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Insights from a National Survey of Japanese Researchers Covering Topic Exploration and Outreach

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Abstract

In this paper, we investigate how researchers collect information about their research, write articles, distribute their findings to the public, and what actions high performers prioritize. The subjects of this study were researchers affiliated with various universities, national research institutes, and independent administrative research institutes in Japan. Participants were informed in writing, and responses were collected via a web-based questionnaire. Letters were sent to 486 organizations, and 1440 valid responses were obtained. The results indicate significant differences in information-collecting practices across disciplines. Additionally, it was found that highly accomplished researchers place a stronger emphasis on disseminating their research findings more widely than on methods for searching, collecting or acquiring information.

Keywords: information retrieval, outreach, Japanese research institutions, survey research

1 Introduction

In recent years, the popularization of web conferencing systems has led to academic conferences and international meetings being increasingly conducted online, enabling most research-related interactions to occur virtually. The distribution of information via the internet has also become mainstream, making the online presentation and publication of papers a standard practice in the research community.

Meanwhile, the process from initiating research to publishing a paper has diversified, requiring researchers to choose from a variety of methods to search for and obtain relevant information and to publish their findings. These mainstream methods are expected to differ depending on the discipline, creating uncertainty about the most effective approaches. To address this, we surveyed to understand how researchers collect information, select research topics, conduct studies, publish findings, and how their work is referenced at various stages. This study summarizes and extends further develops the research presented in [1][2].

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2 Survey

2.1 Questionnaire

The purpose of this survey is to clarify how Japanese researchers gather information, consider research topics, conduct research, how they publish their results, and through what process the resulting papers and other materials are cited in other papers. The following questions were asked:

- Attributes of respondents (Organization, Position, Job level, Age, Discipline)
- Frequency of implementation of information search
- Methods of searching for information / acquiring information
- Method of publication, outreach (Open Access, Research Publicity)
- Time required to submit articles, Frequency (Citations, Paper submissions, Research presentations, Book publications)

This survey was partially tailored to PlumX [3] so that it could be analyzed in conjunction with the altmetrics follow-up survey that has been conducted since last year [4]. One of the attributes of the respondents, discipline was defined according to All Science Journal Classification (ASJC) [5] defined by Elsevier, while the other attributes were based on the criteria defined in researchmap [6] by Japan Science and Technology Agency (JST).

A related survey on science communication activities was conducted in 2013 by JST [9]; however, it primarily focused on public relations. More recently, another survey [7][8] was conducted in 2023 by the Japan Research Advisory Forum (JRAF) of Springer Nature, which focused on the importance and frequency of research communication, as well as the methods and motivations for information dissemination. The JRAF survey was conducted in the same year as our survey, and although we have not been able to refer to each other's content, we believe it is meaningful to compare the results. Therefore, we will compare the results of these surveys in the latter part of this paper.

2.2 Target and Period

The response trends for this survey were expected to vary greatly depending on discipline, it was necessary to ask researchers in various fields. Therefore, we targeted research institutions throughout Japan and prepared a list of universities with 90 or more faculty members and national and independent administrative agencies, research institutes, museums, etc., that had won Grant-in-Aid for Scientific Research within the past 10 years.

The survey targeted only researchers. However, since it is difficult to make direct requests to an unspecified number of researchers, the survey was mailed to the person in charge of general affairs at the administrative office of each institution. The letter included an explanation of the survey's purpose and a shortened URL for submitting responses, and we asked them to share this information within their organizations. We also provided the URL of the page to access PDF files with the same content as the mailed version, along with a template for the request letter and suggested that they make use of these resources. The author's organization was notified individually and asked to respond to the request.

A total of 486 letters were sent out in June 2023. Responses were collected anonymously by using Google Forms. Table 1 shows the collection period, method, and number of questions, and Table 2 shows the date of sending the request letter, the recipients, and the number of letters sent.

Table 1: Survey collection period, method, and the number of questions.

Collection period	Collection method	No. of quetsions
May 30, 2023 - July 31, 2023	Web-based questionnaire with Google Forms (secreted form)	25

Table 2: Date of sending the request letter, the recipients and the number of letters sent.

Sent date	Recipients	No. of letters sent
June 5, 2023	National, public and private universities (including postgraduate schools)	390 (one of which was returned to an unknown address)
June 15, 2023	National research institutes, independent research institutes, museums, etc.	98 (one of which was returned to an unknown address)

3 Results

PC (Microsoft Windows11 Pro) and Microsoft Excel (Microsoft365 version) were used to process the response data, and IBM SPSS Statistics v.29 (with the addition of Custom Tables module) was used for analysis. The results of the analysis are shown below.

3.1 Number of Responses and Respondent Attributes

The total number of responses was 1442, of which 1440 were included in the analysis, excluding two cases where the respondents did not answer most of the questions and whose affiliation was "other," with no specific description provided. In cases where the answer was "other," but a description was provided in the free response column, the appropriate option was applied based on its content, and the answers were modified. Table 3 shows the attributes of the respondents (Discipline, Organization, Age, Position, and Job level).

Note that the response rate cannot be calculated because the survey was requested through the general affairs departments of each organization and not directly from the respondents.

Table 3: Attributes of survey respondents.

Discipline	No.	%
Multidisciplinary	24	1.7
Physical Sciences	512	35.6
Health Sciences	250	17.4
Life Sciences	257	17.8
Social Sciences & Humanities	397	27.6
Total	1440	100.0

Organization	No.	%
National universities	623	43.3
R&D Agency, Public Research Institutions, etc.	365	25.3
Private universities	302	21.0
Public universities	139	9.7
Junior colleges, technical colleges, etc.	6	0.4
Corporation	4	0.3
Others	1	0.1
Total	1440	100.0

Age	No.	%
20s	72	5.0
30s	397	27.6
40s	433	30.1
50s	374	26.0
60s	161	11.2
70s	3	0.2
Total	1440	100.0

Position	No.	%
Full-time faculty and researchers	1288	89.4
Part-time faculty and researchers	48	3.3
Full-time staff (URA, etc.)	34	2.4
Postdoctoral researcher	34	2.4
Students (Doctoral programs)	21	1.5
Part-time staff (URA, etc.)	6	0.4
Students (Masters programs)	5	0.3
Others	4	0.3
Total	1440	100.0

Job level	No.	%
Head of an institution	20	1.4
Professor (including special appointment/assignment)	398	27.6
Associate professor/lecturer (including special appointment/assignment)	501	34.8
Assistant Professor (including special appointment/assignment)	250	17.4
Researcher/Postdoctoral	172	11.9
Part-time lecturer	8	0.6
Research manager	16	1.1
Research and Development, Engineer	43	3.0
Doctors, nurses, lawyers, and the other professionals	26	1.8
Others	6	0.4
Total	1440	100.0

3.2 Comparison between Discipline

In this section, we present the results of our analysis of respondents' information search targets, search methods, and publication methods, focusing on the differences between disciplines.

3.2.1 Searching Targets

When respondents were asked about their targets for information searches using a 4-point scale ranging from “1. Not at all” to “4. Always implement” for each item, the results were presented in Table 4. The implementation rates for “research” and “researcher” were high, with positive responses outweighing negative ones. Conversely, for searches related to “societies and organizations” and “research institutions,” negative responses were more prevalent than positive ones. In the Social Sciences & Humanities, the implementation rates for “Searching for researchers” and “Searching for research institutions” were slightly higher compared to other fields. Nevertheless, no significant differences were observed across disciplines.

Table 4: Frequency of information search target.

Mean level of implementation (1.Never, 2.Rarely, 3.Sometimes, 4.Always)		Total	Multidisciplinary	Physical Sciences	Health Sciences	Life Sciences	Social Sciences & Humanities
Target	Searching for research (look up the article itself)	3.73	3.50	3.68	3.75	3.73	3.79
	Searching for researchers (find out what people are doing)	2.76	2.71	2.72	2.61	2.67	2.98
	Searching for research institutions (find out about universities and other institutions)	2.33	2.29	2.15	2.46	2.14	2.63
	Searching for societies and organizations (find out about related societies and organizations)	2.05	2.12	1.91	2.11	2.08	2.18

3.2.2 Searching and Acquiring Information

Table 5 shows the results of questions regarding the methods used to search for and manage information about research, as well as how literature was obtained. Responses to this question were multiple-choice, and the number of times each item was selected was aggregated by each respondent's discipline. The percentage for each discipline was then calculated. When tabulating the results by field of study, column proportions were compared using the z-test (significance level of 0.05, with p-values corrected using the Bonferroni method). Large values were bolded for groups where significant differences were observed between two groups, while small values were underlined. Similar descriptions are provided in subsequent tables.

Table 5: Responses on methods of searching for and acquiring information.

