit between the scope of the journal and that of your (researcher’s) articles and provision of appropriate peer-review.
- As a reason for never having published their articles in OA journals, nearly half (47.8%) of the respondents cited “expensive publishing fees”. In open-ended answer, many respondents expressed their need for subsidies or financial assistance provided by the national government or universities.
- It is highly necessary to grasp the overall publishing expenditure, including the costs of not only conventional subscription contracts, but also payments of APCs. University libraries and other parties concerned should start to consider establishing a model in which such institutions cover the APCs of their researchers and appropriate APC pricing.

The interview survey was aimed at grasping the situations regarding APC payments in universities,

institutions of higher education and research institutions in Japan. In particular, the interviews with libraries were designed to clarify the library's policy regarding dissemination of research outputs and how open access was perceived in that policy. Also, through these interviews we intended to identify several patterns as to the environment that the library provides for publishing the research outputs of researchers, including those within the institution, and acquired the following results:

- Libraries are aware of the problems relating to APCs. In addition, library staff perceived that recognition of APCs is growing among researchers, although the levels of awareness vary according to the operating organizations and scales of the institutions, as well as the disciplines.
- Most libraries were not engaged in APC payments, and did not know the actual situations of how payments were made by other departments.
- In the future, it will be a great challenge for universities to find optimal ways on an organization-wide basis to secure scholarly information resources, including OA journals, and to strengthen their abilities to disseminate research achievements.

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1. Background

In recent years, there have been increasing numbers of open access journals (hereinafter referred to as "OA journals") and hybrid journals, which are funded by the payments of article processing charges (APC), i.e., fees charged to authors to publish their article in scholarly journals. These journals are expected to further increase sharply in the future, according to some recent predictions.[1,2] Since APC-funded OA journals are based on contracts and payments made between publishers and authors, only the publishers can know the total amount of APC payments by the authors, unlike in the case of conventional scholarly journals subscribed by institutions. For this reason, the transparency of price information for OA journals is likely to decrease. In addition, recent years have seen a growing number of publishers that have implemented or are considering implementing a model in which institutions cover the APCs of their researchers. Although some practical examples are found outside Japan, universities in Japan have not yet fully grasped the actual situations of APC payments, and are not ready for institutional payments of APCs.

Given these circumstances, under the International Scholarly Communication Initiative (SPARC Japan) of the National Institute of Informatics (NII), we decided to investigate the actual situations of submission of articles in OA journals and the payments of publication costs. Specifically, we sent questionnaires to researchers to identify the overview of article publication by researchers in Japan in OA journals and ask these researchers about their views about APCs and open access. We also held interviews with libraries and clerical departments regarding the situations of APC payments. At the same time, we confirmed overseas trends by reviewing relevant literatures.

This survey was conducted by SPARC Japan of NII, with the cooperation of the Japan Alliance of University Library Consortia for E-Resources (JUSTICE), the Committee on Scholarly Information of the Japan Association of National University Libraries (JANUL), and the Standing Committee for Research on Academic Libraries (SCREAL).

[1] Laakso, Michael; Björk, Bo-Christfer. "Anatomy of open access publishing: a study of longitudinal development and internal structure." *BMC Medicine*. 2012, 10:124 http://www.biomedcentral.com/1741-7015/10/124 (accessed: Mar. 21, 2014)

[2] Lewis, David. "The inevitability of Open Access." College & Research Libraries, 2012, vol. 73, no. 5, pp. 493-506. http://crl.acrl.org/content/73/5/493.full.pdf+html (accessed: Mar. 21, 2014)

2. Questionnaire survey

2.1. Purpose and outline of the questionnaire survey

We conducted a web-based questionnaire survey to identify what ideas researchers in Japan had regarding APCs and open access, as well as their experience in publishing articles in OA journals. Prior to the questionnaire survey, a preliminary survey was conducted to grasp the number of researchers in Japan to be covered by the questionnaire survey using the DOAJ (Directory of Open Access Journals[3]) and Elsevier's Scopus research database.

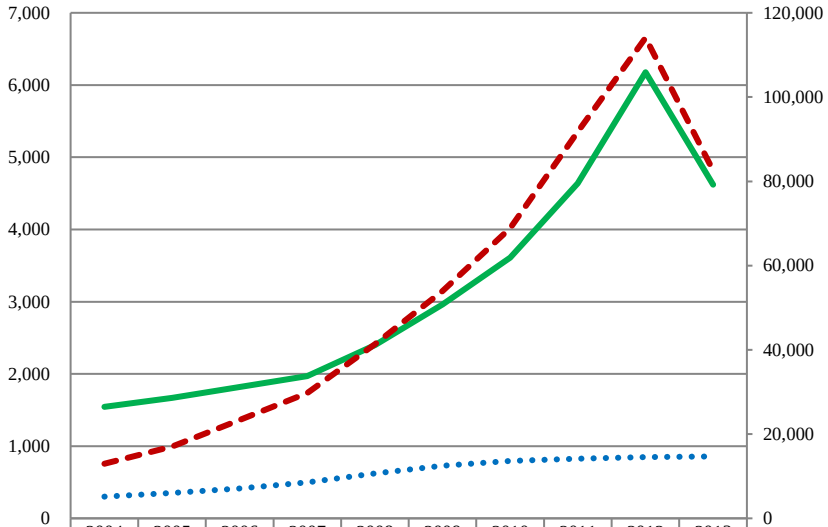
2.2. Target population

2.2.1. Number of articles in APC-funded OA journals

From the DOAJ, we created a list of journals indicating that they were "APC-funded OA journals" (2,649 titles, as of the end of July 2013), and extracted from the list only those titles whose full text was written in English (2,319 titles) and that were indexed in Scopus. Then, by supplementing some OA mega-journals not included in the DOAJ, we created a list of APC-funded OA journals which resulted in 857 titles.

Next, we searched Scopus for each of the 857 titles, and compiled data for each year after 2004 on the number of titles, the total number of articles, and the number of articles published by researchers in Japan. The results are showed in Figure 1. The number of OA journals (indicated by the broken blue line) increased about three fold from 301 titles in 2004 to 857 titles in 2013. However, with Scopus we could not identify the year in which these journals began to provide open access. Accordingly, the graph only shows the number of titles that were included in Scopus in each year and were available for open access at the time of the survey, and thus the number is not strictly accurate and is likely to be lower than reality. The total number of articles published in these journals (indicated by the broken red line) steadily increased from 2004 by about 30% each year. In 2012, the total number of articles reached 114,079, exceeding the 100,000 mark. Since the figure 82,563 in 2013 was the number of articles as of September 2013, certainly the final figure in 2013 would surpass that in 2012, considering the time required to become indexed in Scopus. The solid green line (—) indicates the number of articles at least one of whose authors belonged to a research institution in Japan. The absolute number of these was small, with its maximum value reaching 6,177 in 2012. However, as seen in Table 1, the percentage of such articles out of the total number of articles stood at 7.22%, showing steady growth.

[3] http://www.doaj.org/



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of titles (left axis)	301	352	413	497	620	730	793	826	850	857
Number of articles authored by researchers in Japan (left axis)	1,544	1,667	1,821	1,971	2,398	2,963	3,610	4,638	6,177	4,622
Total number of articles (right axis)	12,966	17,058	23,392	29,758	41,338	53,948	68,892	91,781	114,079	82,563

Figure 1. Number of APC-funded OA journals indexed in Scopus and the number of articles published in these journals (Surveyed in September 2013)

Table 1. Total number of articles indexed in Scopus and the number of articles published in OA journals

	2010	2011	2012
Total number of articles	1,489,753	1,598,475	1,657,210
Total number of articles authored by researchers in Japan	82,730	84,951	85,507
Percentage of articles authored by researchers in Japan, out of the total number of articles	5.55%	5.31%	5.16%
Number of articles published in OA journals	68,892	91,781	114,079
Percentage of articles published in OA journals, out of the total number of articles	4.62%	5.74%	6.88%
Number of articles published in OA journals by researchers in Japan	3,610	4,638	6,177
Percentage of articles published in OA journals, out of the total number of articles authored by researchers in Japan	4.36%	5.46%	7.22%
Percentage of articles published in OA journals by researchers in Japan, out of the total number of articles published in OA journals	5.24%	5.05%	5.41%

After counting the number of the above-mentioned titles by publisher, we listed the top 15 publishers according to the number of articles published in 2012 (appearing in the upper row) in Table 2. The total number of articles published by the top three publishers—PLOS, BioMed Central and Hindawi—was 60,218 (52.8%), accounting for the majority of articles published in 2012. This indicates that the substantial growth of APC-based OA journals in recent years was mostly due to these newly emerging open-access publishers. Moreover, of the total of 182 open access publishers, the top 15 publishers ranked in the table accounted for 77.4% of the total number of articles. The percentage of articles by researchers in Japan (determined by

dividing the value in the lower row by the value in the upper row) represents the proportion of the articles whose authors included researchers working in Japan to the total number of articles, listed for each publisher in 2012. As compared with the overall average percentage of 5.41%, Nature Publishing Group (13.8%),[4] Oxford University Press (9.5%) and other publishers have higher figures, whereas some publishers' figures are extremely low. Thus, the percentage of articles authored by researchers in Japan displays great variation.

Table 2. APC-funded OA journals indexed in Scopus, by publisher

	Publisher/academic society	Number of titles	2010	2011	2012	Percentage of articles by researchers in Japan(2012)	(2013)	2010-2012 Total	2004-2012 Total
1	Public Library of Science (PLOS)	7	8,814	16,125	26,427		23,797	51,366	66,553
			413	833	1,375	5.2%	1,411	2,621	3,252
2	BioMed Central	212	16,286	18,417	19,574		14,454	54,277	98,942
			685	852	977	5.0%	675	2,514	4,053
3	Hindawi Publishing Corporation	126	3,996	6,004	14,217		6,963	24,217	32,462
			236	360	730	5.1%	277	1,326	1,645
4	MDPI AG	18	3,244	3,553	4,866		3,564	11,663	16,100
			207	222	302	6.2%	220	731	967
5	The International Union of Crystallography	1	4,112	4,450	4,046		1,569	12,608	20,327
			71	45	63	1.6%	58	179	363
6	Optical Society of America (OSA)	3	3,115	3,455	3,685		2,358	10,255	20,661
			219	304	317	8.6%	185	840	1,658
7	Frontiers Media	21	694	1,693	3,427		1,891	5,814	5,814
			33	81	189	5.5%	118	303	303
8	Dove Medical Press	56	1,243	1,219	2,279		1,889	4,741	5,882
			91	106	207	9.1%	170	404	465
9	Oxford University Press	5	1,005	1,590	1,765		1,130	4,360	11,704
			170	197	167	9.5%	111	534	1,426
10	Asian Network for Scientific Information	21	1,827	2,040	1,559		1,408	5,426	15,694
			22	22	18	1.2%	11	62	259
11	Springer	29	1,413	1,085	1,529		1,071	4,027	6,936
			46	38	59	3.9%	67	143	236
12	INSInet Publications	2	935	2,426	1,372		0	4,733	5,459
			7	6	1	0.1%	0	14	19
13	Academy Publisher	4	697	972	1,110		967	2,779	3,893
			22	21	15	1.4%	16	58	130
14	Nature Publishing Group	9	112	482	1,358		1,901	1,952	1,952
			7	66	188	13.8%	215	261	261
15	International Journal of Pharmacy and Pharmaceutical Sciences	1	312	571	1,063		799	1,946	2,023
			0	4	3	0.3%	3	7	7

[4] Frontiers Media came under the umbrella of Nature Publishing Group in 2013. However, in this table these two entities are listed separately, since the nature of their journals is different.

Table 3. APC-funded OA journals indexed in Scopus (by discipline)

	Discipline	Number of titles	2010	2011	2012	Component ratio (2012)	(2013)	2010-2013	2004-2012	Component ratio (2004 –2012)	Percentage of articles by researchers in Japan (2004 –2012)
1	Medicine	381	18,496	23,452	28,786	25.2%	20,895	91,629	116,682	25.7%	
			936	1,263	1,717	27.8%	1,149	5,065	6,007	22.4%	5.1%
2	Biology	260	20,863	26,258	25,916	22.7%	15,884	88,921	139,979	30.9%	
			1,505	1,636	1,681	27.2%	1,070	5,892	11,509	43.0%	8.2%
3	Chemistry	24	7,925	9,766	10,028	8.8%	5,160	32,879	43,894	9.7%	
			222	195	317	5.1%	236	970	1,187	4.4%	2.7%
4	Physics	23	4,613	4,906	5,713	5.0%	3,731	18,963	30,259	6.7%	
			305	390	447	7.2%	267	1,409	2,262	8.4%	7.5%
5	Engineering	43	2,650	3,155	6,161	5.4%	5,055	17,021	16,901	3.7%	
			82	84	184	3.0%	107	457	478	1.8%	2.8%
6	Computer science	20	1,693	2,126	3,189	2.8%	3,252	10,260	9,728	2.1%	
			45	32	57	0.9%	52	186	242	0.9%	2.5%
7	Mathematics	19	1,047	1,290	2,834	2.5%	1,571	6,742	8,979	2.0%	
			24	17	40	0.6%	20	101	164	0.6%	1.8%
8	Earth science	30	1,198	1,461	1,814	1.6%	994	5,467	10,751	2.4%	
			76	109	135	2.2%	64	384	1,105	4.1%	10.3%
9	Agricultural science	15	904	1,521	706	0.6%	446	3,577	4,664	1.0%	
			35	48	42	0.7%	31	156	489	1.8%	10.5%
10	Psychology	3	132	464	639	0.6%	311	1,546	1,235	0.3%	
			3	16	25	0.4%	13	57	44	0.2%	3.6%
11	Social sciences	9	287	285	346	0.3%	214	1,132	1,510	0.3%	
			10	7	11	0.2%	5	33	43	0.2%	2.8%
12	Astronomy	5	195	293	152	0.1%	66	706	1,025	0.2%	
			6	17	7	0.1%	0	30	38	0.1%	3.7%
13	Humanities	3	46	45	66	0.1%	68	225	435	0.1%	
			0	1	13	0.2%	3	17	15	0.1%	3.4%
14	Other	22	8,843	16,759	27,729	24.3%	24,916	78,247	67,170	14.8%	
			361	823	1,501	24.3%	1,605	4,290	3,206	12.0%	4.8%
	Total	857	68,892	91,781	114,079	100.0%	82,563	357,315	453,212	100.0%	
			3,610	4,638	6,177	100.0%	4,622	19,047	26,789	100.0%	5.9%

Table 3 shows the data on APC-funded OA journals indexed in Scopus by discipline, classified according to the subject areas defined by Scopus. In 2012, articles in medicine represented 25.2% of all articles published on APC-funded OA journals, and those in biology, 22.7%. In other words, these two disciplines accounted for nearly half of the total number of articles. The percentage of articles categorized as “Others” stood at 24.3% in 2012, a sharp increase from 14.8%, which was the total from 2004 to 2012. This increase can be attributed to rapid growth in articles published in OA journals, such as by PLOS journals and Scientific Reports, which publish articles regardless of subject discipline. The percentage of articles by researchers in Japan (i.e., the proportion of articles whose authors included researchers working in Japan to the total number of articles) is calculated by dividing the figures in the lower row by those in the upper row for each discipline. Looking at the percentages from 2004 to 2012, we can see relatively high figures shown by agricultural sciences (10.5%) and earth science (10.3%). This is probably due to the influence of journals posted on the “Japan Science and Technology Information Aggregator, Electronic” (J-STAGE) by academic societies in Japan.

2.2.2. Selection of universities

Next, from among articles published in and after 2010 in the 857 titles of OA journals mentioned earlier, we extracted the 19,047 articles whose authors include at least one researcher belonging to a research institution in Japan. After dividing co-authors into individual authors, we compiled data on the universities to which each individual author belonged. Table 4 lists the top 20 universities in order of the frequency of these authors. In the case of co-authored articles, the number of authors was counted multiple times for each author, since the data was compiled on an individual author basis. Multiple counting was also applied to cases where one

researcher was involved in several articles. As a result, in terms of the frequency of these authors, the University of Tokyo ranked first (6,075), followed by Kyoto University (3,705), Osaka University (3,492), Tohoku University (2,794) and Hokkaido University (2,430) in that order. In general, universities that have a faculty of medicine tended to occupy a higher rank.