	Percentage of respondents who selected the relevant item(s) (%)	Total	Multidisciplinary	Physical Sciences	Health Sciences	Life Sciences	Social Sciences & Humanities
Searching and management tools	Using general-purpose Internet search (Google, Yahoo, etc.)	91.5	91.7	**96.7**	81.9	**92.6**	**90.2**
	Reading abstract or full text on the journal's publication page or download the file	80.1	91.7	**81.0**	70.3	77.4	**86.1**
	Participation in conferences and symposiums	79.3	87.5	**82.6**	69.9	80.5	**79.8**
	Using government article DB (CiNii, PubMed, etc.)	77.5	83.3	62.6	**88.0**	**85.6**	**84.4**
	Using researchers' achievement DB(Kaken,researchmap,Orcid,GoogleScholar,etc.)	76.0	83.3	74.4	65.9	77.0	**83.4**
	Searching in the reference section of known articles and books	72.1	**87.5**	**74.8**	57.8	64.6	**81.6**
	Referrals from colleagues and collaborators	53.1	50.0	**56.0**	40.2	**58.0**	**54.4**
	Using commercial article DB (Scopus, Web of Science, etc.)	47.7	33.3	**58.7**	33.3	**56.0**	38.0
	Using SNS for researchers (ResearchGate, Academia, etc.)	44.9	41.7	**48.3**	32.9	**52.9**	42.8
	Viewing articles reported in professional magazines	40.9	37.5	39.3	34.1	40.9	**47.4**
	Using institutional repositories published by each research institution	40.0	45.8	30.3	27.7	27.6	**67.8**
	Finding in libraries, archives, bookstores, and other physical stores	33.6	37.5	25.8	22.1	21.0	**58.7**
	Using literature management software (Mendeley, EndNote, etc.)	33.0	25.0	35.4	39.0	39.3	22.4
	Introduction from research supervisor	28.4	25.0	27.4	27.7	31.1	28.5
	Viewing articles reported in general magazines	22.2	20.8	18.6	14.5	**26.8**	**28.7**
	Using SNS for general (X, Facebook, etc.)	21.9	**41.7**	20.5	16.5	21.8	**25.9**
	Reading the research institute's public relations articles	20.7	16.7	21.5	14.5	23.3	21.9
	Using ChatAI (ChatGPT, Bing AI Chat and other interactive AI)	11.3	12.5	13.5	10.8	10.9	8.8
	Viewing articles broadcast on TV and other media	10.5	12.5	9.4	8.0	12.5	12.1
	Using commercial research analysis tools (SciVal, InCites, Dimensions, etc.)	2.1	0.0	2.5	1.2	**4.7**	0.5
Acquiring info.	Papers available free of charge via web download, etc. (free of charge)	98.7	100.0	98.8	98.0	99.6	98.5
	Articles accessible through agreements (Your organization has subscription)	83.8	75.0	**88.7**	**84.3**	**91.1**	73.0
	Borrowing articles from internal/external libraries, etc. (photocopying fees apply)	67.6	66.7	59.0	62.7	61.9	**85.6**
	Journals subscribed to or accessed through membership(with annual/monthly payments)	56.2	45.8	52.5	44.6	47.5	**74.3**
	Paying as you go and get your papers (Pay only when you need them)	31.1	25.0	**28.9**	28.5	19.5	**43.3**
	Obtaining articles directly fromthe authors (Ask themto send. Almost free ofcharge)	26.2	16.7	25.8	18.5	**30.7**	**29.2**

Note: Bold and underlined numbers: Groups with significant differences in column proportions (z-test) at a 0.05 significance level, with p-values adjusted using the Bonferroni method.

The most common method of information search and management was "Using general-purpose Internet search," with only the Health Sciences reporting a slightly lower usage. The Social Sciences & Humanities employed a wider variety of search methods compared to other fields, particularly "Using institutional repositories," "Finding in libraries, archives, bookstores, and other physical stores," and "Viewing articles reported in professional magazines". In the Physical sciences, "Using commercial article DB" was more frequently utilized, while "Using government article DB" was less common. Conversely, many respondents in the Health Science selected "Using government article DB." Additionally, the Health Science had fewer respondents who selected "Referrals from colleagues and collaborators." "Using literature management software" was common in the Health and Life Sciences but less frequently reported in the Social Sciences & Humanities.

Other responses included NASA/ADS (Astrophysics Data System), Agropedia, arXiv, BIOSIS, CNKI, Eos (American Geophysical Union), J-STAGE, and MathSciNet as search methods. Additional resources mentioned were Reaxys, SciFinder, genome and protein databases, RSS feeds, newsletters, YouTube channels (e.g., JST, NEDO, AIST, new technology briefings), introductions to equipment manufacturers, thesis and literature databases developed by the National Institute for Japanese Language and Literature, policy press releases, publicity available information (e.g., court decisions) that respondents themselves owned.

3.2.3 Open Access and Research Publicity

Table 6 shows the status of support for open access of articles. Overall, "Open Access" was the most common, followed in descending order by "Closed Access," "Gold OA," "Delayed OA," "Green OA," "Hybrid OA," "Preprint Servers," and "Bronze OA." When comparing by academic discipline, the Social Sciences & Humanities were most likely to use publication methods that did not incur any costs, whereas the Physical Sciences were more likely to use methods that involved costs for either readers or authors. The use of "Preprint Servers" was also common in the Physical Sciences, which may be attributed to both the potential for reducing publication costs and the aim of enabling quicker dissemination of information.

Table 6: Responses on methods of open access.

Percentage of respondents who selected the relevant item(s) (%)		Total	Multidisciplinary	Physical Sciences	Health Sciences	Life Sciences	Social Sciences & Humanities
Method of open access	Open Access (no subscription or publication fees are charged)	56.6	65.2	48.1	**60.0**	51.8	**68.2**
	Closed Access (readers pay a subscription fee)	46.9	43.5	**58.6**	38.4	46.6	37.4
	Gold OA (author pays publication fee)	41.8	34.8	**50.3**	**46.1**	**56.5**	19.0
	Delayed OA (automatically released after a reserved period)	34.6	30.4	**32.5**	22.0	**45.8**	**37.9**
	Green OA (author's own publication in repository)	22.0	17.4	21.3	16.3	15.0	**31.3**
	Hybrid OA (author chooses to pay, reader is free)	16.6	21.7	**19.3**	**19.2**	**22.1**	7.7
	Preprint servers (to publish pre-reviewed papers)	13.4	17.4	**22.5**	6.1	**13.0**	6.2
	Bronze OA (free of charge at publisher's discretion)	2.5	**8.7**	2.8	4.5	0.8	1.8

Note: Bold and underlined numbers: Groups with significant differences in column proportions (z-test) at a 0.05 significance level, with p-values adjusted using the Bonferroni method.

Table 7 shows the status of response regarding research publicity. All items had an average value of 2.5 or less, indicating an overall tendency not to engage in research publicity. The most common response was "Sending papers to the parties involved in your research." Examining differences by discipline, "Publication on websites, etc." was slightly more common in the Physical and Life Sciences than the Social Sciences & Humanities and Multidisciplinary fields. Conversely, "Sending papers to your own colleagues" and "researchers relevant to your research" were more frequently observed in the Social Sciences & Humanities and Multidisciplinary fields.

Table 7: Frequency of implementation of research publicity methods.

	Mean level of implementation (1.Never, 2.Rarely, 3.Sometimes, 4.Always)	Total	Multidisciplinary	Physical Sciences	Health Sciences	Life Sciences	Social Sciences & Humanities
Research publicity	Sending papers to the people involved in your research	2.42	2.83	2.21	2.52	2.39	2.60
	Posting an introduction of your research on your own laboratory website, etc.	2.23	1.87	2.55	2.16	2.41	1.77
	Your organization publishes a press release introducing your research	1.76	1.79	1.79	1.75	2.02	1.58
	Sending papers to your own colleagues	1.72	**1.87**	1.58	1.51	1.66	**2.06**
	Sending papers to researchers that you think might be relevant to your research	1.49	**1.67**	1.38	1.20	1.36	**1.87**
	Your organization posts your research introduction on X, Facebook, and other SNS	1.49	1.38	1.53	1.44	1.62	1.39
	Sending papers to your sponsors of your research	1.48	1.33	1.46	1.40	1.42	1.58
	Posting an introduction of your research on X, Facebook, and other SNS yourself	1.48	1.58	1.54	1.40	1.56	1.41

Note: Bold and underlined numbers: Groups with significant differences (at a 0.05 significance level) divided into two groups by one-way ANOVA and Tukey B test.

3.2.4 Time Required for Submission and Frequency of Citation, Submission, Presentation and Book Publication

Table 8 shows the distribution of responses regarding the time required to submit a paper, the number of citations, and the frequency of submissions, presentations, and publications. The "Average number of citations" is calculated and displayed by assigning approximate values to the selected choices, as the responses were provided in categorical form rather than as numerical data. The "Time required to submit a paper" was shorter in the Social Sciences & Humanities, whereas it took more than twice as long in the Life Sciences. There was no significant difference in the "Frequency of paper submission." However, the Natural Sciences and Health Sciences had more "Research publications," while the Multidisciplinary and Social Sciences & Humanities exhibited higher "Frequency of publications."

Table 8: Paper submission and citation frequency.

	Mean value of responses	Total	Multidisciplinary	Physical Sciences	Health Sciences	Life Sciences	Social Sciences & Humanities
Frequency	Time required to submit a paper (in months)	25.89	26.25	25.60	25.95	**38.21**	18.33
	Average number of citations per paper (books/per paper)	22.83	14.96	22.07	23.51	**30.31**	19.06
	Frequency of paper submissions (times/year)	1.94	1.75	2.35	2.04	1.74	1.48
	Frequency of research presentations (times/year)	2.49	1.58	**3.26**	**2.67**	2.20	1.62
	Frequency of book publication (total number of books)	2.51	**4.42**	1.71	2.44	2.18	**3.68**

Note: Bold and underlined numbers: Groups with significant differences (at a 0.05 significance level) divided into two groups by one-way ANOVA and Tukey B test.

3.3 Comparison of High and Low Performers' Behavior

In this section, respondents were categorized as either high performers or low performers based on their academic field, and we analyzed the differences between these groups. The criteria for classifying someone as a high performer included their frequency of submitting papers, presenting research, and publishing books. Specifically, individuals in the top 20% for these activities within their discipline were considered high performers. We excluded the Multidisciplinary field from our analysis due to its limited number of respondents (24) and focused on the four remaining fields. The results are shown in Table 9. High performers are highlighted in light gray and circled by a square, and low performers are highlighted in dark gray.

Table 9: Categorized high and low performer groups.

	Physical Sciences			Health Sciences			Life Sciences			Social Sciences & Humanities		
Answer	Paper submissions No. (%)	Research presentations No. (%)	Book publications No. (%)	Paper submissions No. (%)	Research presentations No. (%)	Book publications No. (%)	Paper submissions No. (%)	Research presentations No. (%)	Book publications No. (%)	Paper submissions No. (%)	Research presentations No. (%)	Book publications No. (%)
Less than 1	**98 (19.1)**	**36 (7.0)**	**258 (50.4)**	**74 (29.7)**	**27 (10.8)**	**109 (44.3)**	**67 (26.4)**	**40 (15.7)**	**114 (44.7)**	**75 (18.9)**	**81 (20.5)**	**100 (25.3)**
1	**121 (23.6)**	**83 (16.2)**	**75 (14.6)**	**63 (25.3)**	**64 (25.7)**	**25 (10.2)**	**73 (28.7)**	**53 (20.8)**	**32 (12.5)**	**153 (38.6)**	**129 (32.6)**	**51 (12.9)**
2	**128 (25.0)**	**151 (29.5)**	**46 (9.0)**	**42 (16.9)**	**66 (26.5)**	**29 (11.8)**	**60 (23.6)**	**86 (33.7)**	**29 (11.4)**	113 (28.5)	**106 (26.8)**	**31 (7.8)**
3	**58 (11.3)**	**69 (13.5)**	41 (8.0)	25 (10.0)	**31 (12.4)**	**18 (7.3)**	26 (10.2)	40 (15.7)	**21 (8.2)**	32 (8.1)	43 (10.9)	**41 (10.4)**
4	24 (4.7)	**56 (10.9)**	28 (5.5)	12 (4.8)	15 (6.0)	**11 (4.5)**	8 (3.1)	15 (5.9)	13 (5.1)	11 (2.8)	21 (5.3)	**35 (8.8)**
5	43 (8.4)	37 (7.2)	23 (4.5)	15 (6.0)	24 (9.6)	17 (6.9)	9 (3.5)	9 (3.5)	17 (6.7)	10 (2.5)	10 (2.5)	**29 (7.3)**
6	11 (2.1)	24 (4.7)	11 (2.1)	3 (1.2)	4 (1.6)	5 (2.0)	3 (1.2)	2 (0.8)	3 (1.2)		4 (1.0)	**21 (5.3)**
7	3 (0.6)	3 (0.6)	1 (0.2)	1 (0.4)	2 (0.8)	3 (1.2)	1 (0.4)		2 (0.8)	1 (0.3)	2 (0.5)	14 (3.5)
8	3 (0.6)	13 (2.5)	2 (0.4)	1 (0.4)	1 (0.4)	3 (1.2)	1 (0.4)		3 (1.2)			11 (2.8)
9		2 (0.4)	1 (0.2)	1 (0.4)		1 (0.4)						4 (1.0)
10 or more	23 (4.5)	38 (7.4)	26 (5.1)	12 (4.8)	15 (6.0)	25 (10.2)	6 (2.4)	10 (3.9)	21 (8.2)	1 (0.3)		59 (14.9)
Total	512 (100.0)	512 (100.0)	512 (100.0)	249 (100.0)	249 (100.0)	246 (100.0)	254 (100.0)	255 (100.0)	255 (100.0)	396 (100.0)	396 (100.0)	396 (100.0)

* No. of "Paper submissions" and "Research presentations" are indicate the number of submissions and presents per year.
* No. of "Book publications" is indicate the total number of books published to date.

Note that among these three indicators, Paper submissions and Research presentations were based on the average annual count, whereas Book publications refer to the total number of publications over a researcher's lifetime. It is important to note that indicators based on the total number of Book publications may favor older researchers.

We applied T-tests and Chi-square tests across three indicators—number of Paper submissions, number of Research presentations, and number of Book publications—for each of the disciplines. In the following paragraphs, we present the results of these analyses.

3.3.1 Searching Targets

Table 10 shows the results of comparing the objects of information search target. The questions were asked using a 4-point scale, and an asterisk (*) indicates items where the T-test showed a significant difference in mean values. Items with higher values are underlined. Those with positive implications (frequently selected by high performers) are highlighted in light gray and circled by a square, and those with negative implications (frequently selected by low performers) are highlighted in dark gray. Overall, "Searching for research" and "Searching for researchers" were commonly positive; however, there are no significant differences common to all fields, indicating that the trends vary widely by field.

Table 10: Comparison of frequency of information search target (T-tests).

Questions	Group	Physical Sciences			Health Sciences			Life Sciences			Social Sciences & Humanities		
		Paper submissions Mean p	Research presentations Mean p	Book publications Mean p	Paper submissions Mean p	Research presentations Mean p	Book publications Mean p	Paper submissions Mean p	Research presentations Mean p	Book publications Mean p	Paper submissions Mean p	Research presentations Mean p	Book publications Mean p
Searching for research (look up the article itself)	High	3.77 *	3.76 **	**3.56** *	3.87 *	3.78	3.78	3.78	3.89 **	3.75	3.82	3.85 **	3.83
	Low	3.66	3.63	**3.71**	3.72	3.73	3.74	3.71	3.66	3.72	3.79	3.74	3.78
Searching for researchers (find out what people are doing)	High	2.75	2.77	2.71	2.82 *	2.58	2.68	2.68	2.73	2.71	2.96	3.03	3.05
	Low	2.71	2.70	2.72	2.56	2.62	2.59	2.67	2.65	2.66	2.98	2.94	2.96
Searching for research institutions (find out about universities and other institutions)	High	**1.71** **	1.87	1.85	2.23	2.08	2.30 *	2.06	2.08	2.24 *	2.35 *	2.16	2.29
	Low	**1.95**	1.93	1.93	2.09	2.13	2.06	2.08	2.08	2.03	2.15	2.19	2.14
Searching for societies and organizations (find out about related societies and organizations)	High	2.12	2.18	2.19	2.30	**2.32** *	2.47	1.98	2.12	2.19	2.78	2.69	2.61
	Low	2.15	2.13	2.13	2.49	**2.54**	2.45	2.18	2.15	2.12	2.61	2.58	2.64

* $p < 0.05$, ** $p < 0.01$ Options: 1.Never, 2.Rarely, 3.Sometimes, 4.Always = High = Low

3.3.2 Searching and Acquiring Information

Table 11 shows the results of comparing the methods of searching information. Respondents were allowed to select multiple methods they use, and the results were cross-tabulated. An asterisk (*) indicates items where the Chi-square test identified a significant difference. Items with positive implications (frequently selected by high performers) are highlighted in dark gray, while those with negative implications (frequently selected by low performers) are highlighted in light gray and circled by a square. There were no items that showed significant differences in common across all disciplines, indicating that trends vary greatly by field. Focusing only on items with significant differences, in the Physical Sciences, only negative items were present, whereas in the Social Sciences & Humanities, only positive items were observed. In the Life Sciences, only a few items showed significant differences, and those that did were negative. In the Health Sciences, there were negative items related to Book publications; however, many other items were positive. This difference in trends may be attributed to the nature of the book publication index, which considers the total number of publications over a researcher's lifetime. Since the Book publication index asks about the number of publications over a lifetime, it favors older researchers and may have a different trend than the article submission and research publication index, which asks about the number of publications per year.

Table 11: Comparison of methods of searching for information (Chi-square tests).