Table 4. Frequency of authors in Japan by university

	University	Frequency (2010 and later)		University	Frequency (2010 and later)
1	University of Tokyo	6,075	11	Nagasaki University	1,305
2	Kyoto University	3,705	12	Kobe University	1,168
3	Osaka University	3,492	13	Okayama University	1,108
4	Tohoku University	2,794	14	Hiroshima University	1,107
5	Hokkaido University	2,430	15	Tokyo University of Agriculture Technology	995
6	Kyushu University	2,105	16	Kanazawa University	905
7	Keio University	1,970	17	Tokyo Medical and Dental University	899
8	Nagoya University	1,819	18	Gifu University	869
9	University of Tsukuba	1,376	19	Yokohama City University	851
10	Chiba University	1,345	20	Nihon University	839

In selecting the universities to be covered by our questionnaire survey, one criterion was that the frequency of authors in a university should be ranked within the top 50 places or so. However, it was likely that we would not be able to grasp the trend in each discipline if we simply selected universities based on the ranking of the frequency alone. We therefore added several research universities comprising faculties other than medicine, even if their frequency of authors was not within the first 50 places, in order to achieve an overall balance. We sent the announcement of the questionnaire survey (call for participation) to libraries of the universities selected in this manner, and obtained the participation of the 44 universities listed in Table 5.

2.3. Methodology

First, the survey announcement was sent from each university's library by email or other means to prospective respondents, to call on them to access the SPARC webpage for survey and public relations (http://www.nii.ac.jp/sparc/apc/index.html). At this time, we limited the target population to natural science researchers. We excluded researchers, graduates and undergraduates in humanities and social sciences from the target population, because they hardly submit articles to APC-funded OA journals, and so we were concerned that explanations of terminology in these disciplines could take a long time. Nevertheless, survey responses from researchers in disciplines other than natural sciences were included in the data compilation, if we did not find any particular problems.

The webpage for the actual online survey was created and administered at qualtrics.com, with the cooperation of SCREAL. The URL of the webpage for our survey was as follows:

https://APC2013Survey.qualtrics.com/SE/?SID=SV_9XNCql9cF52yyot (Closed after the period of the survey.)

As for the period of the survey, initially we planned 15 days from December 2 (Mon.) to December 16 (Mon.), 2013. However, this was later changed to 25 days from December 2 (Mon.) to December 26 (Thu.), 2013, since we received requests from some universities to extend the period due to procedural delays or other reasons.

2.4. Results of the questionnaire survey

2.4.1. Demographics of the respondents

2.4.1.1. Number of respondents by university

- As seen in Table 5, a total of 2,475 complete responses were received from researchers in 44 universities. Complete responses are those from respondents who filled in the survey by answering all the questions. The data compiled in the table does not include responses from respondents who started to answer the survey and possibly answered several questions, but failed to complete the survey (incomplete responses). We asked about 47,600 people in total to answer the questionnaire survey, and the overall response rate is estimated at 5.2%.
- By university, we received many responses from Kyoto University, Nihon University, the University of Tokyo, Nagoya University, Hokkaido University and Tokyo Institute of Technology. We received a small number of responses from some large-scale universities. This survey data include cases where we had sent the survey announcement (request) only to specific departments of the universities.
- The survey did not make it compulsory for respondents to provide the names of their universities. Therefore, when the name of the respondent's university could not be identified, it was classified as "Unidentified and others" in the table below.

Table 5. Number of survey responses (by university)

University	No. of responses	University	No. of responses	University	No. of responses
Kyoto University	222	University of Tsukuba	58	Tokyo Women's Medical University	22
Nihon University	169	Chiba University	51	Yokohama City University	21
The University of Tokyo	167	Tokyo University of Agriculture and Technology	50	Ehime University	20
Nagoya University	161	Tokyo University of Science	50	University of the Ryukyus	20
Hokkaido University	141	Kagoshima University	46	Niigata University	18
Tokyo Institute of Technology	141	Tottori University	38	University of Electro-Communications	18
University of Tokushima	92	Tokyo Medical and Dental University	35	Iwate University	17
Hiroshima University	86	Kumamoto University	35	Keio University	15
Gifu University	73	Shinshu University	34	Yokohama National University	11
Tohoku University	69	Kinki University	34	Obihiro University of Agricultural Sciences and Veterinary Medicine	11
Okayama University	65	Kurume University	33	Toho University	11
Waseda University	60	Kyushu University	29	Jikei University School of Medicine	9
Yamaguchi University	58	Shizuoka University	27	Osaka University	2
Mie University	58	Hirosaki University	24	Kagawa University	1
Kobe University	58	University of Toyama	22	Unidentified and others	93
				Total	2,475

2.4.1.2. Number of respondents by area

- Based on the answers given to our question asking for the discipline respondents specializes in or belongs to (the question read "What discipline do you specialize in or belong to? [Example: Space engineering, urban environmental engineering, material engineering, ocean engineering, etc.]"), we coded the "area"

and "discipline" of the respondents, referencing the List of Categories, Areas, Disciplines and Research Fields for the Grants-in-Aid for Scientific Research FY2014,[5] and the Appendix Table of Keywords "Categories, Areas, Disciplines and Research Fields" for the Grants-in-Aid for Scientific Research FY2014.[6]

- Table 6 shows the numbers and percentages of respondents by area. Large proportions were engaged in medicine (487 respondents, 19.8%) and biology (277 respondents, 11.3%), both of which held large percentages in the number of articles published in OA journals indexed in Scopus, as mentioned in the previous section.
- Meanwhile, engineering (393 respondents, 16.0%) and agricultural sciences (360 respondents, 14.6%) did not have high percentages in terms of the number of articles published in OA journals indexed in Scopus. However, if combined, these two disciplines accounted for more than 30% of the total in this table. One reason for this was that many journals published in the J-STAGE site fall within these two disciplines.
- In the Grants-in-Aid for Scientific Research, "biological sciences" is defined as an area comprising neuroscience, laboratory animal science, oncology, genome science and conservation of biological resources. "Interdisciplinary science and engineering" is defined an area comprising nano/micro science, applied physics, quantum beam science, and computational science. "Complex systems" is defined as an area comprising brain sciences, health/sports science, biomedical engineering, geography and other disciplines.

Table 6. Number and percentage of respondents by area

Area	No. of respondents	Percentage
Medicine	487	19.8%
Dentistry	42	1.7%
Pharmacy	41	1.7%
Nursing	42	1.7%
Chemistry	225	9.1%
Physics	101	4.1%
Biology	277	11.3%
Earth and planetary science/Astronomy	86	3.5%
Mathematics	99	4.0%
Engineering	393	16.0%

Area	No. of respondents	Percentage
Informatics	100	4.1%
Biological sciences	60	2.4%
Interdisciplinary science and engineering	37	1.5%
Agricultural sciences	360	14.6%
Environmental science	23	0.9%
Complex systems	56	2.3%
Humanities and social sciences	31	1.3%
Total	2,460	100.0%
Unidentified	15	
Grand total	2,475	

[5] Japan Society for the Promotion of Science, List of Categories, Areas, Disciplines and Research Fields for the Grants-in-Aid for Scientific Research FY2014
http://www.jsps.go.jp/j-grantsinaid/03_keikaku/data/h26/I/h26_koubo_06.pdf (accessed: Mar. 21, 2014)

[6] Japan Society for the Promotion of Science, Appendix Table of Keywords "Categories, Areas, Disciplines and Research Fields" for the Grants-in-Aid for Scientific Research FY2014
http://www.jsps.go.jp/j-grantsinaid/03_keikaku/data/h26/I/h26_koubo_08.pdf (accessed: Mar. 21, 2014)

- Table 7 shows the number and percentage of respondents in each discipline in the areas of medicine, chemistry, engineering, and agricultural sciences, all of which contained a large number of respondents.

Table 7. Number of respondents by discipline in the areas of medicine, chemistry, engineering and agricultural sciences

Discipline	No. of respondents	Percentage
Medicine (no discipline specified)	174	35.7%
Basic medicine	112	23.0%
Clinical internal medicine	98	20.1%
Surgical clinical medicine	66	13.6%
Boundary medicine	10	2.1%
Social medicine	27	5.5%
	487	

Discipline	No. of respondents	Percentage
Chemistry (no discipline specified)	42	18.7%
Basic chemistry	114	50.7%
Materials chemistry	20	8.9%
Applied chemistry	49	21.8%
	225	

Discipline	No. of respondents	Percentage
Engineering (no discipline specified)	5	1.3%
Process/Chemical engineering	42	10.7%
Mechanical engineering	79	20.1%
Architecture and building engineering	33	8.4%
Material engineering	80	20.4%
Integrated engineering	19	4.8%
Electrical and electronic engineering	91	23.2%
Civil engineering	44	11.2%
	393	

Discipline	No. of respondents	Percentage
Agricultural sciences (no discipline specified)	50	13.9%
Boundary agriculture	29	8.1%
Agricultural science in society and economy	13	3.6%
Forest and forest products science	27	7.5%
Applied aquatic science	27	7.5%
Plant production and environmental agriculture	39	10.8%
Animal life science	65	18.1%
Agro-engineering	11	3.1%
Agricultural chemistry	99	27.5%
	360	

2.4.1.3. Number of respondents by professional position, etc.

- Table 8 shows the numbers of respondents by professional position, by whether or not they work under a fixed-term contract, and by age group. Generally, there seems to be no deviation to a specific group.

Table 8. Breakdown of respondents by professional position, by whether or not they work under a fixed-term contract, and by age group

Position	No. of respondents	Percentage
Professor	783	31.6%
Associate professor	652	26.3%
Lecturer	216	8.7%
Assistant professor	700	28.3%
Assistant	43	1.7%
Other research positions	65	2.6%
Others[7]	16	0.6%
Total	2,475	100.0%

Types of contract	No. of respondents	Percentage
Fixed-term contract	763	30.8%
Non-fixed term contract	1,712	69.2%
Total	2,475	100.0%

Age	No. of respondents	Percentage
20–29	66	2.7%
30–39	736	29.7%
40–49	841	34.0%
50–59	602	24.3%
60–69	229	9.3%
70 or over	1	0.0%
Total	2,475	100.0%

2.4.2. Individual responses

2.4.2.1. Publishing research results in scholarly journals

Question 1

Approximately how many articles have you published in scholarly journals (peer-reviewed journals, including open access journals) in the past three years?

- The respondents' mean number of articles published in scholarly journals in the past three years was 9.0 (the median was 5.0). Respondents with a higher professional position had a greater number of published articles, with greater mean and median values (See Table 9).
- The number of articles published in scholarly journals differed widely between areas. The numbers of articles in the areas of physics, interdisciplinary science and engineering, engineering, chemistry, medicine and environmental science were higher than the overall mean, whereas those in the areas of nursing, mathematics, and humanities and social sciences were far below the overall mean and median values (See Table 10).

Table 9. Number of published articles by position of respondents

		Total	Professor	Associate professor	Lecturer	Assistant professor	Assistant	Other researchers	Others
Number of articles		2,475	783	652	215	701	43	65	16
Mean		9.00	12.84	8.28	8.11	6.42	5.67	4.03	4.06
Median		5.00	8.00	6.00	5.00	4.00	3.00	3.00	1.00
Mode		0	0	10	5	0	0	1	0
Standard deviation		13.42	19.69	9.04	9.00	8.20	8.59	5.28	7.15
Minimum value		0	0	0	0	0	0	0	0
Maximum value		200	200	110	50	100	50	30	23
Percentile	25	2	3	3	2	2	2	1	0
	50	5	8	6	5	4	3	3	1
	75	11	15	11	10	9	6	5	4

[7] Breakdown of "others": Medical staff member 1, technical staff member 1, professor/course chief 1, research worker 1, specialized supervisory doctor 1, full-time teaching staff member 1, postgraduate 2, doctoral research fellow 1, professor emeritus 2, university director and vice president 1, and no answer 4.

Table 10. Number of published articles by area

		Medicine	Dentistry	Pharmacy	Nursing	Chemistry	Physics	Biology	Earth and planetary science / Astronomy	Mathematics
Number of articles		487	42	41	42	225	101	277	86	99
Mean		9.58	6.36	8.56	4.00	11.14	13.55	6.91	7.30	4.81
Median		5.00	2.50	6.00	2.00	10.00	10.00	5.00	5.00	3.00
Mode		1	1	3	0	0	3	1	5	3
Standard deviation		15.37	9.45	7.73	5.52	11.27	14.77	6.71	6.94	5.30
Minimum value		0	0	0	0	0	0	0	0	0
Maximum value		170	50	30	25	90	100	45	45	40
Percentile	25	2	1	3	0	3	4	2	3	2
	50	5	2.5	6	2	10	10	5	5	3
	75	10	8	12	5.25	15	20	10	10	5

		Engineering	Informatics	Biological sciences	Interdisciplinary science and engineering	Agricultural sciences	Environmental science	Complex systems	Humanities and social sciences
Number of articles		393	100	60	37	360	23	56	31
Mean		11.38	7.49	6.08	11.84	8.59	9.26	6.66	5.68
Median		7.00	4.00	4.00	7.00	6.00	7.00	5.00	3.00
Mode		10	0	1	0[a]	0[a]	0	3	1[a]
standard deviation		18.30	20.27	7.74	13.23	12.08	10.35	6.72	9.03
Minimum value		0	0	0	0	0	0	0	0
Maximum value		200	200	50	70	180	37	30	50
Percentile	25	3	1	1.25	4.5	3	1	2	1
	50	7	4	4	7	6	7	5	3
	75	14	7.75	7.75	14.5	10	14	9.75	6

a. If there were several modes, the minimum value among them is shown in the above table.

Question 2

When you are determining a scholarly journal to submit your article for publication, to what degree do you consider the following factors? For each factor, please select the option that best describes the degree to which you take it into account.

- As the factors for deciding which scholarly journal to submit their articles for publication, 97.2% of respondents considered the "journal's reputation in the discipline" to be "very important" or "important", demonstrating a more conspicuous interest as compared with for other factors. This was followed by the factors "fit between the scope of the journal and that of your (researcher's) articles" (92.0%) and "provision of appropriate peer-review" (91.4%). Only 17.9% respondents considered "open accessibility" to be important, and this figure was the lowest of all the factors (See Figure 2).

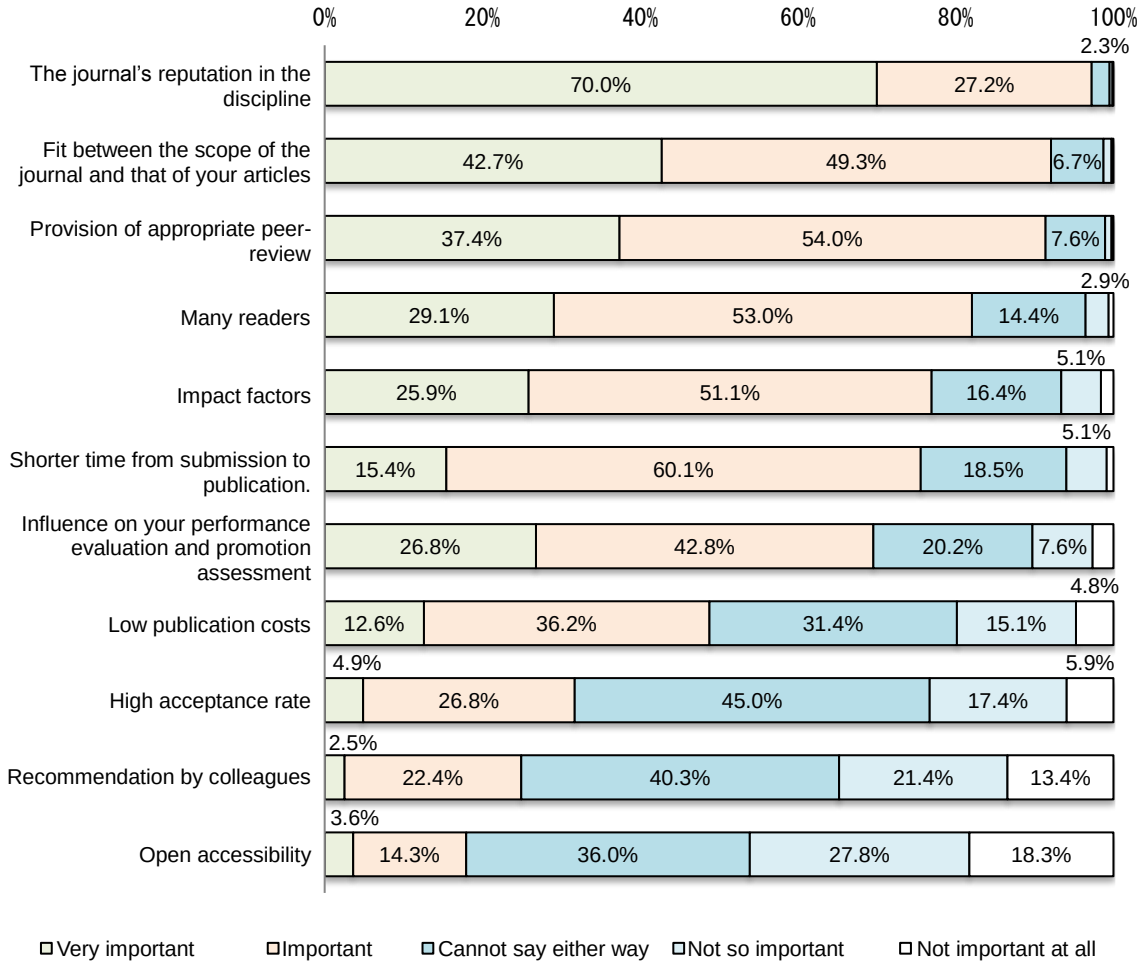


Figure 2. Factors influencing the choice of an OA journal to submit articles for publication

2.4.2.2. Publishing research results in OA journals

Question 3
Of the articles you have published **in the past one year**, approximately how many articles have you published in open access journals?

- In advance of this question, respondents are provided with the following definition of OA journals in this survey.

Publishing research results in open access journals

In this survey, an "open access journal" is defined as a scholarly journal that has the following features:

- The journal is peer-reviewed.
- The articles formally published in the journal are posted online.
- The journal charges an article processing charge (APC) to authors who have submitted their articles that have been accepted for publication in the journal (excluding the offprint cost).
- Readers can read the journal free of charge.

To name a few, *PLOS ONE*, *PLOS Biology*, and *Scientific Reports* can be cited as specific titles of the open access journals defined above. For more extensive examples, please refer to the List of APC-funded OA Journals.[8]

Please note that the open access journals in this survey do not include journals that have a subscription but provide open access only to the articles for which APCs are paid ("hybrid journals", such as *Springer Open Choice* and *Oxford Open*).

- As shown in Table 11, 873 (35.3%) of all the respondents answered that they had published one or more articles in OA journals in the past one year. In other words, more than a third of the researchers had posted their articles in OA journals. This ratio is fairly high, considering the results of the aforementioned question regarding the number of articles published in OA journals using Scopus, and other surveys.[9] This indicates that respondents to this question included a higher percentage of researchers who had experience of publishing their articles in OA journals.
- By area, 56.7% respondents in biological sciences (n=60) answered that they had published one or more article in the past one year. Other areas with high percentages of researchers who had published articles in OA journals were pharmacy (n=41; 48.8%), biology (n=277; 48.0%) and medicine (n=487; 45.4%). By contrast, lower publishing percentages were seen in mathematics (n=99; 12.1%), chemistry (n=225; 16.9%), physics (n=101; 24.8%), and engineering (n=393; 26.5%) (See Table 12).

[8] http://www.screal.jp/APC2013/list.html

[9] Reference: Ayaka Saka "Benchmarking Scientific Research 2010: Bibliometric Analysis on Dynamic Alternation of Research Activity in the World and Japan" presented in the 8th SPARC Japan Seminar held in February 2011 on the topic "The Impact and Position of Japanese Journals / Articles in the World".
https://www.nii.ac.jp/sparc/event/2010/pdf/8/1_1up_ms_saka_20110203.pdf, (accessed: Mar. 21, 2014) (in Japanese).

Table 11. Number of articles published in OA journals in the past one year

Number of articles		2,475
Mode		0
Standard deviation		2.576
Percentile	25	0
	50	0
	75	1

	Number of articles	Percentage	Cumulative percentage
0	1,602	64.7	64.7
1	461	18.6	83.4
2	186	7.5	90.9
3	116	4.7	95.6
4	34	1.4	96.9
5	34	1.4	98.3
6	7	0.3	98.6
7	5	0.2	98.8
8	9	0.4	99.2
10	14	0.6	99.7
13	2	0.1	99.8
15	1	0.0	99.8
17	1	0.0	99.9
20	1	0.0	99.9
25	1	0.0	100.0
100	1	0.0	100.0

Table 12. Number of articles published in OA journals in the past one year (by area)

		Medicine	Dentistry	Pharmacy	Nursing	Chemistry	Physics	Biology	Earth and planetary science/ Astronomy	Mathematics
Number of articles		487	42	41	42	225	101	277	86	99
Mean		1.26	0.62	0.85	0.31	0.30	1.43	0.83	0.67	0.16
Mode		0	0	0	0	0	0	0	0	0
Standard deviation		2.44	1.08	1.15	0.60	0.99	9.96	1.21	1.35	0.47
Percentile	25	0	0	0	0	0	0	0	0	0
	50	0	0	0	0	0	0	0	0	0
	75	2	1	1	0.25	0	0.5	1	1	0
Ratio of respondents who published one or more articles		45.4%	33.3%	48.8%	23.8%	16.9%	24.8%	48.0%	31.4%	12.1%

		Engineering	Informatics	Biological sciences	Interdisciplinary science and engineering	Agricultural sciences	Environmental science	Complex systems	Humanities and social sciences
Number of articles		393	100	60	37	360	23	56	31
Mean		0.61	0.75	1.13	0.84	0.78	0.48	0.95	0.35
Mode		0	0	0	0	0	0	0	0
Standard deviation		1.53	1.22	1.63	1.72	1.41	0.95	2.41	0.75
Percentile	25	0	0	0	0	0	0	0	0
	50	0	0	1	0	0	0	0	0
	75	1	1	2	1	1	1	1	0
Ratio of respondents who published one or more articles		26.5%	38.0%	56.7%	35.1%	39.7%	26.1%	41.1%	22.6%

2.4.2.2.1. For respondents who published no articles in the past one year

Question a4-1 below was only for respondents who had answered that they had published "0 (zero)" articles in OA journals in the past one year.

Question a4-1 Have you ever published your articles in open access journals before?

- Of those who replied "zero" to Question 3 asking how many articles they had published in OA journals in the past one year, only 17.7% respondents answered that they had experience in publishing articles in OA journals in the past, with respondents who had no such experience accounting for the majority (82.3%) (See Table 13).

Table 13. Experience in publishing articles in OA journals before the past one year

	Frequency	Percent
Published	283	17.7%
Not published	1,319	82.3%
Total	1,602	100%

- However, if the number of respondents who answered "one or more" to Question 3—which asked how many articles they had published in OA journals—was included, the number of those who had experience in publishing articles in OA journals in the past accounted for 46.7%, nearly half of the total (See Figure 3).

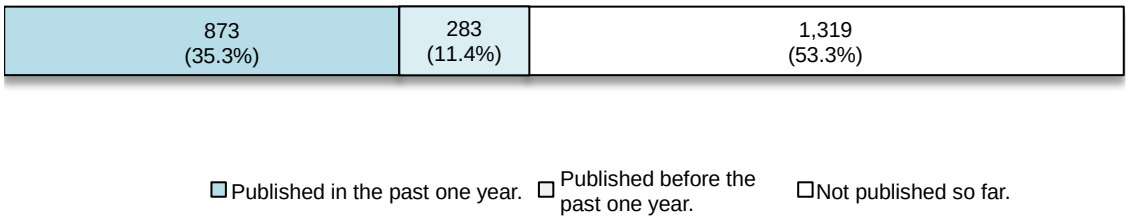


Figure 3. Proportion of article publishing in OA journals

- By area, life sciences constituted a noteworthy proportion. Specifically, the percentage of respondents who had published their articles in OA journals in the past exceeded 50% in biological sciences, pharmacy, biology medicine, agricultural sciences, complex systems, informatics and dentistry. On the other hand, the percentages in mathematics and chemistry were less than 30% (See Figure 4).

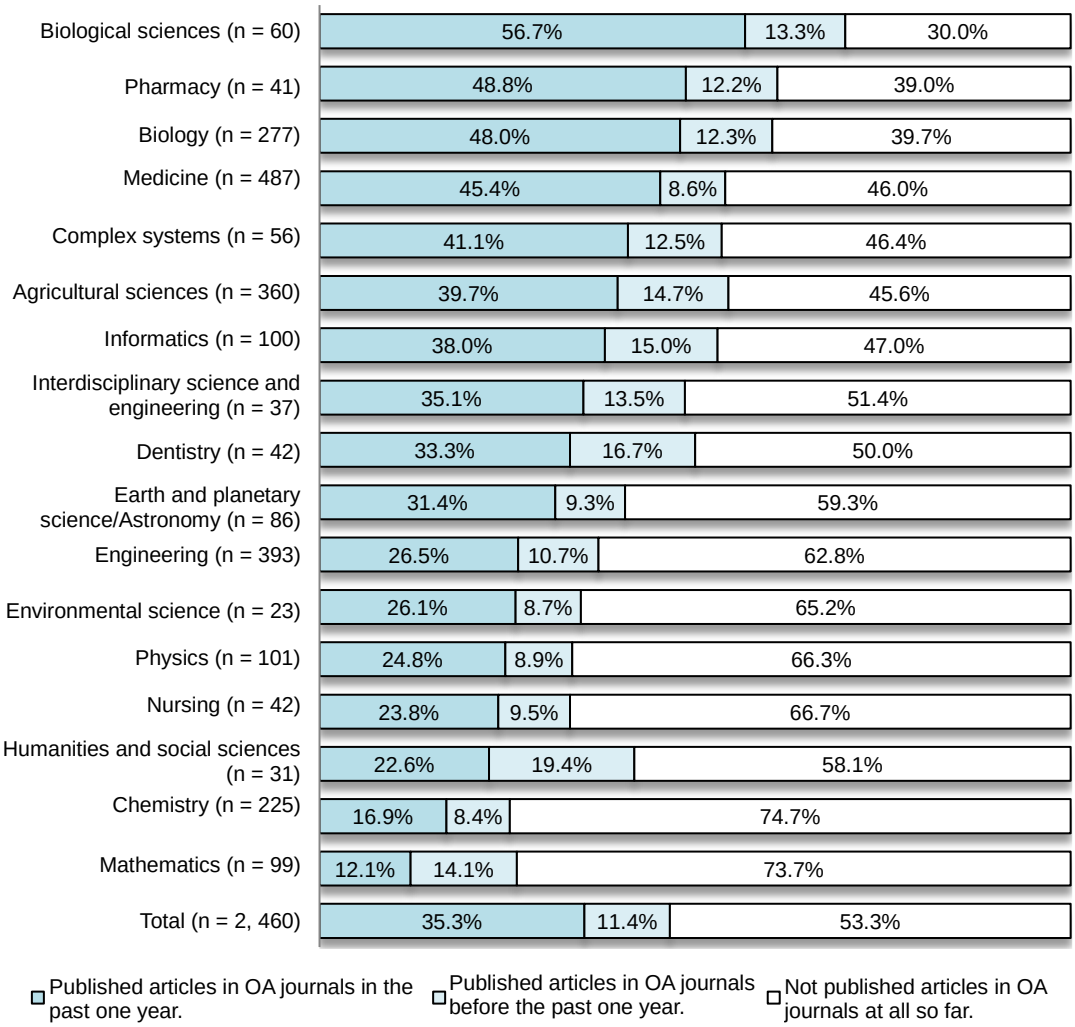


Figure 4. Experience in publishing articles in OA journals (by area)

Questions a4-2 and a4-3 introduced below were only for respondents who answered that they had not published articles at all in OA journals in the past.

Question a4-2 Why have you not published any articles in open access journals? Please select all that apply.

- Of the respondents who answered they had never published articles in the past in OA journals to Question a4-1, the largest percentage (47.8%) cited "expensive publishing fees" as a reason. The second largest percentage (39%) of the respondents cited "low reputation of OA journals in the discipline" as a reason (See Figure 5).
- The above reasons were followed by "impact factors" (28.2%), "concern about whether OA journals provide appropriate peer-review or not" (26.9%), "doubt about open access" (25.3%), and "disparity in the scope of OA journals and that of your (the researchers') articles" (24.2%).

- The lowest percentage (6.3%) of respondents selected a "high rate of article adoption (acceptance)" as a reason.

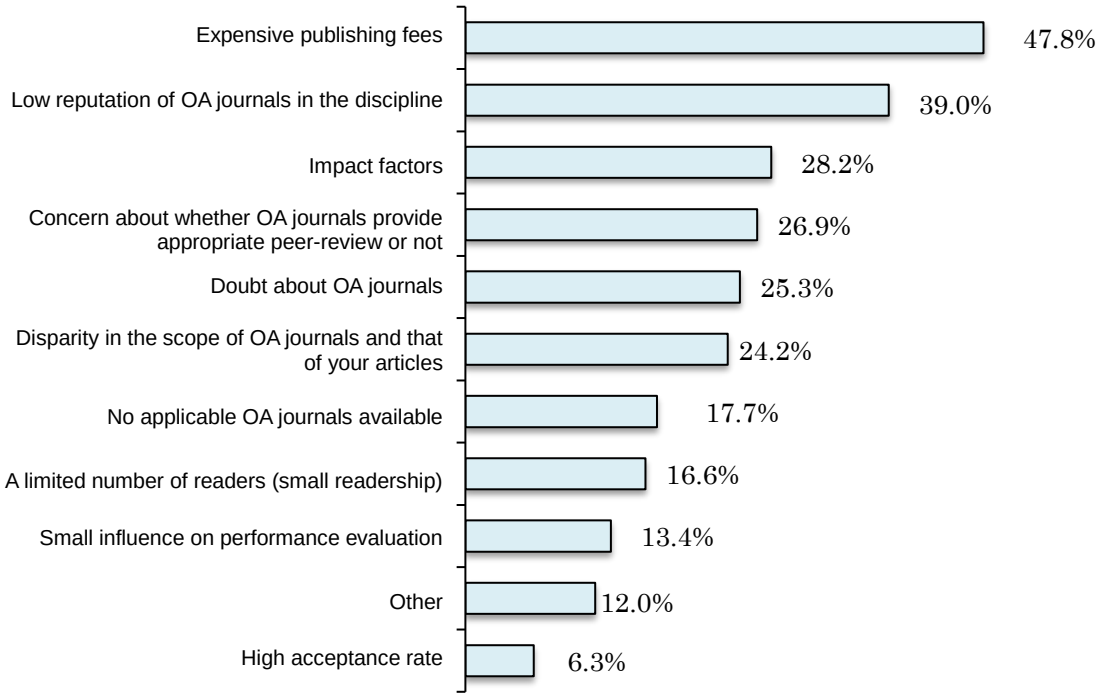


Figure 5. Reasons for not having published articles in OA journals

- Table 14 shows the reasons why respondents had not published their articles in OA journals, for each area. In general, large differences are found between areas.
- A "low reputation of OA journals in the discipline" was cited as a reason by large proportions of respondents pursuing environmental science (66.7%), earth and planetary science/astronomy (58.8%), and chemistry (55.4%). In contrast, smaller numbers of researchers in nursing (17.9%), pharmacy (18.8%), agricultural sciences (20.1%), and humanities and social sciences (22.2%) selected the above statement as their reason.
- A relatively high percentage of respondents in the area of chemistry (37.5%) cited "a limited number of readers (small readership)," whereas no respondents (0%) in the areas of dentistry and humanities and social sciences selected this as a reason.
- A relatively high percentage of respondents in environmental science (66.7%) and chemistry (47.0%) gave "impact factors" as a reason. However, a low percentage was given to this reason in some areas, including humanities and social sciences (5.6%), informatics (10.6%), nursing (10.7%), mathematics (11.0%), and pharmacy (12.5%).
- The reason "expensive publishing fees" was pointed out by considerably high percentages of respondents in environmental science (73.3%), pharmacy (62.5%), and agricultural sciences (59.1%), whereas low percentages were found in nursing (14.3%), humanities and social sciences (16.7%), informatics (29.8%) and earth and planetary science/astronomy (33.3%).