Questions		Physical Sciences						Health Sciences						Life Sciences						Social Sciences & Humanities					
		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications	
		High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Using general-purpose Internet search (Google, Yahoo, etc.)	Yes	80	414	166	328	128	366	37	167	77	127	44	160	50	188	69	169	56	182	50	308	171	187	80	278
	No	3	15	7	11	5	13	8	38	15	31	10	36	4	15	7	12	3	16	5	34	15	24	8	31
Reading abstract or full text on the journal's publication page or download the file	Yes	**60**	**354***	135	279	103	311	33	142	62	113	40	135	41	158	61	138	46	153	48	294	165	177	78	264
	No	**23***	**75**	38	60	30	68	12	63	30	45	14	61	13	45	15	43	13	45	7	48	21	34	10	45
Participation in conferences and symposiums	Yes	67	355	148	274	107	315	33	141	65	109	38	136	44	163	58	149	47	160	45	272	161**	156	72	245
	No	16	74	25	65	26	64	12	64	27	49	16	60	10	40	18	32	12	38	10	70	25	55**	16	64
Using government article DB (CiNii, PubMed, etc.)	Yes	49	271	100	220	75	245	41	178	86*	133	50	169	44	176	68	152	51	169	44	291	163	172	80	255
	No	34	158	73	119	58	134	4	27	6	25*	4	27	10	27	8	29	8	29	11	51	23	39	8	54
Using researchers' achievement DB (Kaken, researchmap, Orcid, Google Scholar, etc.)	Yes	**54**	**326***	**118**	**262***	92	288	34	130	59	105	**29**	**135***	43	155	57	141	46	152	46	285	155	176	74	257
	No	**29***	**103**	**55***	**77**	41	91	11	75	33	53	**25***	**61**	11	48	19	40	13	46	9	57	31	35	14	52
Searching in the reference section of known articles and books	Yes	60	322	125	257	92	290	24	120	53	91	27	117	34	132	43	123	36	130	47	277	155	169	75	249
	No	23	107	48	82	41	89	21	85	39	67	27	79	20	71	33	58	23	68	8	65	31	42	13	60
Referrals from colleagues and collaborators	Yes	45	241	104	182	68	218	24*	76	36	64	19	81	29	120	37	112	37	112	32	184	120**	96	52	164
	No	38	188	69	157	65	161	21	129*	56	94	35	115	25	83	39	69	22	86	23	158	66	115**	36	145
Using commercial article DB (Scopus, Web of Science, etc.)	Yes	53	247	110	190	81	219	17	66	30	53	16	67	28	116	40	104	32	112	28*	123	79	72	36	115
	No	30	182	63	149	52	160	28	139	62	105	38	129	26	87	36	77	27	86	27	219*	107	139	52	194
Using SNS for researchers (ResearchGate, Academia, etc.)	Yes	37	210	73	174	59	188	21*	61	30	52	21	61	29	107	45	91	31	105	22	148	90*	80	35	135
	No	46	219	100	165	74	191	24	144*	62	106	33	135	25	96	31	90	28	93	33	194	96	131*	53	174
Viewing articles reported in professional magazines	Yes	34	167	70	131	60	141	21*	64	38	47	21	64	23	82	30	75	26	79	34*	154	103**	85	50*	138
	No	49	262	103	208	73	238	24	141*	54	111	33	132	31	121	46	106	33	119	21	188*	83	126**	38	171*
Using institutional repositories published by each research institution	Yes	18	137	43	112	**28**	**127****	9	60	19	50	14	55	10	61	17	54	18	53	40	229	129	140	66	203
	No	65	292	130	227	**105****	**252**	36	145	73	108	40	141	44	142	59	127	41	145	15	113	57	71	22	106
Finding in libraries, archives, bookstores, and other physical stores	Yes	20	112	40	92	35	97	9	46	18	37	13	42	14	40	15	39	14	40	37	196	107	126	54	179
	No	63	317	133	247	98	282	36	159	74	121	41	154	40	163	61	142	45	158	18	146	79	85	34	130
Using literature management software (Mendeley, EndNote, etc.)	Yes	35	146	66	115	40	141	23	74	39	58	**13**	**84***	25	76	32	69	20	81	16	73	46	43	16	73
	No	48	283	107	224	93	238	22	131	53	100	**41***	**112**	29	127	44	112	39	117	39	269	140	168	72	236
Introduction from research supervisor	Yes	**13**	**127***	42	98	**20**	**120****	15	54	20	49	11	58	11	69	**13**	**67****	14	66	13	100	63*	50	24	89
	No	**70***	**302**	131	241	**113****	**259**	30	151	72	109	43	138	43	134	**63****	**114**	45	132	42	242	123	161*	64	220
Viewing articles reported in general magazines	Yes	15	80	32	63	30	65	13**	23	17	19	11	25	16	53	20	49	17	52	19	95	58	56	26	88
	No	68	349	141	276	103	314	32	182**	75	139	43	171	38	150	56	132	42	146	36	247	128	155	62	221
Using SNS for general (X, Facebook, etc.)	Yes	15	90	30	75	113	294	11	30	19	22	7	34	10	46	16	40	9	47	17	86	61**	42	22	81
	No	68	339	143	264	20	85	34	175	73	136	47	162	44	157	60	141	50	151	38	256	125	169**	66	228
Reading the research institute's public relations articles	Yes	16	94	30	80	22	88	11*	25	19*	17	8	28	9	51	15	45	**7**	**53***	17	70	45	42	18	69
	No	67	335	143	259	111	291	34	180*	73	141*	46	168	45	152	61	136	**52***	**145**	38	272	141	169	70	240
Using ChatAI (ChatGPT, Bing AI Chat and other interactive AI)	Yes	7	62	**16**	**53***	120	323	8	19	13	14	8	19	7	21	9	19	5	23	8	27	17	18	10	25
	No	76	367	**157***	**286**	13	56	37	186	79	144	46	177	47	182	67	162	54	175	47	315	169	193	78	284
Viewing articles broadcast on TV and other media	Yes	7	41	14	34	14	34	8**	12	10	10	6	14	6	26	5	27	8	24	9	39	21	27	14	34
	No	76	388	159	305	119	345	37	193**	82	148	48	182	48	177	71	154	51	174	46	303	165	184	74	275
Using commercial research analysis tools (SciVal, InCites, Dimensions, etc.)	Yes	1	12	5	8	3	10	1	2	2	1	1	2	1	11	2	10	1	11	1	1	2	0	1	1
	No	82	417	168	331	130	369	44	203	90	157	53	194	53	192	74	171	58	187	54	341	184	211	87	308

* $p < 0.05$, ** $p < 0.01$ = High = Low

Table 12 shows the results of comparing methods of acquiring information. The approach to interpreting these results is similar to that used for Table 11. There are significant differences in the Health Sciences and Social Sciences & Humanities fields, with two specific aspects showing marked disparities, particularly in the research presentations within Social Sciences & Humanities. However, the overall number of items with significant differences remains small. There were no items that showed significant differences across all disciplines, indicating that trends vary greatly by field. Focusing only on items with significant differences, in Physical Sciences, only negative items are present, while in Social Sciences & Humanities, only positive items are present. In Life Sciences, a few items are significantly different, and a few are negative. In Health Sciences, there are negative items related to book publications, but otherwise, many items are positive. The characteristics of the book publication index are described earlier.

Table 12: Comparison of methods of acquiring information (Chi-square tests).

Questions		Physical Sciences						Health Sciences						Life Sciences						Social Sciences & Humanities					
		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications	
		High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Papers available free of charge via web download, etc. (free of charge)	Yes	83	423	170	336	131	375	43	201	90	154	53	191	53	203	75	181	59	197	55	336	182	209	87	304
	No	0	6	3	3	2	4	2	4	2	4	1	5	1	0	1	0	0	1	0	6	4	2	1	5
Articles accessible through agreements (Your organization has subscription)	Yes	71	383	153	301	108	346	42	168	84*	126	47	163	50	184	67	167	49	185	43	247	138	152	65	225
	No	12	46	20	38	25	33	3	37	8	32*	7	33	4	19	9	14	10	13	12	95	48	59	23	84
Borrowing articles from internal/external libraries, etc. (photocopying fees apply)	Yes	52	250	99	203	82	220	24	132	55	101	35	121	29	130	46	113	41	118	48	292	157	183	78	262
	No	31	179	74	136	51	159	21	73	37	57	19	75	25	73	30	68	18	80	7	50	29	28	10	47
Journals subscribed or accessed through membership (with annual / monthly payments)	Yes	41	228	89	180	67	202	22	89	48	63	26	85	26	96	39	83	28	94	**33**	**262****	143	152	70	225
	No	42	201	84	159	66	177	23	116	44	95	28	111	28	107	37	98	31	104	**22****	**80**	43	59	18	84
Paying as you go and get your papers (Pay only when you need them)	Yes	28	120	54	94	40	108	15	56	30	41	11	60	10	40	19	31	17	33	18	154	91*	81	41	131
	No	55	309	119	245	93	271	30	149	62	117	43	136	44	163	57	150	42	165	37	188	95	130*	47	178
Obtaining articles directly from the authors (Ask them to send. Almost free of charge)	Yes	28	104	53	79	39	93	11	35	17	29	10	36	19	60	23	56	18	61	18	98	67**	49	29	87
	No	55	325	120	260	94	286	34	170	75	129	44	160	35	143	53	125	41	137	37	244	119	162**	59	222

* $p < 0.05$, ** $p < 0.01$ = High = Low

3.3.3 Open Access and Research Publicity

Table 13 shows the results of responses regarding open access publishing. The approach to interpreting these results mirrors that of Table 11 or 12. While the item "Open Access" received negative responses in the context of Research presentations in the Physical Sciences, all other items across all fields received positive responses. Particularly, "Gold OA" emerged as the most prevalent practice. Additionally, the fields of Health Sciences and Social Sciences & Humanities were more likely to engage in "Closed Access." There were no significant differences in the use of "Preprint servers," whose usage has been rapidly increasing in recent years.

Table 14 shows the results related to the frequency of disseminating research information. The approach to interpreting these results mirrors that of Table 10. Significant differences were observed across numerous aspects of research dissemination, with nearly all outcomes being positive, except for one. Particularly, practices such as "Posting an introduction of your research on your own laboratory website, etc." and "Your organization publishes a press release introducing your research" were found to be prevalent across various fields.

Table 13: Comparison of methods of open access (Chi-square tests).

Questions		Physical Sciences						Health Sciences						Life Sciences						Social Sciences & Humanities					
		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications	
		High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Open Access (no subscription or publication fees are charged)	Yes	39	205	**70**	**174***	64	180	32	115	59	88	33	114	33	98	39	92	37*	94	38	228	120	146	57	209
	No	44	224	**103***	**165**	69	199	13	90	33	70	21	82	21	105	37	89	22	104*	17	114	66	65	31	100
Closed Access (readers pay a subscription fee)	Yes	51	246	96	201	83	214	24*	70	44*	50	25	69	27	91	36	82	25	93	21	125	69	77	42*	104
	No	32	183	77	138	50	165	21	135*	48	108*	29	127	27	112	40	99	34	105	34	217	117	134	46	205*
Gold OA (author pays publication fee)	Yes	59**	196	99*	156	76*	179	27*	86	50*	63	25	88	32	111	43	100	31	112	14	60	46**	28	14	60
	No	24	233**	74	183*	57	200*	18	119*	42	95*	29	108	22	92	33	81	28	86	41	282	140	183**	74	249
Delayed OA (automatically released after a reserved period)	Yes	29	136	50	115	51	114	13	41	23	31	16	38	29	87	42*	74	26	90	22	126	72	76	44**	104
	No	54	293	123	224	82	265	32	164	69	127	38	158	25	116	34	107*	33	108	33	216	114	135	44	205**
Green OA (author's own publication in repository)	Yes	27**	81	51**	57	29	79	8	32	17	23	11	29	9	29	14	24	8	30	16	106	50	72	27	95
	No	56	348**	122	282**	104	300	37	173	75	135	43	167	45	174	62	157	51	168	39	236	136	139	61	214
Hybrid OA (author chooses to pay, reader is free)	Yes	23*	75	38	60	24	74	13	34	18	29	7	40	10	46	17	39	14	42	9**	21	18	12	6	24
	No	60	354*	135	279	109	305	32	171	74	129	47	156	44	157	59	142	45	156	46	321**	168	199	82	285
Preprint servers (to publish pre-reviewed papers)	Yes	17	97	37	77	24	90	5	10	7	8	4	11	10	23	12	21	10	23	4	20	14	10	4	20
	No	66	332	136	262	109	289	40	195	85	150	50	185	44	180	64	160	49	175	51	322	172	201	84	289
Bronze OA (free of charge at publisher's discretion)	Yes	3	11	4	10	3	11	3	8	7	4	3	8	0	2	1	1	1	1	1	6	5	2	2	5
	No	80	418	169	329	130	368	42	197	85	154	51	188	54	201	75	180	58	197	54	336	181	209	86	304

* p < 0.05, ** p < 0.01 = High = Low

Table 14: Comparison of frequency of research publicity methods (T-tests).