Table 14. Reasons for not having published articles in OA journals (by area)

	Overall	Medicine	Dentistry	Pharmacy	Nursing	Chemistry	Physics	Biology	Earth and planetary science/ Astronomy
Low reputation of OA journals in the discipline	39.0	34.4	42.9	★ 18.8	★ 17.9	☆ 55.4	○ 49.3	33.6	☆ 58.8
Doubt about OA journals	25.3	22.8	33.3	18.8	25.0	32.1	17.9	21.8	17.6
Small influence on performance evaluation	13.4	11.2	14.3	● 0.0	10.7	20.2	11.9	10.0	9.8
Disparity in the scope of OA journals and that of your articles	24.2	25.9	☆ 42.9	31.3	14.3	20.8	25.4	20.0	29.4
Concern about whether OA journals provide appropriate peer-review or not	26.9	21.0	● 14.3	● 12.5	17.9	31.0	22.4	28.2	27.5
A limited number of readers (small readership)	16.6	9.8	★ 0.0	● 6.3	● 3.6	☆ 37.5	○ 29.9	● 4.5	23.5
High acceptance rate	6.3	6.3	4.8	0.0	10.7	6.5	3.0	9.1	5.9
Impact factors	28.2	34.4	23.8	★ 12.5	★ 10.7	☆ 47.0	19.4	26.4	● 17.6
Expensive publishing fees	47.8	50.4	42.9	○ 62.5	★ 14.3	57.7	52.2	54.5	● 33.3
No applicable OA journals available	17.7	10.3	19.0	25.0	21.4	11.3	26.9	● 6.4	○ 29.4
Other	12.0	12.5	0.0	12.5	39.3	7.7	7.5	21.8	7.8
Number of respondents	1,319	224	21	16	28	168	67	110	51

	Mathematics	Engineering	Informatics	Biological sciences	Interdisciplinary science and engineering	Agricultural science	Environmental science	Complex systems	Humanities and social sciences
Low reputation of OA journals in the discipline	34.2	43.3	44.7	● 27.8	47.4	★ 20.1	☆ 66.7	42.3	★ 22.2
Doubt about OA journals	23.3	33.2	17.0	● 11.1	26.3	22.6	☆ 46.7	26.9	★ 0.0
Small influence on performance evaluation	9.6	15.4	12.8	16.7	○ 26.3	9.8	☆ 33.3	23.1	5.6
Disparity in the scope of OA journals and that of your articles	16.4	17.0	29.8	27.8	○ 36.8	32.3	33.3	○ 34.6	16.7
Concern about whether OA journals provide appropriate peer-review or not	20.5	34.4	34.0	22.2	36.8	24.4	☆ 46.7	26.9	● 16.7
A limited number of readers (small readership)	8.2	22.7	14.9	● 5.6	21.1	7.9	○ 26.7	7.7	★ 0.0
High acceptance rate	1.4	8.1	4.3	☆ 22.2	0.0	4.3	13.3	7.7	0.0
Impact factors	★ 11.0	30.4	★ 10.6	33.3	○ 42.1	21.3	☆ 66.7	23.1	★ 5.6
Expensive publishing fees	39.7	39.7	★ 29.8	50.0	52.6	○ 59.1	☆ 73.3	42.3	★ 16.7
No applicable OA journals available	○ 30.1	23.9	○ 31.9	11.1	★ 0.0	14.6	● 6.7	26.9	☆ 38.9
Other	21.9	8.9	12.8	5.6	10.5	11.0	0.0	7.7	16.7
Number of respondents	73	247	47	18	19	164	15	26	18

☆: A value that is higher by 15% or more, than the overall value

★: A value that is lower by 15% or more, than the overall value

○: A value that is higher by 10-14% than the overall value

●: A value that is lower by 10-14% than the overall value

Question a4-3

If the problems cited in the above question are resolved, will you publish your articles in open access journals?

- A great majority of respondents (81.8%) answered that they would publish, if the problems cited in Question a4-2 as the reasons for not having published their articles in OA journals were resolved.

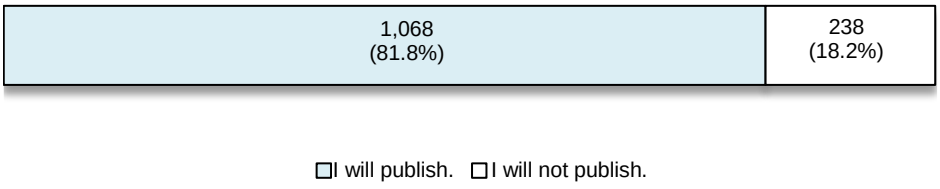


Figure 6. Willingness to publish articles in OA journals if problems are resolved

2.4.2.2.2. For respondents who had published one or more articles in OA journals in the past one year

Questions A4-1, A4-2, A4-3 and A4-4 given below were only for respondents who answered to Question 3 that they had published one or more articles in OA journals in the past one year.

Question A4-1 What was the title of the open access journal your article was published most recently? Please write the title name in full in the following field (e.g.: *PLOS ONE*, *PLOS Biology* or *Scientific Reports*).

- We received a total of 865 responses from respondents who answered "one or more articles" to Question 3 asking how many articles they had published in OA journals in the past one year, and who also gave the specific title of a journal. Of the 865 responses, 246 (28.4%) answered the title *PLOS ONE* by PLOS, indicating a high degree of concentration (see Table 5). On the other hand, 57% of the responses fell within the category "Others," which collectively covers journals whose titles or publishers were answered by less than three respondents, as well as journals whose titles were unclear. This figure for "Others" suggests that despite the many titles of OA journals published, there are many titles with a low possibility of being chosen as journals to which respondents would submit their articles.
- By publisher, PLOS represented 29.2% (253 responses), accounting for the largest proportion. If this figure is combined with those of Nature Publishing Group and its affiliate Frontiers Media, as well as BioMed Central and its owner, Springer, the sum of these three groups is 425, accounting for 49.1% (See Table 16).
- A total of 99 responses (11.4%) named journals issued by MDPI (38 responses), Scientific Research (31 responses), OMICS Publishing Group (eight responses) and other publishers that were on the Beall's List 2014[10] as "predatory publishers". The authors who published articles in these journals were not limited to specific areas or universities but were widely distributed across respondents.
- Question A4-1 was designed to request respondents to give the specific title of an OA journal. However, the actually submitted answers included "a hybrid journal" (94 responses; 10.9%) and "a subscription journal" (15 responses; 1.7%). This indicates that researchers had particular difficulty in understanding the differences between hybrid journals and OA journals (See Table 17).
- As seen in Table 18, increasing numbers of journals of academic societies both in and outside Japan have been published by open-access publishers. This trend is likely to grow in the future.

[10] Beall, Jeffrey. "List of Predatory Publishers." http://scholarlyoa.com/2014/01/02/list-of-predatory-publishers-2014/, (accessed: Mar. 21, 2014); MDPI was included in the list in February 2014.

Table 15. OA journals in which respondents' articles were published

Title of journal	Frequency	Percentage
PLOS ONE	246	28.4%
Scientific Reports	42	4.9%
Optics Express	12	1.4%
Molecules	10	1.2%
Journal of Veterinary Medical Science	9	1.0%
Nature Communications	8	0.9%
New Journal of Physics	7	0.8%
American Journal of Plant Sciences	6	0.7%

Title of journal	Frequency	Percentage
Nucleic Acids Research	6	0.7%
AIP Advances	5	0.6%
Biology Open	5	0.6%
BMC Genomics	4	0.5%
FEBS Open Bio	4	0.5%
Sensors	4	0.5%
SpringerPlus	4	0.5%
Others	493	57.0%
Total	865	100%

Table 16. Publishers of OA journals in which respondents' articles were published

Publisher	Frequency	Percentage
PLOS	253	29.2%
BioMed Central	67	7.7%
J-STAGE	63	7.3%
Nature Publishing Group	57	6.6%
Hindawi	53	6.1%
MDPI	38	4.4%
Springer	34	3.9%
Scientific Research	31	3.6%
Elsevier	25	2.9%
Wiley	21	2.4%
Frontiers Media	14	1.6%
Optical Society of America (OSA)	14	1.6%
IOP	12	1.4%

Publisher	Frequency	Percentage
Oxford	10	1.2%
AIP	8	0.9%
OMICS Publishing Group	8	0.9%
Fuji Technology Press	8	0.9%
Copernicus Publications	6	0.7%
The Company of Biologists	6	0.7%
Dove Medical Press	5	0.6%
Karger	5	0.6%
Academic Journals	4	0.5%
IEEE	4	0.5%
InTech	4	0.5%
Others	115	13.3%
Total	865	100%

Table 17. Types of materials answered as OA journals

Type of material	Frequency	Percentage
OA journals (APC-funded)	732	84.6%
OA journals (non-APC-funded)	8	0.9%
OA books	3	0.3%
OA proceedings	1	0.1%
Hybrid journals	94	10.9%
Subscription journals	15	1.7%
Unidentified	12	1.4%
Total	865	100%

Table 18. Academic societies that publish their journals through publishers and platforms

abe-journal.org	
	Japanese Society for Medical and Biological Engineering
Bernoulli Society	
	Institute of Mathematical Statistics (IMS)
BioMed Central	
	Chinese American Hematologist and Oncologist Network, Japanese Society of Psychosomatic Medicine, and Japan Society of Physiological Anthropology
BioOne	
	Zoological Society of Japan
Copernicus Publications	
	European Geosciences Union
EBSCO	
	Bioinfo Publications
Elsevier	
	American Association for Thoracic Surgery, The Ceramic Society of Japan and the Korean Ceramic Society, and Japanese Geotechnical Society
IOP	
	Deutsche Physikalische Gesellschaft, Japan Society of Applied Physics
J-STAGE	
	Asian Agricultural and Biological Engineering Association, Genetics Society of Japan, Japan Epidemiological Association, Japan Society of Mechanical Engineers, Japan Society of Plasma Science and Nuclear Fusion Research, Japanese Circulation Society, Japanese Endocrine Society, Japanese Society of Microbial Ecology, The Japanese Society of Soil Microbiology, Japanese Society of Veterinary Science, The Ceramic Society of Japan, Biomedical Research Press, Institute of Image Information and Television Engineers, Kaifukuki Rehabilitation Ward Association, Research Institute of Signal Processing Japan, Institute of Electrical Engineers of Japan, Institute of Electronics, Information and Communication Engineers, Japan Society of Civil Engineers, Tohoku University Medical Press, Japan Society for Laser Surgery and Medicine, Japan Poultry Science Association, Japan Society of Mechanical Engineers, Heat Transfer Society of Japan, Transactions of the JSME, Meteorological Society of Japan, Architectural Institute of Japan, Japanese Society of Oral and Maxillofacial Surgeons, Japan Association of Mineralogical Sciences, Japanese Society for Dental Materials and Devices, Japanese Association for Laboratory Animal Science, Japan Ergonomics Society, Japanese Society for Artificial Intelligence, Biophysical Society of Japan, Iron and Steel Institute of Japan, Japanese Society of Toxicologic Pathology, Japan Society for Bioscience, Biotechnology, and Agrochemistry, Society for Reproduction and Development, and Japanese Society of Radiation Safety Management
Springer	
	International Pediatric Nephrology Association, International Society of Artificial Life and Robotics, and Japanese Society of Gastroenterology
Taylor & Francis	
	Atomic Energy Society of Japan
Wiley	
	Japanese Society of Animal Science, Department of Health Science of Yamaguchi University Graduate School of Medicine, Japan Academy of Nursing Science, Geological Society of Japan, and Japanese Society of Pathology

Question A4-2

In the past one year, approximately how much money in total (in Japanese yen) did you pay by yourself to submit/publish articles to/in open access journals? Please tell us the amount (excluding amounts paid by your co-authors), converting the figures at 100 yen to one dollar.

- In advance of this question, respondents were provided with the following explanation about article processing charges in this survey.

Article processing charge

Some open access journals may charge a fee for publishing accepted articles in these journals.

- This fee is generally called an "article processing charge" (APC).
- An author may be required to pay an amount from a few hundred dollars to 50 million dollars or so.
- However, the above fee does not include the costs for offprints.

The following questions relate to the article processing charges (APCs) explained above.

- The total amount of APCs that respondents paid for their articles published in OA journals in the past one year ranged from 8,000 yen (one respondent) to 1,000,000 yen (two respondents) (See Table 19). The mean value was approximately 165,000 yen per year. The largest number of respondents replied that the total amount was 100,000 yen, accounting for 11.7% (61 respondents) of all respondents.

Table 19. Amount of APC paid by respondents (Unit: yen)

Frequency	Valid	522
Mean		166,433
Median		135,000
Mode		100,000
Standard deviation		141,227.46
Percentile	25	80,000
	50	135,000
	75	200,000

* The number of respondents who answered "3,000 yen or lower" were excluded, since they were highly likely to have confused APC and other expenses (such as offprint costs).

Question A4-3
Which funding sources did you use for your APCs? Please select all that apply. (Choose as many answers as apply.)

- As for the sources of funding respondents have available for paying APC of articles published in OA journals in the past one year, the largest number (40.3%) of them answered "governmental research grants, such as Grant-in-Aid for Scientific Research". This option accounted for a significant proportion, alongside "personal research funds" (31.5%) (See Figure 7).
- In the survey report by the Committee on Internationally Scholarly Communication, the Japan Association of National University Libraries and the National Institute of Informatics,[11] to the question "Where do you think OA publication fees should come from?" the largest proportion of respondents (65%) answered that they thought publication fees should be paid from their research grant, with 41% who would use departmental budgets and 36% who would use library or other institutional budgets (as of the end of December 2005). In this present survey, however, the percentages of respondents who used "competitive funds within the university" and a "financial assistance for APCs provided by the department or university" were only 7.2% and 6.9%, respectively.

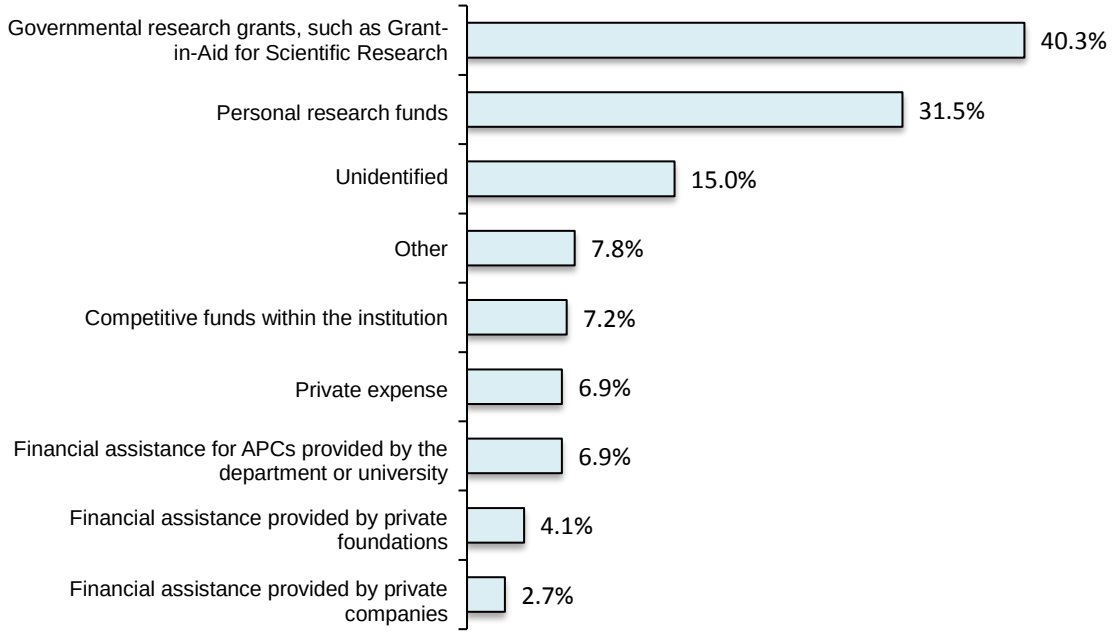


Figure 7. Funding source for article processing charges

- By area, a great dependence on "governmental research grants, such as Grant-in-Aid for Scientific Research" was found in interdisciplinary science and engineering (69.2%) and earth and planetary

[11] Committee on Internationally Scholarly Communication, Japan Association of National University Libraries and National Institute of Informatics. "Survey Report on Research Activities and Open Access (OA)," National Institute of Informatics, 2006, p. 43. http://www.janul.jp/j/projects/isc/sparc/oa_chosa.pdf, (accessed: Mar. 21, 2014) (in Japanese).

science/astronomy (63.0%), whereas a high degree of use of "personal research funds" was indicated in engineering (50%). (See Table 20.)