Questions		Physical Sciences						Health Sciences						Life Sciences						Social Sciences & Humanities					
		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications		Paper submissions		Research presentations		Book publications	
	Group	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p	Mean	p
Sending papers to the people involved in your research	High	2.13		2.32		2.21		2.45		2.50		2.75		2.24		2.44		2.59		2.72		2.68		2.88	**
	Low	2.23		2.16		2.21		2.53		2.53		2.45		2.42		2.37		2.33		2.58		2.54		2.52	
Posting an introduction of your research on your own laboratory website, etc.	High	2.95	**	2.87	**	2.76	**	2.72	**	2.36	*	2.26		3.02	**	2.84	**	2.60		2.11	*	1.91	**	1.87	
	Low	2.47		2.39		2.48		2.04		2.05		2.13		2.24		2.22		2.35		1.72		1.66		1.75	
Your organization publishes a press release introducing your research	High	2.01	**	1.85		1.93	*	2.24	**	1.92	*	2.12	**	2.27	*	2.17	*	2.21	*	1.74		1.62		1.76	**
	Low	1.75		1.77		1.75		1.64		1.65		1.66		1.95		1.95		1.96		1.55		1.54		1.52	
Sending papers to your own colleagues	High	**1.44**	*	1.57		1.54		1.47		1.43		1.50		1.62		1.67		1.73		2.22		2.07		2.38	**
	Low	**1.60**		1.58		1.59		1.53		1.56		1.52		1.66		1.65		1.63		2.03		2.05		1.97	
Sending papers to researchers that you think might be relevant to your research	High	1.37		1.37		1.34		1.26		1.23		1.24		1.41		1.44		1.46		1.85		1.87		2.26	**
	Low	1.38		1.39		1.39		1.18		1.17		1.19		1.35		1.33		1.33		1.87		1.87		1.76	
Your organization posts your research introduction on X, Facebook, and other SNS	High	1.68	*	1.57		1.59		1.84	**	1.60	**	1.62	*	1.65		1.66		1.68		1.46		1.47	*	1.54	*
	Low	1.50		1.51		1.51		1.35		1.34		1.39		1.61		1.60		1.60		1.38		1.33		1.35	
Sending papers to your sponsors of your research	High	1.58		1.77	**	1.73	**	1.42		1.42		1.66	*	1.52		1.70		1.54		1.44		1.47		1.52	
	Low	1.53		1.42		1.48		1.39		1.38		1.33		1.57		1.51		1.57		1.41		1.37		1.39	
Posting an introduction of your research on X, Facebook, and other SNS yourself	High	1.65	*	1.57	*	1.48		1.50		1.49		1.35		1.72	**	1.53		1.49		1.76		1.68	*	1.64	
	Low	1.42		1.41		1.45		1.37		1.34		1.41		1.34		1.38		1.40		1.55		1.50		1.57	

* p < 0.05, ** p < 0.01 Options: 1.Never, 2.Rarely, 3.Sometimes, 4.Always = High = Low

4 Discussion

In this study, we compared and analyzed differences in behavior related to gathering research information and publishing papers across disciplines, as well as between high and low performers. The comparison of the frequency of implementation regarding information retrieval (Table 4) showed no significant differences between disciplines. However, the comparison between high and low performers (Table 10) indicated differences in behavior. Specifically, in "Searching the research itself," certain actions were performed more frequently by high performers across all fields.

There were significant differences among the disciplines in terms of information collection methods (Table 5), and the behavior of high and low performers also varied greatly across disciplines (Table 11). In particular, Social Sciences & Humanities utilized a wide range of items (12), whereas Health Sciences were almost entirely concentrated on a single item (use of government DBs). Regarding methods for obtaining information, while most fields relied on contracts with organizations, Social Sciences & Humanities were unique in that the use of libraries and individual contracts or payments were mainstream, highlighting a significant difference from other disciplines.

In comparison with high performers (Table 11), low performers in the Physical Sciences used a variety of methods, covering seven items, whereas high performers in the Social Sciences & Humanities employed nine items. In the Health Sciences, low performers in book publishing were more likely to use the "Researcher Achievement DB" and a "Literature management application," among two items. This may be because this question asks about the number of books published during a person's lifetime. Consequently, the behavior of younger researchers, who publish fewer books, may have had a significant impact. In contrast, high performers tended to utilize a broader range of methods, encompassing eight items. Regarding the Life Sciences, only two items showed significant differences in the behavior of low performers, and these differences were marginal. As for obtaining information (Table 12), only a few items displayed significant differences.

Regarding open access (Table 6), "Open Access" was popular overall. However, "Gold OA" was frequently selected in fields other than Social Sciences & Humanities. High performers also tended to choose "Gold OA" in many cases, with significant differences observed in nine items (Table 13). As for research publicity (Table 7), while Social Sciences & Humanities and Multidisciplinary fields showed more frequent behavior in "Sending papers to colleagues and others who might be involved," high performers (Table 14) employed a wide variety of publicity methods. These included Internet-based publicity, publicity by organizations, and publicity via social networking sites (SNS), with significant differences noted in 34 items for high performers. In contrast, low performers were significant in only one item: "Sending papers to colleagues."

According to the JRAF survey [7][8] conducted in 2023, the following characteristics of Japanese researchers' communication were identified: "Japan's researchers see high value in communicating their research more broadly beyond academic publications and presentations. 94% of researchers in Japan believe it is crucial to communicate their research to a wider audience, and 87% expressed a strong interest in sharing their research." This conclusion aligns with our findings that high performers place a high priority on research outreach. In addition, the

JRAF survey also noted: "Amongst those who decided to communicate, however, approximately a third of the researchers did not have a clear idea of their target audience and approximately 80% felt they needed more support to communicate their research effectively to the wider community." This observation is consistent with one of our findings, which suggests that the inability to identify a clear target audience arises because the methods of obtaining information vary widely across disciplines.

Defining the target audience is crucial for research outreach; however, it is challenging to establish a standardized approach because information sources vary across fields. While research articles need to be discoverable through general internet searches, which are used in all fields, consideration should also be given to the specific characteristics of each discipline. For example, Health Sciences should prioritize indexing in government-affiliated databases such as PubMed. Similarly, in the Physical Sciences, where government-affiliated databases are less predominant, it may be more effective to focus on being listed in commercial databases. On the other hand, in Social Sciences & Humanities, finding information often requires a variety of tailored search methods. To address this, digitizing information, assigning persistent identifiers (PIDs) to research outputs, and developing unified databases are essential for improving accessibility.

In addition to posting articles on websites, social media platforms are often used for public relations via the Internet. However, it is necessary to evaluate whether posting on these general-purpose channels is truly effective. Studies examining whether posting on Twitter (now X) increases the number of citations have consistently questioned its effectiveness [10][11][12]. Additionally, some articles report that thousands of scientists have refrained from using X [13]. Our findings (Table 5) also suggest that the use of general-purpose SNS is not optimal, but rather that specialized SNS are used and are considered a more reliable channel. Instead, platforms dedicated to researchers are more likely to be effective.

5 Conclusion

This study examines the behaviors related to information gathering and paper publishing among researchers, focusing on variations across disciplines and performance levels. The findings reveal differences in approaches to information retrieval, publication strategies, and research outreach. The study emphasizes defining a clear target audience to ensure effective research communication. However, the disparities in information access across disciplines indicate that a one-size-fits-all approach is impractical. Instead, discipline-specific measures are recommended, such as indexing in government databases for Health Sciences or enhancing digitization and persistent identifiers for the Social Sciences & Humanities.

Furthermore, the effectiveness of general-purpose social media platforms for research outreach is questionable, with specialized platforms proving more reliable for scientific communication. These findings are consistent with broader trends highlighted in the 2023 JRAF survey, which underscored the significance of research communication while acknowledging gaps in targeting and support mechanisms. To enhance research impact and accessibility, it is crucial to adopt targeted and discipline-specific outreach strategies alongside unified databases and digital tools that facilitate academic dissemination across diverse fields. While the current survey results suggest some correlations, they do not establish causality, caution should be exercised when interpreting the findings. To strengthen the validity of these results, future analyses should

combine these indicators with other relevant metrics such as altmetrics, and utilize the latest data from [4][14].