Table 20. Funding sources for article processing charges (by area)

	Medicine	Dentistry	Pharmacy	Nursing	Chemistry	Physics	Biology	Earth and planetary science/ Astronomy	Mathematics
Personal research funds	23.5%	35.7%	40.0%	10.0%	31.6%	24.0%	27.1%	40.7%	33.3%
Competitive funds within the university	5.9%	7.1%	0.0%	0.0%	2.6%	12.0%	8.3%	3.7%	8.3%
Financial assistance for APCs provided by the department or university	13.6%	0.0%	20.0%	0.0%	7.9%	4.0%	3.0%	3.7%	0.0%
Governmental research grants, such as Grant-in-Aid for Scientific Research	36.7%	35.7%	45.0%	60.0%	28.9%	52.0%	39.8%	63.0%	16.7%
Financial assistance provided by private foundations	6.3%	7.1%	5.0%	0.0%	2.6%	4.0%	5.3%	0.0%	0.0%
Financial assistance provided by private companies	2.3%	0.0%	0.0%	0.0%	7.9%	0.0%	2.3%	0.0%	0.0%
Private expenses	13.1%	14.3%	5.0%	30.0%	7.9%	4.0%	3.8%	0.0%	0.0%
Unidentified	15.8%	0.0%	0.0%	10.0%	10.5%	8.0%	23.3%	11.1%	16.7%
Others	9.5%	14.3%	5.0%	10.0%	10.5%	12.0%	4.5%	3.7%	33.3%
No. of respondents	221	14	20	10	38	25	133	27	12

	Engineering	Informatics	Biological sciences	Interdisciplinary science and engineering	Agricultural sciences	Environmental science	Complex systems	Humanities and social sciences
Personal research funds	50.0%	36.8%	17.6%	23.1%	35.7%	33.3%	26.1%	28.6%
Competitive funds within the university	10.6%	7.9%	8.8%	0.0%	3.5%	0.0%	13.0%	14.3%
Financial assistance for APCs provided by the department or university	8.7%	2.6%	0.0%	0.0%	3.5%	16.7%	13.0%	0.0%
Governmental research grants, such as Grant-in-Aid for Scientific Research	38.5%	44.7%	58.8%	69.2%	37.8%	33.3%	43.5%	28.6%
Financial assistance provided by private foundations	5.8%	2.6%	2.9%	0.0%	1.4%	0.0%	4.3%	0.0%
Financial assistance provided by private companies	3.8%	0.0%	5.9%	7.7%	4.2%	0.0%	0.0%	0.0%
Private expenses	2.9%	0.0%	2.9%	0.0%	4.9%	16.7%	8.7%	28.6%
Unidentified	10.6%	7.9%	11.8%	0.0%	21.7%	0.0%	8.7%	28.6%
Others	5.8%	15.8%	8.8%	15.4%	4.2%	0.0%	8.7%	0.0%
No. of respondents	104	38	34	13	143	6	23	7

Question A4-4
When you are determining an open access journal to submit your article, to what degree do you consider the following factors? For each factor, please select the option that best describes the degree to which you take it into account.

- As for the factors for determining which OA journal they would submit their articles, 92.9% of respondents considered the "journal's reputation in the discipline" to be important (those who answered "very important" or "important"). This was followed by such factors as "fit between the scope of the journal and that of your (researcher's) articles" (89.2%); "provision of appropriate peer-review" (88.1%); and "shorter time from submission to publication" (83.1%). The responses to this question followed almost the same trend as those to Question 2, which asked all the respondents about the factors determining which journal they would submit their articles (See Figure 8).
- Meanwhile, the percentage of researchers who thought "open accessibility" to be important (answering "very important" or "important") was 43.1%, which was higher than the 17.9% figure for Question 2. Nevertheless, "open accessibility" was ranked 10th among all 11 factors. This result showed that respondents' interest in "open accessibility" was not so high even among those who had published their articles in OA journals.
- Previous surveys conducted outside Japan generally showed a trend where importance was attached to "open accessibility." For example, Solomon and Björk conducted a survey[12] of authors of articles published in OA journals. The results revealed that more than 90% of respondents considered fit between the scope of the journal and that of their articles (fit with the scope)" to be important, just as was the case with this present survey. However, in the survey by Solomon and Björk, concerning open accessibility, 60% or more respondents thought the factor was important, and about 20% thought OA had "some influence." As another example, we can cite the survey of SOAP (Study of Open Access Publishing), conducted in 2010 regarding open access publishing. The SOAP survey collected 53,890 responses from 162 countries.[13] In its results, Japan was among the countries categorized in the "OA-skeptical cluster".[14] It can be said that the results of this present survey suggest that such a trend has continued.

[12] Solomon, David J., Björk, Bo-Christer. "Publication fees in open access publishing: sources of funding and factors influencing choice of journal." *Journal of the American Society for Information Science and Technology*. 2012, vol. 63, no. 1, p. 98–107.
[13] This data include 748 responses from Japan.
[14] Lambert, Simon. The SOAP Symposium—II, What Scientists Think about Open Access Publishing. 2011.1 http://indico.cern.ch/event/102080/session/26/material/0/0.pdf, (accessed: Mar. 21, 2014)

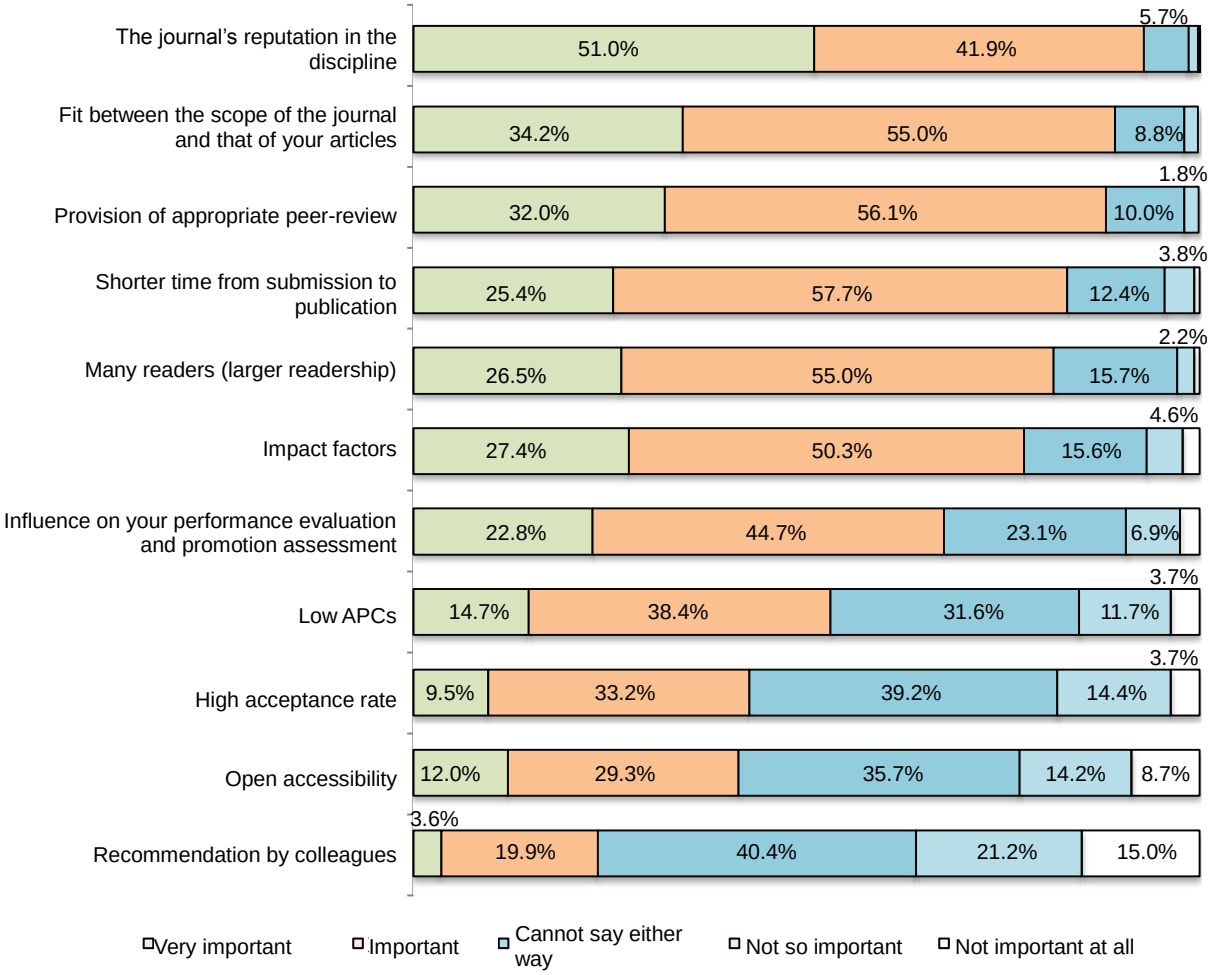


Figure 8. Factors influencing the choice of OA journal to submit articles for publication

- Table 21 lists the factors by academic area in descending order of the mean value for each factor's level of importance. The mean values were determined based on respondents' answers by converting them into numbers as follows: Very important: 5; Important: 4; Cannot say either way: 3; Not so important: 2; and Not important at all: 1. As a whole, the factor "the journal's reputation in the discipline" was ranked high, except in the cases of areas whose number of samples was limited. This also held true for the factors "fit between the scope of the journal and that of your (researcher's) articles" and "provision of appropriate peer-review." On the other hand, "open accessibility" was ranked low for most disciplines, although this factor gained a slightly higher rank in mathematics and environmental science. Accordingly, open accessibility was thought to be less important by respondents, regardless of the areas.

Table 21. Factors influencing the choice of OA journal to submit your articles (by area)

Rank	Medicine (n=221)	Dentistry (n=14)	Pharmacy (n=20)	Nursing (n=10)	Chemistry (n=38)
1	The journal's reputation in the discipline	Provision of appropriate peer-review	The journal's reputation in the discipline	Shorter time from submission to publication.	Fit between the scope of the journal and that of your articles
2	Provision of appropriate peer-review	The journal's reputation in the discipline	Impact factors	Provision of appropriate peer-review	The journal's reputation in the discipline
3	Fit between the scope of the journal and that of your articles	Fit between the scope of the journal and that of your articles	Shorter time from submission to publication.	Fit between the scope of the journal and that of your articles	Many readers
4	Impact factors	Shorter time from submission to publication.	Provision of appropriate peer-review	The journal's reputation in the discipline	Provision of appropriate peer-review
5	Shorter time from submission to publication.	Many readers	Many readers	Low publication costs	Shorter time from submission to publication.
6	Many readers	Impact factors	Fit between the scope of the journal and that of your articles	Many readers	Impact factors
7	Influence on your performance evaluation and promotion assessment	Influence on your performance evaluation and promotion assessment	Low publication costs	High acceptance rate	Low publication costs
8	Low publication costs	High acceptance rate	Influence on your performance evaluation and promotion assessment	Impact factors	Influence on your performance evaluation and promotion assessment
9	High acceptance rate	Low publication costs	High acceptance rate	Influence on your performance evaluation and promotion assessment	High acceptance rate
10	Open accessibility	Open accessibility	Recommendation by colleagues	Open accessibility	Open accessibility
11	Recommendation by colleagues	Recommendation by colleagues	Open accessibility	Recommendation by colleagues	Recommendation by colleagues

Rank	Physics (n=25)	Biology (n=133)	Earth and planetary science/Astronomy (n=27)	Mathematics (n=12)	Engineering (n=104)
1	The journal's reputation in the discipline	The journal's reputation in the discipline	The journal's reputation in the discipline	The journal's reputation in the discipline	The journal's reputation in the discipline
2	Provision of appropriate peer-review	Fit between the scope of the journal and that of your articles	Fit between the scope of the journal and that of your articles	Fit between the scope of the journal and that of your articles	Fit between the scope of the journal and that of your articles
3	Fit between the scope of the journal and that of your articles	Provision of appropriate peer-review	Provision of appropriate peer-review	Provision of appropriate peer-review	Provision of appropriate peer-review
4	Many readers	Many readers	Many readers	Shorter time from submission to publication.	Many readers
5	Shorter time from submission to publication.	Impact factors	Shorter time from submission to publication.	Open accessibility	Shorter time from submission to publication.
6	Impact factors	Shorter time from submission to publication.	Impact factors	Many readers	Impact factors
7	Influence on your performance evaluation and promotion assessment	Influence on your performance evaluation and promotion assessment	Influence on your performance evaluation and promotion assessment	Influence on your performance evaluation and promotion assessment	Influence on your performance evaluation and promotion assessment
8	Low publication costs	Low publication costs	Low publication costs	Low publication costs	Low publication costs
9	Open accessibility	Open accessibility	Open accessibility	High acceptance rate	High acceptance rate
10	High acceptance rate	High acceptance rate	High acceptance rate	Impact factors	Open accessibility
11	Recommendation by colleagues	Recommendation by colleagues	Recommendation by colleagues	Recommendation by colleagues	Recommendation by colleagues

Rank	Informatics (n=38)	Biological sciences (n=34)	Interdisciplinary science and engineering (n=13)	Agricultural sciences (n=143)	Environmental science (n=6)
1	The journal's reputation in the discipline	The journal's reputation in the discipline	The journal's reputation in the discipline	The journal's reputation in the discipline	Fit between the scope of the journal and that of your articles
2	Fit between the scope of the journal and that of your articles	Provision of appropriate peer-review	Fit between the scope of the journal and that of your articles	Provision of appropriate peer-review	Shorter time from submission to publication.
3	Provision of appropriate peer-review	Fit between the scope of the journal and that of your articles	Many readers	Fit between the scope of the journal and that of your articles	Provision of appropriate peer-review
4	Many readers	Many readers	Influence on your performance evaluation and promotion assessment	Shorter time from submission to publication.	The journal's reputation in the discipline
5	Influence on your performance evaluation and promotion assessment	Impact factors	Provision of appropriate peer-review	Many readers	Many readers
6	Shorter time from submission to publication.	Shorter time from submission to publication.	Shorter time from submission to publication.	Impact factors	Open accessibility
7	Impact factors	Influence on your performance evaluation and promotion assessment	Impact factors	Influence on your performance evaluation and promotion assessment	Impact factors
8	Open accessibility	Low publication costs	Low publication costs	Low publication costs	High acceptance rate
9	High acceptance rate	High acceptance rate	Open accessibility	High acceptance rate	Influence on your performance evaluation and promotion assessment
10	Low publication costs	Open accessibility	High acceptance rate	Open accessibility	Low publication costs
11	Recommendation by colleagues	Recommendation by colleagues	Recommendation by colleagues	Recommendation by colleagues	Recommendation by colleagues

	Complex systems (n=23)	Humanities and social sciences (n=7)
1	The journal's reputation in the discipline	The journal's reputation in the discipline
2	Shorter time from submission to publication.	Fit between the scope of the journal and that of your articles
3	Fit between the scope of the journal and that of your articles	Provision of appropriate peer-review
4	Provision of appropriate peer-review	Shorter time from submission to publication.
5	Many readers	Influence on your performance evaluation and promotion assessment
6	Influence on your performance evaluation and promotion assessment	Impact factors
7	Impact factors	Many readers
8	High acceptance rate	High acceptance rate
9	Low publication costs	Open accessibility
10	Open accessibility	Recommendation by colleagues
11	Recommendation by colleagues	Low publication costs

2.4.2.3. Open-ended question

Question 5 Please feel free to write your opinion concerning open access journals and publication of research results in general.

- To the above question asking respondents to write their opinions freely, we received a total of 1,040 responses, which accounted for 42.0% of all valid responses (2,475) (excluding comments such as "Nothing in particular" or the like). The breakdown of responses by area is given Table 22. The distribution of respondents in each area was almost the same as that of the overall respondents, though some variations were observed.

Table 22. Number of open-ended answers from respondents by area

Area	Number of response	Percentage of responses
Medicine	202	41.5%
Dentistry	10	23.8%
Pharmacy	18	43.9%
Nursing	11	26.2%
Chemistry	98	43.6%
Physics	43	42.6%
Biology	140	50.5%
Earth and planetary science/Astronomy	35	40.7%
Mathematics	39	39.4%
Engineering	142	36.1%
Informatics	38	38.0%
Biological sciences	29	48.3%
Interdisciplinary science and engineering	16	43.2%
Agricultural sciences	167	46.4%
Environmental science	10	43.5%
Complex systems	29	51.8%
Humanities and social sciences	10	32.3%
Unidentified	3	20.0%
Total	1,040	100%

<Overall trend of free opinions>

To grasp the overall trend of the opinions freely described by respondents, we used KH Coder[15] to draw a co-occurrence network (structure of relationships among words that concurrently occurred in comments) (See Figure 9). Based on the results, we can make some interpretations, the chief among which are stated below. These interpretations are presented based on Figure 9, along with typical opinions extracted from respondents.

(1) Advantages of OA journals

[15] KH Coder. http://khc.sourceforge.net/

a. Freely available for reading

Both authors and readers highly regarded OA journals' advantage of making submitted articles available for reading free of charge. Specifically, many respondents pointed out that authors could increase the readership of their articles, and the readers could obtain information by reading the articles without a financial barrier.

- If an article is made freely accessible to everyone, the number of readers can be increased due to the enhanced convenience. So this advantage should be promoted. As a reader, I like OA journals since I can read the articles I need to read from anywhere.
- To obtain scientific findings, only subscribers can read journal articles—in other words, we cannot read these articles if we do not belong to a large organization such as a university
  . This present situation will not be suitable in the future. In this respect, I think that open access journals that can be read by everyone are epoch-making.

b. Faster process from submission to publication

Both as authors and readers, respondents highly evaluated the faster processes of article submission, peer-review, and publication. Specifically, some respondents pointed out the speed of OA journals in refereeing submitted articles and in deciding whether or not the articles should be published. The free availability of reading the latest research results was cited as an advantage of OA journals.

- In highly competitive disciplines, speed in publishing articles is very important. I consider OA helpful as it offers a faster process from submission to publication of our work.
- Open access journals take a shorter time to peer-review submitted articles and determine if they should be published or not. For this advantage, I will continue submitting my articles in open access journals.
- I think that it is advantageous that I can obtain new information sooner and I can read articles earlier.

(2) Concerns about OA journals

a. Quality, evaluation and continuity as scholarly journals

While open access journals are recognized as having some advantages, there is also a perception that OA journals have not yet established their reputation as scholarly journals (for example, impact factors) in each discipline. The presence of OA journals published by "predatory publishers" has been a matter of concern. Many respondents pointed out that researchers were concerned about a surge in the number of OA journals, the quality of the published articles and refereeing. Also, respondents expressed anxiety about the continuity of publication and preservation of OA journals, probably due to the above-mentioned concerns about their quality and evaluation.

- In recent years, rather too many OA journals have been published. As of now, many of them have no impact factors (IFs) which are important for performance evaluation. Therefore, I have not submitted my articles to OA journals other than a few reliable ones (including *PLOS ONE*) that have already established a reputation.

- There are many other OA journals that are rated very low and considered suspect in addition to those cited as examples here. It is also doubtful whether they manage articles with publishing ethics. Publishing articles in such journals seems akin to "buying research achievements with money". It would make absolutely no sense if researchers could conduct sloppy experiments using research grants provided by the national government and have their articles published in OA journals by paying money to save the situation.
- At present, I am not entirely sure that articles published in OA journals will be able to remain in a form worthy of receiving fair evaluation, say 100 and 200 years from now. This is the greatest reason why I hesitate to submit my articles to OA journals.

b. APC pricing and solvency

Many respondents answered that the expensive prices of article processing costs (APCs) posed a great burden to them. They therefore noted that APCs constitute a barrier that makes it difficult for them to submit articles to OA journals or to frequently use such articles. For this reason, many respondents suggested that the government or universities should provide researchers with support in paying APCs.

- OA journals may be useful, considering their wider readership as well as the fact that some of them have a high impact factor, even if only a few years have passed since their first publication. However, publication fees are rather high, which I think is a major barrier that makes researchers hesitate to submit their articles to OA journals.
- I believe that OA journals should be encouraged so that research results can be read by as many people as possible, and that even researchers without enough money can obtain necessary information. However, the current APC pricing of OA journals are too expensive, so I hope these fees will be lowered. If not, it may result in a situation where researchers without enough money simply cannot publish their articles.
- Open access fees are too expensive. The burden is so heavy that it is difficult for researchers to pay the fees from the Grant-in-Aid for Scientific Research and other grants offered for personal projects. I therefore hope universities or the government will offer financial assistance or subsidies to help us fund open access fees.

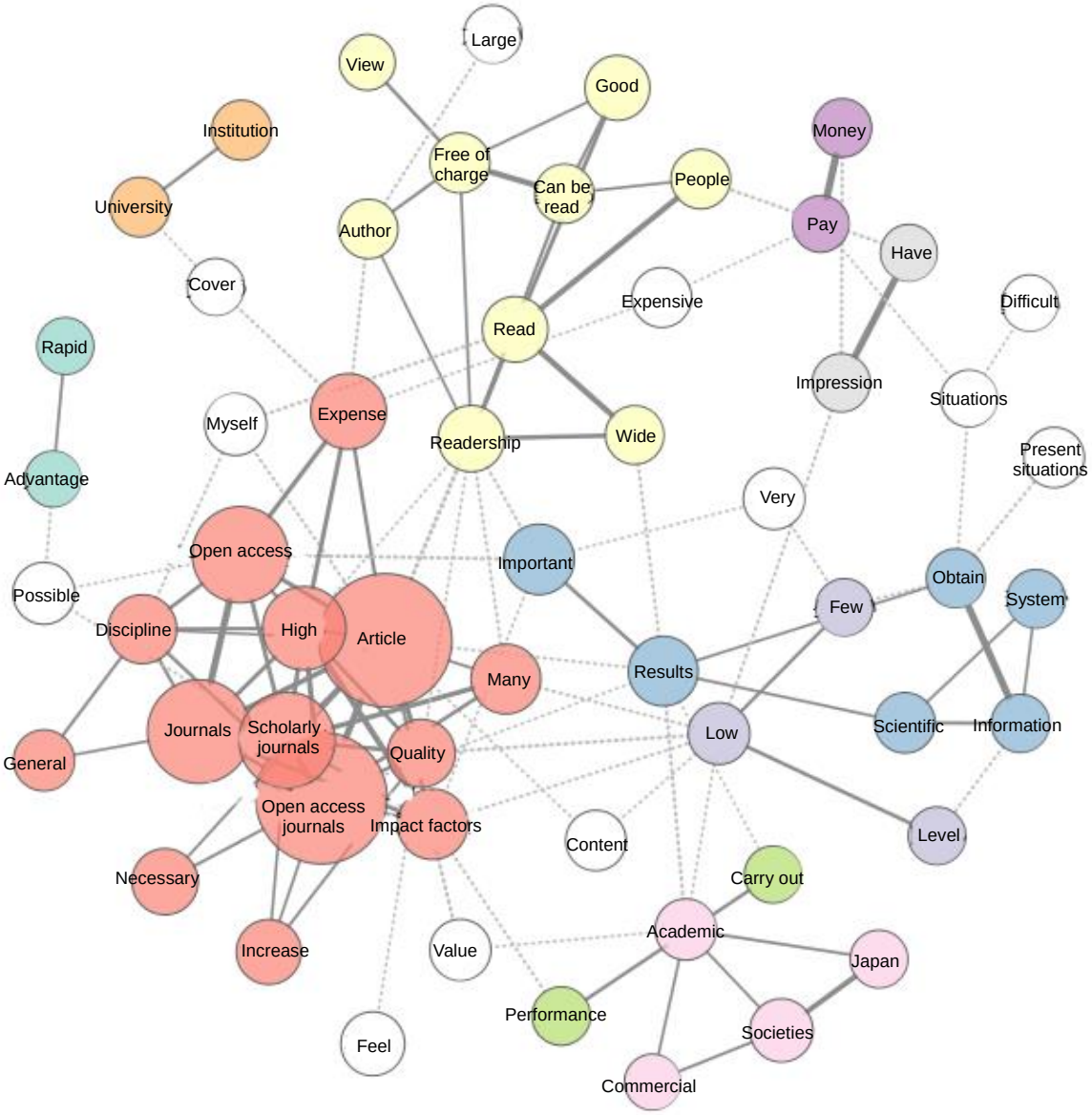


Figure 9. Co-occurrence network of words included in open-ended opinions described by respondents

2.5. Summary

- The number of articles published in APC-funded OA journals, including mega-journals such as *PLOS ONE*, has increased rapidly in recent years. The number of such articles authored by researchers in Japan have also been on the rise.
- Of the journals indicated as "APC-funded OA journals" in DOAJ, the number of articles that are authored by researchers in Japan and that are covered by Scopus stood at 6,177 in 2012. If this number is multiplied by 135,000 yen—the APC for *PLOS ONE*, the journal most often selected by researchers for submitting their articles—the amount exceeds 800 million yen. Article publication in APC-funded OA journals is expected to be more common in the future. Given this possibility, it will become all the more necessary to comprehend overall article publishing expenses, including not only conventional subscription fees but also APCs.
- A large difference was found between subject areas in the number of articles published in OA journals. In biological sciences (n=60), 56.7% of respondents answered that they had published more than one article in OA journals in the past one year. In other areas, pharmacy (n=41; 48.8%), biology (n=277; 48.0%) and medicine (n=487; 45.4%) showed high percentages of publication of open access articles. Conversely, low percentages were found in mathematics (n=99; 12.1%), chemistry (n=225; 16.9%), physics (n=101; 24.8%) and engineering (n=393; 26.5%).
- Respondents who attached importance to "open accessibility" in selecting an OA journal to submit their articles amounted to only 17.9%, which was a very low figure. Likewise, "open accessibility" was not regarded highly even among respondents who had experience in publishing articles in OA journals. In Japan, it seems that an increase in the number of articles published in OA journals has been driven by the emergence of OA journals that satisfy the conventional factors influencing the choice of a journal, such as "the journal's reputation in the discipline", "fit between the scope of the journal and that of your (researcher's) articles" and "provision of appropriate peer-review."
- Meanwhile, of all the journals selected by respondents to publish their articles, 11.4% accounted for titles issued by so-called "predatory publishers". In addition, the respondents in these cases were not concentrated in specific disciplines or universities. Open access publishers widely differ in the quality of their journals. In many cases, conventional quality indicators such as impact factors cannot be used. It would therefore be necessary to promote activities to more widely provide information on overall open access publishing, including hybrid journals.
- As a reason for never having published their articles in OA journals, nearly half (47.8%) of respondents cited "expensive publishing fees". In their open-ended opinions, many respondents expressed their need for subsidies from the national government or financial assistance by universities. University libraries and other parties concerned should start to consider establishing a model in which institutions cover the APCs of their researchers and appropriate APC pricing.
- This survey is the first of its kind and scale to investigate the actual situations regarding APC-funded OA journals in Japan. However, these situations are changing very quickly. Starting with this survey, we should continue to observe the trend in the future.

3. Interviews

3.1. Purpose and overview of the interviews

Interviews were conducted to grasp more detailed situations regarding APC payments in universities, institutions of higher education and research institutions in Japan. We held interviews with the respective institutions' research support organizations (libraries or departments in charge). The interviews were designed to clarify the policy on dissemination of research result by not only libraries but also entire institutions, and the way open access was perceived in that policy. Further, through these interviews we intended to identify several patterns as to the environment that the library provides for publishing the research results of the researchers, including those within the institution.

3.2. Target population

We interviewed 24 institutions, which responded to our announcement of (call for participation) the questionnaire survey that they could take part in interviews, as well as eight institutions that we had selected from among institutions whose libraries were considered to be involved in the payment of APCs, although we had not made the announcement to these institutions. In selecting the institutions to interview, we took into account the differences in operating organizations between private and national/public universities and the difference in scales between these institutions. Consequently, we selected five national institutions (two large-scale universities, one medium-scale university, one medical college, and one science and technological college), two private institutions (one science and technological college and one medical college), and one public institution (one science and technological college).

3.3. Methodology

In advance of the interviews, we sent an interview sheet as shown in Table 23, based on which we held interviews. For two institutions, the survey was made through the interview sheet alone. We held interviews from December 2013 to January 2014.

The questions in the interview sheet were designed to investigate both the general situations and the awareness of the respondents. We held interviews with the following two points in mind.

1) In terms of sources of APC funding, what is the most frequently used at your institution, from among research funds, the university's financial assistance, external competitive funds, and private expenses (paid temporarily on behalf of the institution)? What other sources are available?
2) Regarding awareness of OA, what is the institution's policy for disseminating research results, and how OA is perceived in that policy? In particular, which does the university prioritize—a subscription-based publishing model or an APC-based publishing model? Does the university have such a policy or intention?

Table 23. Interview sheet

Category	Question No.	Descriptions of question
Institution outline	1	University (Institution) name
	2	Department and job title of the person in charge
	3	Name of the person in charge
	4	Contact address (email address)
	5	Date of response
General situations survey	6	Department in charge of payment processing work regarding articles and publishing
	7	Whether or not the number of articles is identified
	8	Number of articles
	9	Outline of payment in AY2012
	10	Major payment recipients (names of publishers, academic societies, etc.) in AY2012
	11	Titles of major journals to which articles were submitted in AY2012
	12	Funding sources in AY2012
	13	Outline of payment in AY2013
	14	Major payment recipients (names of publishers, academic societies, etc.) in AY2013
	15	Titles of major journals to which articles were submitted in AY2013
	16	Funding sources in AY2013
	17	Does your institution have a financial assistance application form?
	18	Does your institution have APC payment regulations?
Awareness survey	19	To what degree are article processing charges (APCs) recognized by researchers and the university personnel in charge?
	20	Do you think APC-funded publishing will increase in the future?/Why or why not?
	21	Is it possible to cover both APCs and subscription fees by the “limited” funds of your university/research institution?
	22	Hybrid OA journals tend to set more expensive APCs than fully OA journals, and have a “double-dipping” problem. What do you think about these issues?
	23	This question concerns your institution’s overall policy for research result publishing and the perception of OA in that policy. Which does your university prioritize—a subscription-based publishing model or an APC-based publishing model? Does your university have such a policy or intention?

3.4. Results of the interviews

3.4.1. Overview of responses

This section summarizes the responses from eight institutions to questions (other than those concerning the outline of the institution) to grasp the general situations (Questions No.6–No. 18) and to measure the awareness of OA (Questions No.19–No.23).

3.4.1.1. Results of the general situations survey

The set of questions No.6–No. 8 asked respondents to “write the name of the department in charge of payment processing work related to articles and publishing, and the number of articles (if identified)”. To this set of questions, all of the eight institutions answered the name of the department in charge. Of the eight institutions,

only three replied that their library was in charge of payment processing work. Further, only one of these three institutions answered that it identified the number of articles.

The set of questions No.9–No. 16 stated “Please write the payment situations in AY2013 and AY2014”. The results showed that no institutions knew their detailed payment situations for both years. As for the situations in AY2012, three institutions gave the names of payment recipients, the names of journals to which articles were submitted, and funding sources, but only one institution knew the amount of payments. For the situations in AY2012, likewise, three institutions (including some that were different from AY2012) wrote payment recipients, the titles of journals to which articles were submitted and funding sources, but only one institution knew the amount of payments, as well.

The set of questions No.17–No.18 asked whether or not the respondent’s institution had a financial assistance application form and APC payment regulations. Of the eight institutions, two had a financial assistance application form, while the others answered “No” or “Unidentified”. No institutions replied that they had APC payment regulations.

3.4.1.2. Results of the awareness survey

Question No.19 read “To what degree are article processing charges (APCs) recognized by researchers and university personnel in charge?” The answer to this question might depend on the respondent. While some respondents answered that the degree varied according to the discipline, others replied that the overall degree of recognition of APCs was still low.

To Question No.20 which read “Do you think APC-funded publishing will increase in the future?/Why or why not?” five institutions replied that APC-funded publishing would increase. Some of these institutions attached conditions. No institutions showed negative attitudes.

Question No.21 stated “Is it possible to cover both APCs and subscription fees by the ‘limited’ funds of your university/research institution?” Most institutions gave negative opinions. Four institutions answered “Impossible” or “Our institution has already reached its financial limit just from paying the subscription fees”.

Question No.22 read “Hybrid OA journals tend to set more expensive APCs than fully OA journals, and have a ‘double dipping’ problem. What do you think about these issues?” Responses to this question included the viewpoint that the publisher should make improvements to address these problems, since universities could not fully identify the entire picture of expenditure including subscriptions fees and APCs, and so it was difficult for individual universities to cope with these problems.

Question No.23 states “This question concerns your institution’s overall policy for dissemination of research results and the position of OA in that policy. Which does your university prioritize—a subscription-based publishing model or an APC-based publishing model? Does your university have such a policy or intention?” To this question, seven institutions replied that they had no such policy. The remaining one institution also

wrote that it was difficult to give an answer for the entire institution or university. These responses revealed that none of the institutions we interviewed had established a clear policy.

3.4.2. Individual responses

3.4.2.1. Institution A (large scale national university)

3.4.2.1.1. Situations survey

- The payment processing work related to articles and publishing are carried out by the accounting personnel in each department. However, the actual track records, including the number of applicable articles, are not grasped. It is more difficult to collectively understand the conditions of all university departments. Accordingly, the payment situations in AY2012 and AY2013 are not clear.
- We have not established a mechanism for applying for financial assistance offered by our university, nor regulations concerning payment of APCs.