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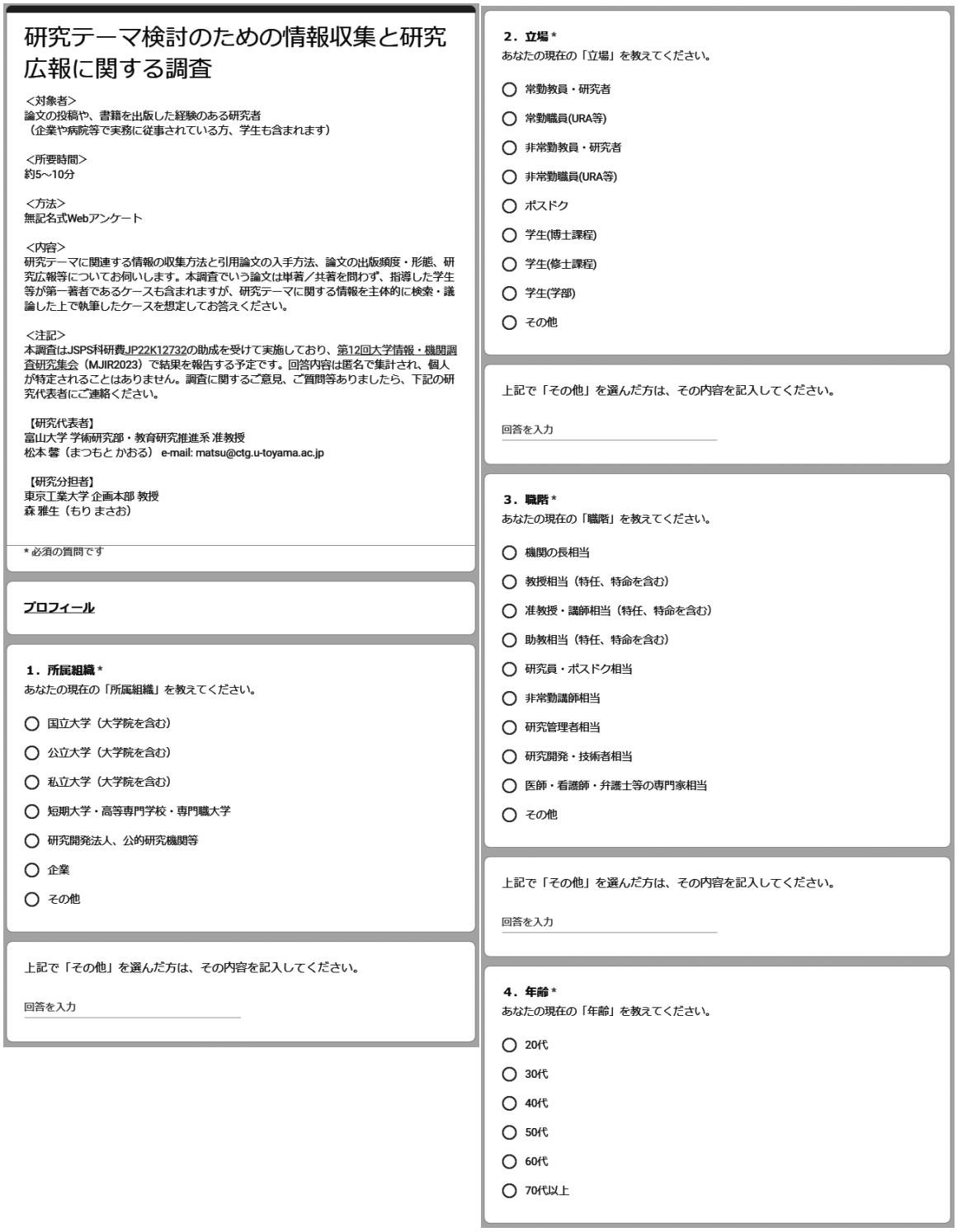
Appendix



研究テーマ検討のための情報収集と研究広報に関する調査

<対象者>
論文の投稿や、書籍を出版した経験のある研究者
（企業や病院等で実務に従事されている方、学生も含まれます）

<所要時間>
約5～10分

<方法>
無記名式Webアンケート

<内容>
研究テーマに関連する情報の収集方法と引用論文の入手方法、論文の出版頻度・形態、研究広報等についてお伺いします。本調査でいう論文は単著／共著を問わず、指導した学生等が第一著者であるケースも含まれますが、研究テーマに関する情報を主体的に検索・議論した上で執筆したケースを想定してお答えください。

<注記>
本調査はJSPS科研費JP22K12732の助成を受けて実施しており、第12回大学情報・機関調査研究集会（MJIR2023）で結果を報告する予定です。回答内容は匿名で集計され、個人が特定されることはありません。調査に関するご意見、ご質問等ありましたら、下記の研究代表者にご連絡ください。

【研究代表者】
富山大学 学術研究部・教育研究推進系 准教授
松本 馨（まつもと かおる） e-mail: matsu@ctg.u-toyama.ac.jp

【研究分担者】
東京工業大学 企画本部 教授
森 雅生（もり まさお）

* 必須の質問です

プロフィール

1．所属組織 *
あなたの現在の「所属組織」を教えてください。

- 国立大学（大学院を含む）
- 公立大学（大学院を含む）
- 私立大学（大学院を含む）
- 短期大学・高等専門学校・専門職大学
- 研究開発法人、公的研究機関等
- 企業
- その他

上記で「その他」を選んだ方は、その内容を記入してください。

回答を入力

2．立場 *
あなたの現在の「立場」を教えてください。

- 常勤教員・研究者
- 常勤職員(URA等)
- 非常勤教員・研究者
- 非常勤職員(URA等)
- ポスドク
- 学生(博士課程)
- 学生(修士課程)
- 学生(学部)
- その他

上記で「その他」を選んだ方は、その内容を記入してください。

回答を入力

3．職階 *
あなたの現在の「職階」を教えてください。

- 機関の長相当
- 教授相当（特任、特命を含む）
- 准教授・講師相当（特任、特命を含む）
- 助教相当（特任、特命を含む）
- 研究員・ポスドク相当
- 非常勤講師相当
- 研究管理者相当
- 研究開発・技術者相当
- 医師・看護師・弁護士等の専門家相当
- その他

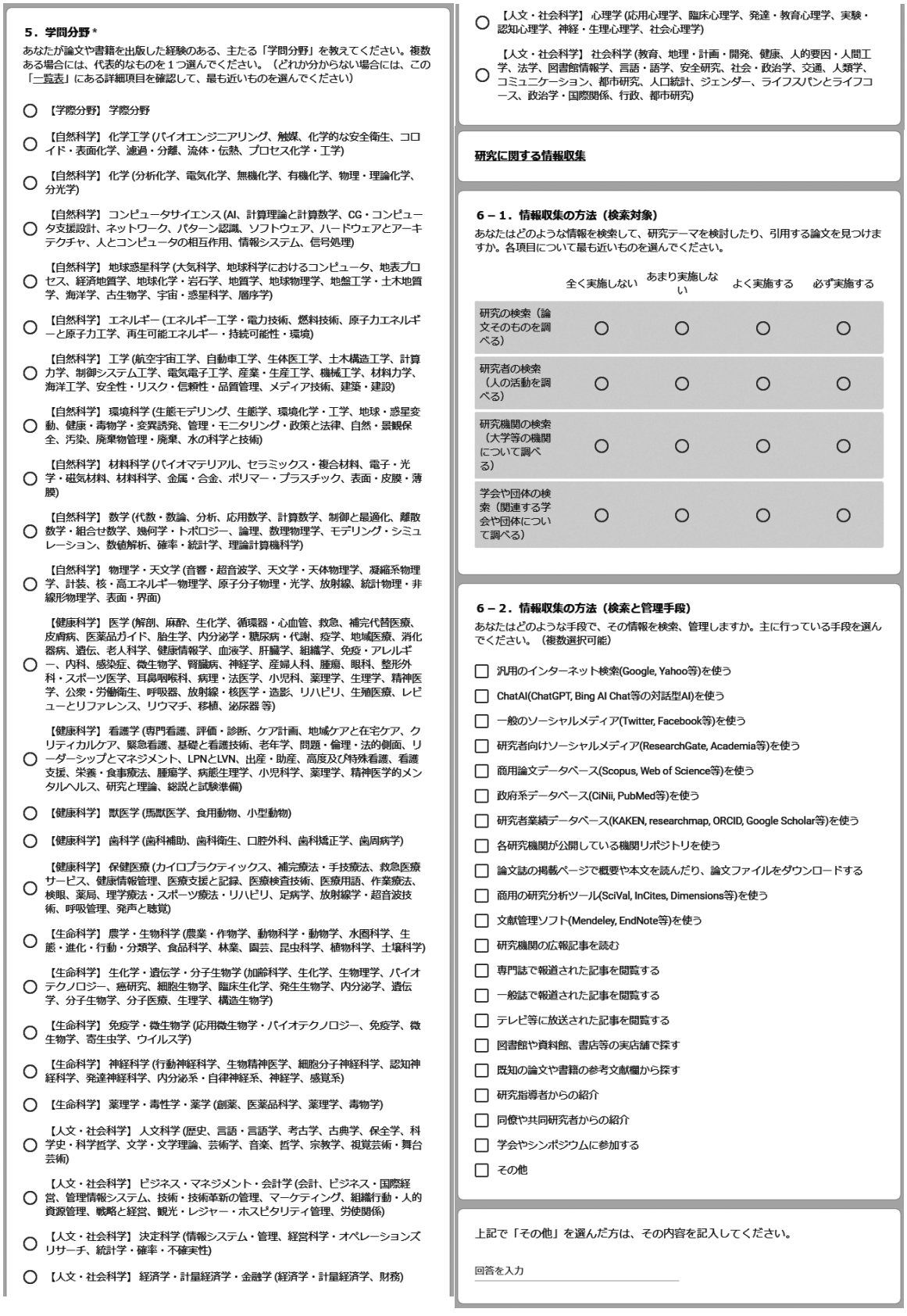
上記で「その他」を選んだ方は、その内容を記入してください。

回答を入力

4．年齢 *
あなたの現在の「年齢」を教えてください。

- 20代
- 30代
- 40代
- 50代
- 60代
- 70代以上

Figure A: Questionnaire 1 of 4 (in Japanese).



5．学問分野 *

あなたが論文や書籍を出版した経験のある、主たる「学問分野」を教えてください。複数ある場合には、代表的なものを１つ選んでください。（どれか分からない場合には、この「一覧表」にある詳細項目を確認して、最も近いものを選んでください）

- ○ 【学際分野】 学際分野
- ○ 【自然科学】 化学工学 (バイオエンジニアリング、触媒、化学的な安全衛生、コロイド・表面化学、濾過・分離、流体・伝熱、プロセス化学・工学)
- ○ 【自然科学】 化学 (分析化学、電気化学、無機化学、有機化学、物理・理論化学、分光学)
- ○ 【自然科学】 コンピュータサイエンス (AI、計算理論と計算数学、CG・コンピュータ支援設計、ネットワーク、パターン認識、ソフトウェア、ハードウェアとアーキテクチャ、人とコンピュータの相互作用、情報システム、信号処理)
- ○ 【自然科学】 地球惑星科学 (大気科学、地球科学におけるコンピュータ、地表プロセス、経済地質学、地球化学・岩石学、地質学、地球物理学、地盤工学・土木地質学、海洋学、古生物学、宇宙・惑星科学、層序学)
- ○ 【自然科学】 エネルギー (エネルギー工学・電力技術、燃料技術、原子力エネルギーと原子力工学、再生可能エネルギー・持続可能性・環境)
- ○ 【自然科学】 工学 (航空宇宙工学、自動車工学、生体医工学、土木構造工学、計算力学、制御システム工学、電気電子工学、産業・生産工学、機械工学、材料力学、海洋工学、安全性・リスク・信頼性・品質管理、メディア技術、建築・建設)
- ○ 【自然科学】 環境科学 (生態モデリング、生態学、環境化学・工学、地球・惑星変動、健康・毒物学・変異誘発、管理・モニタリング・政策と法律、自然・景観保全、汚染、廃棄物管理・廃棄、水の科学と技術)
- ○ 【自然科学】 材料科学 (バイオマテリアル、セラミックス・複合材料、電子・光学・磁気材料、材料科学、金属・合金、ポリマー・プラスチック、表面・皮膜・薄膜)
- ○ 【自然科学】 数学 (代数・数論、分析、応用数学、計算数学、制御と最適化、離散数学・組合せ数学、幾何学・トポロジー、論理、数理物理学、モデリング・シミュレーション、数値解析、確率・統計学、理論計算機科学)
- ○ 【自然科学】 物理学・天文学 (音響・超音波学、天文学・天体物理学、凝縮系物理学、計装、核・高エネルギー物理学、原子分子物理・光学、放射線、統計物理・非線形物理学、表面・界面)
- ○ 【健康科学】 医学 (解剖、麻酔、生化学、循環器・心血管、救急、補完代替医療、皮膚病、医薬品ガイド、胎生学、内分泌学・糖尿病・代謝、疫学、地域医療、消化器病、遺伝、老人科学、健康情報学、血液学、肝臓学、組織学、免疫・アレルギー、内科、感染症、微生物学、腎臓病、神経学、産婦人科、腫瘍、眼科、整形外科・スポーツ医学、耳鼻咽喉科、病理・法医学、小児科、薬理学、生理学、精神医学、公衆・労働衛生、呼吸器、放射線・核医学・造影、リハビリ、生殖医療、レビューとリファレンス、リウマチ、移植、泌尿器 等)
- ○ 【健康科学】 看護学 (専門看護、評価・診断、ケア計画、地域ケアと在宅ケア、クリティカルケア、緊急看護、基礎と看護技術、老年学、問題・倫理・法的側面、リーダーシップとマネジメント、LPNとLVN、出産・助産、高度及び特殊看護、看護支援、栄養・食事療法、腫瘍学、病態生理学、小児科学、薬理学、精神医学的メンタルヘルス、研究と理論、総説と試験準備)
- ○ 【健康科学】 獣医学 (馬獣医学、食用動物、小型動物)
- ○ 【健康科学】 歯科学 (歯科補助、歯科衛生、口腔外科、歯科矯正学、歯周病学)
- ○ 【健康科学】 保健医療 (カイロプラクティックス、補完療法・手技療法、救急医療サービス、健康情報管理、医療支援と記録、医療検査技術、医療用語、作業療法、検眼、薬局、理学療法・スポーツ療法・リハビリ、足病学、放射線学・超音波技術、呼吸管理、発声と聴覚)
- ○ 【生命科学】 農学・生物科学 (農業・作物学、動物科学・動物学、水圏科学、生態・進化・行動・分類学、食品科学、林業、園芸、昆虫科学、植物科学、土壌科学)
- ○ 【生命科学】 生化学・遺伝学・分子生物学 (加齢科学、生化学、生物理学、バイオテクノロジー、癌研究、細胞生物学、臨床生化学、発生生物学、内分泌学、遺伝学、分子生物学、分子医療、生理学、構造生物学)
- ○ 【生命科学】 免疫学・微生物学 (応用微生物学・バイオテクノロジー、免疫学、微生物学、寄生虫学、ウイルス学)
- ○ 【生命科学】 神経科学 (行動神経科学、生物精神医学、細胞分子神経科学、認知神経科学、発達神経科学、内分泌系・自律神経系、神経学、感覚系)
- ○ 【生命科学】 薬理学・毒性学・薬学 (創薬、医薬品科学、薬理学、毒物学)
- ○ 【人文・社会科学】 人文科学 (歴史、言語・言語学、考古学、古典学、保全学、科学史・科学哲学、文学・文学理論、芸術学、音楽、哲学、宗教学、視覚芸術・舞台芸術)
- ○ 【人文・社会科学】 ビジネス・マネジメント・会計学 (会計、ビジネス・国際経営、管理情報システム、技術・技術革新の管理、マーケティング、組織行動・人的資源管理、戦略と経営、観光・レジャー・ホスピタリティ管理、労使関係)
- ○ 【人文・社会科学】 決定科学 (情報システム・管理、経営科学・オペレーションズリサーチ、統計学・確率・不確実性)
- ○ 【人文・社会科学】 経済学・計量経済学・金融学 (経済学・計量経済学、財務)
- ○ 【人文・社会科学】 心理学 (応用心理学、臨床心理学、発達・教育心理学、実験・認知心理学、神経・生理心理学、社会心理学)
- ○ 【人文・社会科学】 社会科学 (教育、地理・計画・開発、健康、人的要因・人間工学、法学、図書館情報学、言語・語学、安全研究、社会・政治学、交通、人類学、コミュニケーション、都市研究、人口統計、ジェンダー、ライフスパンとライフコース、政治学・国際関係、行政、都市研究)

研究に関する情報収集

6－1．情報収集の方法（検索対象）

あなたはどのような情報を検索して、研究テーマを検討したり、引用する論文を見つけますか。各項目について最も近いものを選んでください。

	全く実施しない	あまり実施しない	よく実施する	必ず実施する
研究の検索（論文そのものを調べる）	○	○	○	○
研究者の検索（人の活動を調べる）	○	○	○	○
研究機関の検索（大学等の機関について調べる）	○	○	○	○
学会や団体の検索（関連する学会や団体について調べる）	○	○	○	○

6－2．情報収集の方法（検索と管理手段）

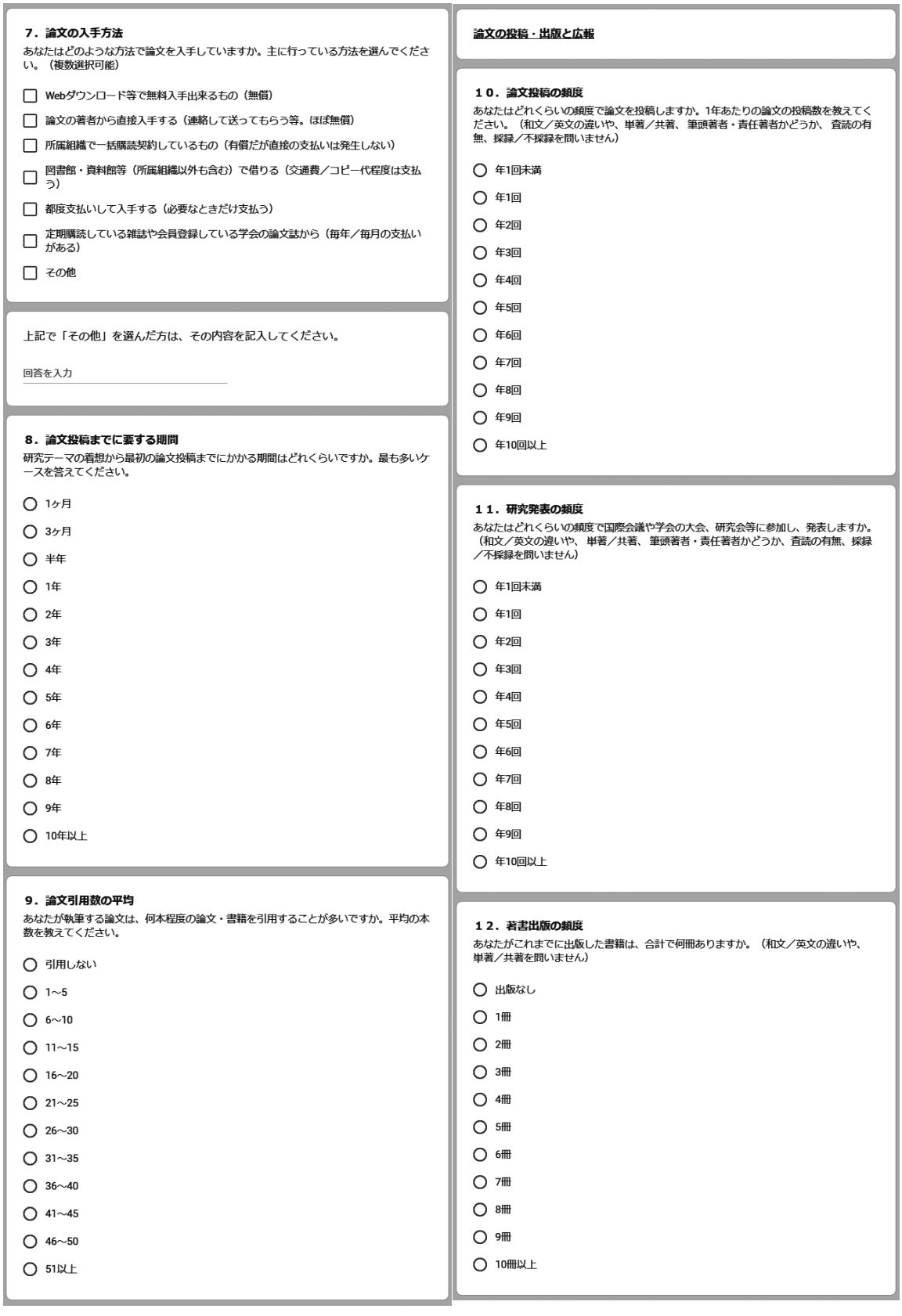
あなたはどのような手段で、その情報を検索、管理しますか。主に行っている手段を選んでください。（複数選択可能）