3.4.2.1.2. Awareness survey

- Researchers' recognition of OA and APCs varies according to their disciplines. I have the impression that the recognition is widespread in some disciplines.
- As to whether or not APC-funded publishing will increase in the future, opinions vary depending upon the disciplines. However, such publishing is expected to increase if we make open access mandatory for articles that report the results of public funded research.
- Hybrid OA journals tend to set more expensive APCs than fully OA journals, and have a "double dipping" problem. These problems should be addressed by publishers. Some publishers have begun to reduce publishing costs to avoid the "double dipping" problem. I hope that other publishers will actively follow suit.
- Our university has established neither an overall policy for disseminating research results nor an OA policy as part of the overall policy.

3.4.2.1.3. Others

- As a person in charge of journals, I think that due discussions will be necessary to include the matters concerning APC payments into the formal duties of the library.

3.4.2.2. Institution B (A department of a large-scale national university)

3.4.2.2.1. Situations survey

- The payment processing work related to articles and publishing is carried out by the office in each department. In AY2012, one payment was made for a Japanese OA journal.
- The cost is funded from university operating expenses, separately from journal expenses of the department's library.
- Our university has no fixed form for financial assistance application and no regulations concerning payment of APCs.

3.4.2.2.2. Awareness survey

- The department personnel's recognition of OA is low. This survey provided an opportunity to develop their awareness of APCs.
- We are not sure whether or not APC-funded publishing will increase in the future. It will depend on the trends among researchers.
- The library is now in the process of careful consideration about whether or not subscription contracts should be maintained. It is unclear whether it is possible to cover both subscription fees and APCs with the "limited" budgets of the university/institution.
- With regard to the problems with hybrid OA journals, we pay APCs upon request from researchers. As such, we do not care whether the payment is for an OA journal or a hybrid OA journal.
- From the standpoint of one department of the university, it is difficult to give an answer about the university's overall policy for disseminating research results.

3.4.2.3. Institution C (medium-scale national university)

3.4.2.3.1. Situations survey

- The contract section of the financial department is in charge of the payment processing work related to articles and publishing. However, the section does not grasp the track records including the number of applicable articles published.
- The payment situations in AY2012 and in AY2013 are not identified.
- Our university has not established a mechanism for its financial assistance application and regulations regarding APC payments.

3.4.2.3.2. Awareness survey

- We have recently begun to provide information on APCs in our university. Many researchers do not appreciate the differences between APCs and article submission fees. It also seems that APCs are regarded as simply a type of article submission fee. When we provided researchers in the relevant disciplines with information on the use of OA vouchers offered by a publisher, we received inquiries about and applications for the OA vouchers from these researchers. This is an indication that researches in some disciplines have begun to realize what APCs are like. On the other hand, the directors in charge of research and the research promotion divisions had a greater understanding of APCs.
- I think that APC-funded publishing will increase in the future. Those who submit their articles in OA journals can expect an increase in their citation rates, since their articles will be read by more people. Also for publishers, APC-funded publishing will be beneficial. University libraries' budgets, which have covered subscriptions of journals, will not increase any more. However, publishers can compensate for this, as they can expect that the number of submitted articles will grow, and publishing fees (including referee fees) will also increase. As such, APC-funded publishing can find needs from both authors and publishers.

  University libraries have already reached the limit of their capacity by covering rising subscription fees, let alone considering whether or not they can cover both APCs and journal subscription fees. It will be futile no matter how hard individual universities may try to come up with some measures. I believe that

we need extensive efforts involving researchers.

- In light of the social contribution to be made by a national university corporation, submitting articles to APC-funded journals would be desirable, in order to publish research results widely. However, there is no agreed intention or policy at our university in this regard. We are still at the stage where information on APCs is provided at the time of discussion of the expenses for electronic journals, etc. Since awareness of APC-related issues is not shared, I think it is necessary to build a consensus and promote information sharing in the future.

3.4.2.4. Institution D (national medical college)

3.4.2.4.1. Situations survey

- Since AY2013, the library has been centrally responsible for article-related payment processing services, including payments of article publishing and offprint fees. As a rule, the articles for which certain payments are made have been registered in the institution repository. Accordingly, the library is able to grasp the actual situations of APC payments from the university budgets made between April and October in 2013. However, the library is not aware of the situations in AY2012.
- Since APCs should be paid in advance, researchers are required to pay temporarily on behalf of the institution, if the APC is funded by the institution. Although we wish to withhold the specific number of cases and amount of payments, we can identify the track records of payments from research funds and donations (temporarily made by researchers) to Hindawi Publishing Corporation, BioMed Central, and other publishers.
- Our institution has not established a mechanism for its financial assistance application and regulations regarding APC payments.

3.4.2.4.2. Awareness survey

- It appears that researchers have a high level of recognition of APCs.
- APC-funded publishing is expected to increase in the future. However, I have the impression that researchers may be skeptical about APC-funded journals, so I doubt whether these journals will be able to continue to exist. I presume that only reliable, high-quality journals will remain, regardless of whether they are OA or not, and regardless of whether an APC-based or a subscription-based publishing model is adopted.
- It is already becoming impossible for our institution's budgets to cover even subscription fees alone. If the current total number of subscription model journals is maintained and the number of APC model journals also increases, I am afraid that the scholarly publishing and research community could go bankrupt.
- Notably, hybrid journals face the "double dipping" issue. It is strongly hoped that some measures will be taken to resolve this issue.
- Our institution has not formulated its overall policy concerning open access.

3.4.2.5. Institution E (national science and technological college)

3.4.2.5.1. Situations survey

- Because of our conventional division of duties, the library clerical personnel are in charge of payments

of expenses for article submission, publishing, and offprint. However, the budget for these expenses is not for the library, but is allocated to faculty members and researchers. These payments are often made by faculty members temporarily so that the institution will pay them back later. Our institution therefore does not grasp the payment situations entirely, though the institution understands the names of publishers, academic societies and other final payment recipients in individual cases.

- These payments are processed in the names of an administrative subsidy, an external fund, and other items of expenditure. If the payment recipients are outside Japan, in many cases researches make advance payments which will be reimbursed later.
- Our institution has no fixed form for financial assistance applications and no regulations concerning APC payments.

3.4.2.5.2. Awareness survey

- Japanese academic societies in the field of engineering have a long tradition of collecting article submission fees from authors. I don't think researchers care whether the journal is APC-based or not. As such, they simply choose a journal to submit their work, based on whether or not it is a suitable medium for publishing their research results.
- I feel that the number of authors who submit articles to OA journals has been on the rise. So I think that APC payments will increase in the future.
- The institution's budget has reached its limit just by paying subscription fees. At the beginning of this academic year, we held discussions where we considered the possibility of financing subscription fees from the faculty members' research funds. However, we found this difficult due to the budgetary structure. Meanwhile, article submission fees are matters that cannot be controlled by the judgment of the university management, but rather should be judged by individual researchers. To judge the total amount of submission fees, it is necessary to review the budgetary structure.
- As for hybrid OA journals, we may well have to require publishers to offer contracts on an article-by-article basis (inexpensive pay-per-view and digital rights management on an article-by-article basis). In addition, since APCs are the prices paid for the reputation of journals, it may not make sense to discuss whether they are expensive or reasonable.
- The choice of journals to which articles are submitted is supposed to be discussed by university research administrators (URAs) of the organization for research promotion, which develops the university's research strategies. I presume, however, that it is not a matter of choice between a subscription-based model or an APC-funded model, and that URAs will select journals that have earned a higher reputation from universities (especially overseas research institutions).

3.4.2.5.3. Others

- Since AY2013, our institution has been designated as a URA model institution under the program for promoting the enhancement of research universities. Since then, we have undertaken initiatives to strengthen our research capabilities.

3.4.2.6. Institution F (private science and engineering college)

3.4.2.6.1. Situations survey

- Since the educational affairs section is in charge of payments concerning articles and publishing, the library is not aware of the number of articles.
- Concerning payment situations in AY2012 and AY2014, we identify the major payment recipients and funding sources, but do not know the journal titles. The major payment recipients comprise academic societies in Japan, with some examples where the funding sources are the dean's funds, research funds including personal research expenditure, and public funds (the institution's funds).
- Our institution has no fixed form for financial assistance application and no regulations concerning APC payments.

3.4.2.6.2. Awareness survey

- It appears that researchers have a low degree of recognition of OA and APCs. Library staff know what APCs are, but do not feel that APCs should be borne by the library.
- I am not sure if APC-fund publishing will increase or not in the future.
- Covering both APCs and subscription fees may be possible if it is on the premise that the expenses for OA journals are deducted from subscription fees. However, it would be difficult under the present conditions in which subscription fees are rising.
- As for the "double dipping" problem with hybrid OA journals, I think the essential difficulty lies in including both free and charged articles in a single journal. The problem is that we cannot check the breakdown of costs for hybrid journals since we are unable to grasp the entire expenditure, including subscription fees and APCs.
- Our institution has not yet established an overall policy for disseminating research results or for positioning OA in the overall policy. Researchers may generally think that the ongoing subscription model is good enough. They appear to be more interested in submitting their articles to journals with a higher reputation, rather than giving priority to OA.

3.4.2.7. Institution G (private medical college)

3.4.2.7.1. Situations survey

- Although we know the department in charge of payments concerning articles and publishing, we do not know the number of articles published.
- We also do not clearly know the payment situations in AY2012 and AY 2013.
- Our institution has prepared an application form for the financial assistance for article submission expenses, but has not established regulations for APC payments.

3.4.2.7.2. Awareness survey

- The degree of recognition of APCs among researchers/university staff in charge is not so high: some of them are aware of APCs, but others are not.
- This may not be a correct answer to the question asking whether or not APC-funded publishing will increase in the future, but I think that if paying APCs is considered a reasonable proposition, the

university management will agree to pay these charges. For universities, what matters is that APC-funded publishing could lead to the enhancement of research and an increase in the total number of articles published.

- As for the issue of covering both APCs and subscription fees with the university's budgets, this is a difficult question to answer, since it is not yet a tangible problem confronting us.
- The "double dipping" problem with hybrid OA journals will become obvious when our institution comes to cover APCs. At present, our institution has no policy regarding OA, but has a clear policy on research results dissemination. For example, the policy sets forth that only our institution's publications can be registered in our repository. This is because we place emphasis on disseminating scholalry information created at our institution with our responsibility as a university. Our institution actively recommends that researchers submit their articles to the institution's publications, and also takes supporting measures to help increase the number of articles.

3.4.2.8. Institution H (independent administrative institution for science and engineering research)

3.4.2.8.1. Situations survey

- The library department is responsible for compiling and recording data on all research results (excluding intellectual properties and computer programs, etc.) achieved within the institution, in an integrated manner. The library department is also engaged in editing and publishing relevant reports. In addition, the department creates and manages CRIS and disseminates the information through the Internet. When researchers in the institution publish their research results in scholarly journals, they can receive financial assistance for article submission fees and APCs (excluding APCs for hybrid OA journals, in principle). Through these activities, the library department grasps the number of articles published.
- The recipients of subsidized payments for submission fees are many and varied, including international publishers, international academic societies, and academic associations in Japan.
- The library department requests a budget for expenses for researchers' participation in academic conferences and the submission of their articles in journals, and manages the execution of the budget. However, when research results are published by using external competitive funds, the payment should basically be made by the department directly in charge.
- Our institution has prepared a uniform financial assistance application form throughout the institution. Applicants are required to submit the application form after filling in the article's bibliographic information, the names of conferences at which the research results will be presented, and other necessary items. The completed form will then be checked by the research department, so as to be deemed eligible to receive financial assistance for submission fees and/or APCs.

3.4.2.8.2. Awareness survey

- In the future, I predict that APC-funded publishing will increase, primarily among foreign publishers. While I process payments for article submission fees, I feel that an APC-funded model would be suitable for publishers to certainly recover publishing-related expenses. I also think that publishers based on the APC-funded model will increase, in the context of a trend toward providing open access to the results of publicly subsidized research projects, a trend that is accelerating in Western countries.

- The price of APCs per article is high. Taking this into account, in order to cover both subscription fees and APCs with the institution's limited budgets, it would be necessary not only to consider the compatibility with the library's expenditure for subscription fees, but also to hold institution-wide discussions as to how to handle the APC model, along with the provision of open access to research results.
- With regard to hybrid OA journals, the so-called "double dipping" problem may be attributed to the current ambiguities in how we manage payments both APCs and subscription fees. Some publishers attempt to reflect the track records of APC payments in the subscription fees for the following year, but it seems that many unclear parts remain. Regarding another problem, that hybrid OA journals tend to charge higher APCs than fully OA journals, it may be unavoidable if the journal has acquired many subscribers thus far.
- For now, our institution has not established a policy for giving priority to either a subscription model or an APC model in selecting a journal for submitting researchers' articles. I believe that this matter should be carefully considered, since establishing a policy that will prioritize either of the two may narrow the range of choices for researchers.

3.5. Summary

This interviews revealed that libraries are aware of the problems regarding APCs, though there are some differences in the level of awareness between libraries. Throughout the interviews, we did not hear any negative opinions about OA. Some interviewees expressed the opinion that authors who submit their articles in OA journals can expect an increase in their citation rates, since their articles will be read by more people. On the other hand, libraries have a sense of crisis derived from the actual situations of APC payments. Amid a struggle to cover rising costs for subscription journals, now it would be all the more difficult to fund expenses for institutional subscriptions of APC journals. While it has become clear that publishers offer libraries OA models, such as institutional funding of APCs and the voucher system, the relevant costs appear to be covered not by the entire university but by individual libraries.

The interviews also showed that library staff perceived that recognition of APCs is growing among researchers, although the levels of awareness vary according to the operating organizations and the scales of the institutions, as well as the disciplines. As compared with researchers at universities and science and technological colleges, those at medical colleges are considered to have a higher degree of recognition of APCs. However, some respondents pointed out that researchers aimed to have their articles published in journals with a higher reputation in their disciplines, and that their awareness of APCs was more centered on the amount of expenses rather than the concept of OA. At the same time, it was also clarified that this matter was regarded as an issue concerning researchers' levels of awareness and recognition, and that many universities had not formulated an open access policy that applied to the entire institution.

Through our interviews, we could not clearly identify actual situations of APC payments. Of the 57 universities that positively responded to our call to participate in the survey, only one replied that its library

handled APCs, and other universities did not even know the actual conditions about how payments were made by other departments. This indicates that, with some exceptions, larger-scale universities had greater difficulty in grasping the situations of payments related to articles and publishing, on a university-wide basis. When a library that we interviewed was in charge of article and publishing-related payment processing work, needless to say, the library possessed the pertinent information on payment recipients and the amount of payments. However, in the case where other departments were responsible for the payment, generally it was difficult for the library to grasp such information. The survey's failure to clarify the APC payment situations can be attributed to limitations in the methodology of the interviews with libraries.

The future task for libraries that has a high degree of recognition of APC-related problems seems to lie in considering how they should coordinate with researchers and clerical staff who actually process APCs, in order to clarify the actual situations of the entire university, and to take some actions accordingly. The respondents to this interviews mainly comprised the departments in charge of print and electronic scholarly journals, but APC-related work is new to universities. It will be a great challenge for universities to find optimal ways on an institution-wide basis to secure scholarly information resources, including OA journals, and to strengthen their abilities to disseminate research achievements.

4. Literature review

4.1. Purpose and overview of the literature review

We conducted a literature review that complements this present survey of article publishing in OA journals, with the purpose of understanding the latest overseas trends regarding APCs.

4.2. Documents translated into Japanese

We searched and collected related literature available on the web, and translated the following five documents into Japanese.

	Literature title	Japanese title	URL of original literature
1	Implementing Open Access APCs: the role of academic libraries (Sept. 2013)	オープンアクセスの APC を実践する――大学図書館の役割	http://www.uk.sagepub.com/repository/binaries/pdf/apc.pdf
2	Open Access Survey: Exploring the views of Taylor & Francis and Routledge authors (Mar. 2013)	オープンアクセス意識調査：Taylor & Francis 及び Routledge 発行誌の論文著者に対する意識調査	http://www.tandf.co.uk/journals/pdf/open-access-survey-march2013.pdf
3	Open Access: Market Size, Share, Forecast, and Trends (Jan. 2013)	オープンアクセス： 市場規模、シェア、予測と動向	http://img.en25.com/Web/CopyrightClearanceCenterInc/%7B1eced16c-2f3a-47de-9ffd-f6a659abdb2a%7D_Outsell_Open_Access_Report_01312013.pdf
4	The potential role for intermediaries in managing the payment of open access article processing charges (APC) (Oct. 2012)	オープンアクセスの論文処理費用（APC）の支払管理における仲介組織の潜在的役割	http://www.researchinfonet.org/wp-content/uploads/2012/11/APC-report-as-published.pdf
5	UNT Libraries: Open access fund research report (Sept. 2012)	UNT 図書館機構 オープンアクセス基金研究報告書	http://digital.library.unt.edu/ark:/67531/metadc111007/

4.3. Summaries of translated literatures

In this literature review, we selected several documents written in foreign languages and translated them into Japanese. Below are the summaries of the respective documents.

4.3.1. Document No.1

Original title: Implementing Open Access APCs: the role of academic libraries
Japanese title: オープンアクセスの APC を実践する――大学図書館の役割
Summary:
On July 5, 2013, a group of UK librarians, along with representatives from SAGE and Jisc, met to discuss the role of academic librarians in implementing gold open access (OA) article-processing charges (APCs). This is a report on the roundtable meeting. While the academic librarians and their institutions represented in the roundtable support for the goals of open access, the OA mandates from UK funders have created significant practical challenges for them. These include issues about how to apportion funding, challenges about managing many small payments, and concerns about quality and quality management. Some other outcomes from the roundtable include the clear preference in many institutions for green OA. Participants in the roundtable felt that several points would help the process of implementing OA APCs. These points were compiled into the following five recommendations: (1) Clear guidance from funders about what they are looking for and how it should be reported and measured; (2) Better communication by publishers of copyright options and which journals are compliant with the Research Councils UK (RCUK) policy; (3) More robust systems for managing APCs; (4) Cross-industry initiatives and international standards; and (5) More work to address the issue of double dipping or differential pricing.

4.3.2. Document No.2

Original title: Open Access Survey: Exploring the views of Taylor & Francis and Routledge authors
Japanese title:オープンアクセス意識調査：Taylor & Francis 及び Routledge 発行誌の論文著者に対する意識調査
Summary:
The survey was conducted by Taylor & Francis, to ask the Taylor & Francis author community for their views on Open Access publishing and their level of involvement with it. The survey was sent to all authors who had published in a Taylor & Francis journal in the year 2011 and had not opted-out of surveys or been recently surveyed in another capacity. The survey received 14,769 responses, although respondents from the USA & Canada were slightly over-represented, and samples were actually skewed toward the Social Sciences and Humanities, in which area the company is particularly strong.

Questions were asked under the following eight sections: (1) Your attitudes and values, (2) Licenses, (3) Article submission practices, (4) Open Access policy developments, (5) Repositories, (6) Research funders, (7) Open Access services and (8) The future of Open Access publishing. It was originally intended that Section 8 would ask authors both what they "*think will happen*" over the next 10 years, and what they "*would like to happen*" over the next 10 years. However, it was later decided to create two identical

surveys, which differed only by the words "*think will happen*" and "*would like to happen*" in Section 8—and then send one survey to half the population, and the other survey to the other half. The survey results are presented in an open access article.

4.3.3. Document No.3

Original title: Open Access: Market Size, Share, Forecast, and Trends

Japanese title: オープンアクセス： 市場規模、シェア、予測と動向

Summary:

This is a report made by Outsell, a US research and advisory firm, for publishers, policymakers, funders, investors and other stakeholders. In this report, a forecast was made for open access-sourced journal revenue for 2013 to 2015. OA publishing showed a high growth rate. In 2012, the open access revenue increased by 34% from the previous year, accounting for 2.8% of science publishing. Traditional gold OA made up 68% of OA revenues, while 18% of OA revenues stemmed from mega-journals. The trend of funder mandates could influence OA revenues. In the most likely scenario, Outsell anticipated that OA revenues would grow at a CAGR of 27% from 2012 to 2015, to reach a total market size of $336 million in 2015. In 2012, three providers—Springer, Public Library of Science (PLOS) and Hindawi—collected 58% of OA revenues in 2012. Springer showed signs of relative maturity. PLOS has benefited greatly from the success of its first-in-its-class mega-journal *PLOS ONE*. However, the increasing incidence of mega-journals from competitors suggests that PLOS would begin to operate in a more competitive market in the future. The 10 publishers that all players of the OA market should look at are as follows: Copyright Clearance Center (CCC), eLife, Hindawi, NPG, OAK, PeerJ, PLOS, PubMed Central, SCOAP^3, and Springer. Outsell did not foresee a clean switch to OA in the immediate future despite its high growth, and defined success as the ability to accommodate author needs vis-à-vis mandate compliance, and to ensure scientific rigor.

4.3.4. Document No.4

Original title: The potential role for intermediaries in managing the payment of open access article processing charges (APC)

Japanese title: オープンアクセスの論文処理費用（APC）の支払管理における仲介組織の潜在的役割

Summary:

This is a report of a brief study to examine the operational challenges relating to the payment of open access article processing charges (APCs) and the potential role for intermediaries in enhancing the arrangements for the payment. This report was compiled by the Research Information Network (RIN). The study confirmed the following issues surrounding the payment of APCs. 1) Funders: Funders have concerns about accountability for the funds they provide, and compliance with their policies. 2) Universities: Only a small number of universities have set up systematic central arrangements for the payment of APCs. Increasing the proportion funded by APCs would therefore add substantially to workloads. 3) Authors: Authors need to be able to obtain information about the progress of their articles, including the APC payment process. 4) Publishers: For most publishers, a key challenge is to achieve better integration between their editorial and production systems on the one hand, and workflows associated with the payment of APCs on the other. The

study suggests some potential intermediaries, who might play roles in improving the efficiency of processes and information flows associated with APCs. These potential intermediaries fall into four distinctive groups: subscription agents, reproduction rights organizations, collective procurement organizations (procurement consortia), and start-ups (new organizations). The report also recommends that representatives of publishers, universities, RCUK, the Wellcome Trust and JISC should meet together to address the above-mentioned issues and hold discussion as to the development, implementation and adoption of intermediary services for the APC payments and the transferability of such services and relationships from a UK to an international context.

4.3.5. Document No.5

Original title: UNT Libraries: Open Access Fund Research Report

Japanese title: UNT 図書館機構 ：オープンアクセス基金研究報告書

Summary:

The University of North Texas (UNT) and the UNT Libraries have been committed to promoting open access (OA). This report, published on September 7, 2012, presents research findings in order to help better understanding of OA funds and how UNT could work toward its own OA fund. The OA fund initiatives of 30 North American universities were reviewed regarding their sponsors, eligibility, reimbursement criteria, and stipulations related to the fund, and the survey results were compiled in this report. Also, an exploratory pilot survey was conducted by sending 170 UNT faculty members a brief email questionnaire. Twenty-eight respondents offered input on their knowledge and experience concerning OA payments and their needs regarding OA publishing expenses. Based on the findings from this research, the report made the following recommendations: 1) There is a need among the UNT community for an Open Access Fund, and this should be an extension of the core services provided through the UNT Libraries and the university; 2) considerations should be given through the three approaches—sponsors, eligibility of authors and articles, and stipulations placed on the funding; and 3) As the next step, it is recommended that the UNT Open Access Fund be evaluated annually based on clearly defined specifications determined by the sponsors, and that the UNT Open Access Fund establish a web presence with the necessary information.

5. Appendix

5.1. Questionnaire

Publishing research results

1. Approximately how many articles have you published in scholarly journals (peer-reviewed journals, including open access journals) in the past three years?

Number of articles ☐
(Enter the number using a single-byte character.)

2. When you are determining a scholarly journal to submit your article, to what degree do you consider the following factors? For each factor, please select the option that best describes the degree to which you take it into account.

	Very important	Important	Cannot say either way	Not so important	Not important at all
The journal's reputation in the discipline	○	○	○	○	○
Open accessibility	○	○	○	○	○
Influence on your performance evaluation and promotion assessment	○	○	○	○	○
Shorter time from submission to publication	○	○	○	○	○
Fit between the scope of the journal and that of your articles	○	○	○	○	○
Provision of appropriate peer-review	○	○	○	○	○
Many readers (larger readership)	○	○	○	○	○
High acceptance rate	○	○	○	○	○
Impact factors	○	○	○	○	○
Low publication costs	○	○	○	○	○
Recommendation by colleagues	○	○	○	○	○

Publishing research results in open access journals

In this survey, an "open access journal" is defined as a scholarly journal that has the following features.

- The journal is peer-reviewed.
- The articles formally published in the journal are posted online.
- The journal charges an article processing charge (APC) to authors who have submitted their articles that have been accepted for publication in the journal (excluding the offprint cost).
- Readers can read the journal free of charge

To name a few, *PLOS ONE*, *PLOS Biology*, and *Scientific Reports* can be cited as specific titles of the open

access journals defined above. For more extensive examples, please refer to the List of APC-Funded OA Journals.

Please note that the open access journals in this survey do not include journals that have a subscription system but provide open access only to articles for which APCs are paid ("hybrid journals," such as *Springer Open Choice* and *Oxford Open*).

3. Of the articles you have published **in the past one year**, approximately how many articles have you published in open access journals?

Number of articles ☐
(Enter the number using a single-byte character.)

[Different questions are asked depending on the respondents' answers: The following questions from a4-1 to a4-3 are for those who answered "zero" to question 3.**]**

a4-1. Have you ever published your articles in open access journals before?

○ Yes ○ No

a4-2. Why have you not published any articles in open access journals? Please select all that apply.

☐ Low reputation of OA journals in the discipline
☐ Doubt about open access
☐ Small influence on performance evaluation and promotion assessments
☐ Disparity in the scope of OA journals and that of your articles
☐ Concern about whether OA journals provide appropriate peer-review or not
☐ Limited number of readers (small readership)
☐ High acceptance rate
☐ Low impact factors (or impact factors not yet assigned)
☐ Expensive publishing fees
☐ No applicable OA journals available
☐ Other (please describe as specifically as possible.) _____

a4-3. If the problems cited in the above question are resolved, will you publish your articles in open access journals?

○ Yes ○ No

[Different questions are asked depending on the respondents' answers: The following questions from A4-1 to A4-4 are for those who answered "one or more" to question 3.**]**

A4-1. What was the title of the **open access journal** in which your article was published most recently? Please write the title name in full in the following field (e.g.: *PLOS ONE*, *PLOS Biology* or *Scientific Reports*).

Article processing charge

Some open access journals may charge a fee for publishing accepted articles in these journals.

- This fee is generally called an "article processing charge (APC)."
- An author may be required to pay an amount from a few hundred dollars to 50 million dollars or so.
- However, the above fee does not include the costs for offprints.

The following questions relate to the article processing charges (APCs) explained above.

A4-2. **In the past one year,** approximately how much money in total (in Japanese yen) did you pay **by yourself** to submit/publish articles to/in open access journals? Please tell us the amount (excluding the amounts paid by your co-authors), converting the figures at 100 yen to one dollar.

Total amount (yen) ☐

A4-3. Which funding sources did you use for your APCs? Please select all that apply. (Choose as many answers as apply.)

- ☐ Personal research funds (such as grants for education and research infrastructure)
- ☐ Competitive funds within the university
- ☐ Financial assistance for APCs provided by the department or university
- ☐ Governmental research grants, such as Grant-in-Aid for Scientific Research
- ☐ Financial assistance provided by private foundations
- ☐ Financial assistance provided by private companies
- ☐ Private expenses
- ☐ Other (Please describe specifically.) _____
- ☐ Unidentified

A4-4. When you are determining an open access journal to submit your article, to what degree do you consider the following factors? For each factor, please select the option that best describes the degree to

which you take it into account.

	Very important	Important	Cannot say either way	Not so important	Not important at all
The journal's reputation in the discipline	○	○	○	○	○
Open accessibility	○	○	○	○	○
Influence on performance evaluation and promotion assessment	○	○	○	○	○
Shorter time from submission to publication	○	○	○	○	○
Fit between the scope of the journal and that of your articles	○	○	○	○	○
Provision of appropriate peer-review	○	○	○	○	○
Many readers (larger readership)	○	○	○	○	○
High acceptance rate	○	○	○	○	○
Impact factors	○	○	○	○	○
Low publication costs	○	○	○	○	○
Recommendation by colleagues	○	○	○	○	○

5. Please feel free to write your opinion concerning open access journals and publication of research results in general.

Finally, please tell us about yourself.

6. Please tell us your current professional status. Select the one that applies.

- ○ Professor or equivalent research position
- ○ Associate professor or equivalent research position
- ○ Lecturer or equivalent research position

○ Assistant professor or equivalent research position

○ Assistant or equivalent research position

○ Research position other than the above

○ Other (Please describe specifically.) _____

7. Do you work under a fixed-term contract or a non-fixed term contract?

○ Fixed term contract ○ Non-fixed term contract

8. What discipline do you specialize in or belong to? (Example: Space engineering, urban environmental engineering, material engineering, ocean engineering, etc.)

9. What age-bracket do you belong to? Please select the one that applies.

○ 20–29 ○ 30–39 ○ 40–49 ○ 50–59 ○ 60–69 ○ 70 or over

10. What competitive funds have you obtained in the past three years? Please select all that apply. (Choose as many answers as apply.)

☐ Competitive funds within the university

☐ Governmental research grants, such as Grant-in-Aid for Scientific Research

☐ Financial assistance provided by private foundations

☐ Financial assistance provided by private companies

☐ Other (Please describe specifically.) _____

11. Please tell us, if you do not mind, the name your university/institution.

5.2. Interviews questions

Please write the interviewee's (your) department, job title, name, contact address and the date of response.

Question No.	Question	Answer
1	Name of university (institution)	
2	Department & job title	
3	Name	
4	Contact address (email address)	
5	Date of response	(MM/DD/YY)

[General situations survey]

Please write the name of the department in charge of payment processing work related to articles and publishing, and the number of articles (if identified).

Question No.	Question	Answer
6	Name of the department in charge	
7	Whether the number of articles is identified or not	Identified/Not identified* Circle either that applies.
8	If identified, provide the number of articles	cases

Please write the payment situations in AY2012 and AY2013.

AY2012

Question No.	Question & answer															
9	Payment recipient	APC				Publication fees other than APCs				Others (including unknown cases)				Total			
	Overseas		cases		yen		cases		yen		cases		yen	0	cases	0	yen
	Japan		cases		yen		cases		yen		cases		yen	0	cases	0	yen
	Total	0	cases	0	yen	0	cases	0	yen	0	cases	0	yen	0	cases	0	yen
10	Major payment recipients (names of publisher/academic societies)																
11	Titles of major journals to which articles were submitted																
12	Cost funding sources * Please describe: what are the sources of funding costs for article publishing (e.g., research funds, university financial assistance, outside competitive funds, and private expenses [paid temporarily on behalf of the institution]). What source is frequently used? If the cost is funded from the university, which department pay the cost?																

AY2013

Question No.	Question & answer															
13	Payment recipient	APC				Publication fees other than APCs				Others (including unknown cases)				Total			
	Overseas		cases		yen		cases		yen		cases		yen	0	cases	0	yen
	Japan		cases		yen		cases		yen		cases		yen	0	cases	0	yen
	Total	0	cases	0	yen	0	cases	0	yen	0	cases	0	yen	0	cases	0	yen
14	Major payment recipients (names of publisher/academic societies)																
15	Titles of major journals to which articles were submitted																
16	Funding sources * Please describe: what are the sources of funding costs for article publishing (e.g., research funds, university financial assistance, outside competitive funds, and private expenses [paid temporarily on behalf of the institution]). What source is frequently used? If the cost is funded from the university, which department pay the cost?																

Question No.	Question	Answer
17	Does your institution have a financial assistance application form?	(Yes No) * Circle either that applies.
18	Does your institution have APC payment regulations?	(Yes No) * Circle either that applies.

[Awareness survey]

Please freely describe your opinions

Question No.	Question & answer
19	To what degree are article processing charges (APCs) recognized by researchers and university personnel in charge?
20	Do you think APC-funded publishing will increase in the future? / Why or why not?
21	Is it possible to cover both APCs and subscription fees by the “limited” funds of your university/research institution?
22	Hybrid OA journals tend to set more expensive APCs than fully OA journals, and have a “double dipping” problem. What do you think about these issues?
23	This question concerns your institution’s overall policy for research result publishing and the perception of OA in that policy. Which does your university prioritize—a subscription-based publishing model or an APC-based publishing model? Does your university have such a policy or intention?

5.3. Members of the SPARC Japan Working Group on Survey of Publication of Articles in Open Access Journals

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