- ☐ 汎用のインターネット検索(Google, Yahoo等)を使う
- ☐ ChatAI(ChatGPT, Bing AI Chat等の対話型AI)を使う
- ☐ 一般のソーシャルメディア(Twitter, Facebook等)を使う
- ☐ 研究者向けソーシャルメディア(ResearchGate, Academia等)を使う
- ☐ 商用論文データベース(Scopus, Web of Science等)を使う
- ☐ 政府系データベース(CiNii, PubMed等)を使う
- ☐ 研究者業績データベース(KAKEN, researchmap, ORCID, Google Scholar等)を使う
- ☐ 各研究機関が公開している機関リポジトリを使う
- ☐ 論文誌の掲載ページで概要や本文を読んだり、論文ファイルをダウンロードする
- ☐ 商用の研究分析ツール(SciVal, InCites, Dimensions等)を使う
- ☐ 文献管理ソフト(Mendeley, EndNote等)を使う
- ☐ 研究機関の広報記事を読む
- ☐ 専門誌で報道された記事を閲覧する
- ☐ 一般誌で報道された記事を閲覧する
- ☐ テレビ等に放送された記事を閲覧する
- ☐ 図書館や資料館、書店等の実店舗で探す
- ☐ 既知の論文や書籍の参考文献欄から探す
- ☐ 研究指導者からの紹介
- ☐ 同僚や共同研究者からの紹介
- ☐ 学会やシンポジウムに参加する
- ☐ その他

上記で「その他」を選んだ方は、その内容を記入してください。

回答を入力

Figure B: Questionnaire 2 of 4 (in Japanese).



7．論文の入手方法

あなたはどのような方法で論文を入手していますか。主に行っている方法を選んでください。（複数選択可能）

- ☐ Webダウンロード等で無料入手出来るもの（無償）
- ☐ 論文の著者から直接入手する（連絡して送ってもらう等。ほぼ無償）
- ☐ 所属組織で一括購読契約しているもの（有償だが直接の支払いは発生しない）
- ☐ 図書館・資料館等（所属組織以外も含む）で借りる（交通費／コピー代程度は支払う）
- ☐ 都度支払いして入手する（必要なときだけ支払う）
- ☐ 定期購読している雑誌や会員登録している学会の論文誌から（毎年／毎月の支払いがある）
- ☐ その他

上記で「その他」を選んだ方は、その内容を記入してください。

回答を入力

8．論文投稿までに要する期間

研究テーマの着想から最初の論文投稿までにかかる期間はどれくらいですか。最も多いケースを答えてください。

- ○ 1ヶ月
- ○ 3ヶ月
- ○ 半年
- ○ 1年
- ○ 2年
- ○ 3年
- ○ 4年
- ○ 5年
- ○ 6年
- ○ 7年
- ○ 8年
- ○ 9年
- ○ 10年以上

9．論文引用数の平均

あなたが執筆する論文は、何本程度の論文・書籍を引用することが多いですか。平均の本数を教えてください。

- ○ 引用しない
- ○ 1～5
- ○ 6～10
- ○ 11～15
- ○ 16～20
- ○ 21～25
- ○ 26～30
- ○ 31～35
- ○ 36～40
- ○ 41～45
- ○ 46～50
- ○ 51以上

論文の投稿・出版と広報

１０．論文投稿の頻度

あなたはどれくらいの頻度で論文を投稿しますか。1年あたりの論文の投稿数を教えてください。（和文／英文の違いや、単著／共著、筆頭著者・責任著者かどうか、査読の有無、採録／不採録を問いません）

- ○ 年1回未満
- ○ 年1回
- ○ 年2回
- ○ 年3回
- ○ 年4回
- ○ 年5回
- ○ 年6回
- ○ 年7回
- ○ 年8回
- ○ 年9回
- ○ 年10回以上

１１．研究発表の頻度

あなたはどれくらいの頻度で国際会議や学会の大会、研究会等に参加し、発表しますか。（和文／英文の違いや、単著／共著、筆頭著者・責任著者かどうか、査読の有無、採録／不採録を問いません）

- ○ 年1回未満
- ○ 年1回
- ○ 年2回
- ○ 年3回
- ○ 年4回
- ○ 年5回
- ○ 年6回
- ○ 年7回
- ○ 年8回
- ○ 年9回
- ○ 年10回以上

１２．著書出版の頻度

あなたがこれまでに出版した書籍は、合計で何冊ありますか。（和文／英文の違いや、単著／共著を問いません）

- ○ 出版なし
- ○ 1冊
- ○ 2冊
- ○ 3冊
- ○ 4冊
- ○ 5冊
- ○ 6冊
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Figure C: Questionnaire 3 of 4 (in Japanese).

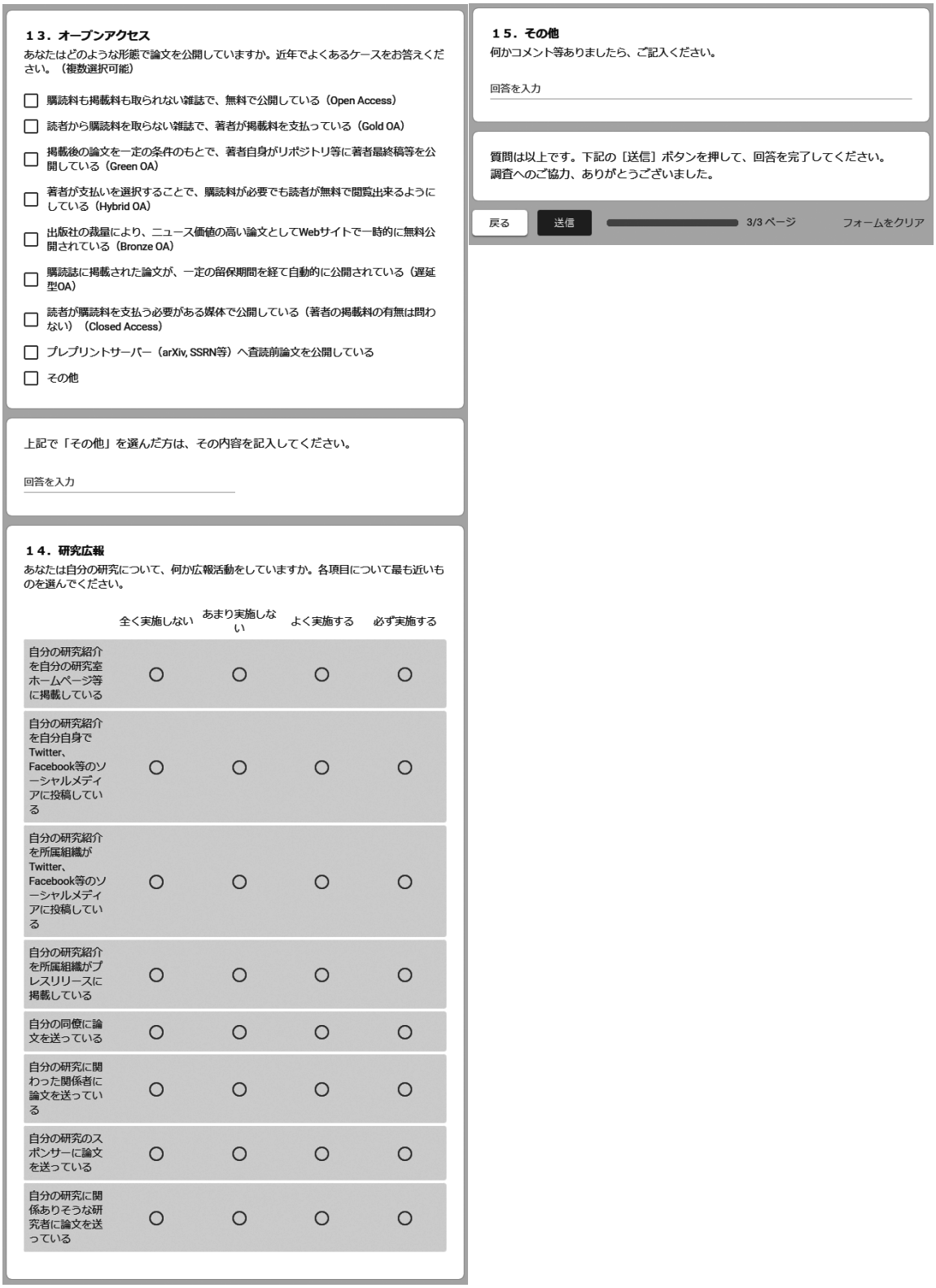

Figure D: Questionnaire 4 of 4 (in Japanese).