

# An Investigation on the Researchers Who Received Japanese Grant-in-Aid for Scientific Research (KAKENHI) with a Focus on Their Roles and Research Achievements

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**Abstract**—Grant-in-Aid for Scientific Research (KAKENHI) is the largest grants for academic research in Japan, and over two hundred billion yen is allocated for KAKENHI, annually. However, little is known about the kind of researchers who are recipients of KAKENHI and their achievements. In this paper, we investigated the number of KAKENHI grant recipients who received KAKENHI projects, the tendencies of their role, and their research achievements. The results suggested that researchers in humanities and social sciences tended to receive KAKENHI in collaborative projects. Also, there was no strong correlation between the number of recipients of KAKENHI projects and their research achievements; however, in some research fields, such as chemistry, a higher correlation was observed. Furthermore, some researchers were found to have received KAKENHI many times although their research achievements were few.

**Keywords**—research grant, evaluation, Grants-in-Aid for Scientific Research (KAKENHI)

## I. INTRODUCTION

Grant-in-Aid for Scientific Research (KAKENHI) is the largest grants for academic research in Japan. KAKENHI is annually provided to researchers by the Japanese government and the Japan Society for the Promotion of Science (JSPS) based on a peer-review screening process. This grant covers all research fields ranging from the humanities and the social sciences to the natural sciences. JSPS reported that 25,800 projects were adopted from 103,700 applications in 2018 [1], and Japan spent over two hundred billion yen for KAKENHI, annually [2].

However, little is known about the kind of researchers who received KAKENHI and their achievements. To clarify this, we examined researchers who were recipients of KAKENHI. More specifically, we investigated the number of recipients of KAKENHI projects, the tendencies concerning their role (as principal investigators or not), and the correlation between the

number of KAKENHI projects received and the number of research achievements, such as the number of papers.

We randomly selected 2,000 researchers from the KAKEN database (<https://kaken.nii.ac.jp/>) and investigated them. The KAKEN database is a public database that archives the information on KAKENHI such as the adopted projects and the final research reports. From the sample of 2,000 researchers, we obtained data on their research achievements using CiNii Articles (<https://ci.nii.ac.jp/>) and Scopus online database (<https://www.scopus.com/freelookup/form/author.uri>).

Identifying the characteristics of researchers who received KAKENHI will lead to a better comprehension of the Japanese research grant system. It may also serve as basic data to achieve more efficient allocations of research grants.

## II. RELATED STUDIES

Some of the examples of studies on researchers and their grants or funds include Nicholson and Ioannidis [3], who investigated researchers who had published papers with more than 1,000 citations to explore the link between highly cited research and the US National Institutes of Health (NIH). They referred that three out of five authors of these influential papers did not currently have NIH funding as principal investigators. They also found that a large majority of the current members of NIH study sections did have NIH funding for their work irrespective of their citation impact. Similar research on UK researchers was also conducted by Stavropoulou, Somai, and Ioannidis [4]. They investigated UK health research scientists who published highly cited papers, to clarify the number of highly cited authors who received the UK's major funds (the MRC, the NIHR, and the Wellcome Trust). They analysed 164 UK health research scientists who had papers with more than 1,000 citations, and it was found that only 59 (36.0%) currently held an active grant as a principal investigator from one of the three funders, and only 79 (48.2%) had held an active grant from any of the three funders between 2006 and 2017. It was also found that 457 of the 664 board members of MRC, Wellcome

Trust, and NIHR (69%) had held an active grant in the same period from any of these funders.

In Japan, there are few studies on researchers and their grants or funds. Yoshida [5] examined the effects of operating grants from the government (Unei-Kohu-Kin) on grants from outside the university. Satoh et al. [6] studied the network structure of science using the KAKEN database. Nishizawa et al. [7] also used the KAKEN database and reported the adoption patterns of KAKENHI from 1984 to 2002 focusing on the 168 researchers who received large-scale funds (Grant-in-Aid for Specially Promoted Research) or won academic awards. They also examined the correlation between the adoption pattern of KAKENHI and the research achievements of the recipients, using a small sample on a trial basis, and concluding that researchers tend to publish their paper in the last year of their research period under KAKENHI.

### III. METHOD

In this section, we first explain the method we followed to select sample researchers and obtain data on them, such as their research fields and research achievements, and then explain how we analysed the data.

#### A. Sample Researchers

We used 2,000 researchers registered in the KAKEN database as our sample researchers. We first downloaded the researcher records registered in the KAKEN database from April 13 to 17, 2019. It included 251,815 researchers and we randomly chose 2,000 researchers from them. We also obtained data concerning (1) the number of times they received the KAKENHI, (2) the selected review section/research field for each KAKENHI project, (3) the role (principal investigators or not) in each KAKENHI project, and (4) the English name for each sample researcher using the KAKEN database.

We estimated the research field of each sample researcher based on the ‘(2) selected review section/research field’ data and the field list provided in the *Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI FY2017* [8][9]. Table I shows the number of sample researchers in each field. In this table, ‘No field data’ indicates that the number of researchers whose data in the ‘(2) the selected review section/research field’ on the KAKEN database was blank. ‘Undeterminable’ referred to the researchers whose fields we could not estimate [10]. Note that some researchers were allocated two or more fields and hence the total number is not equal to 2,000. The values given in parentheses will explain this point in the next section.

#### B. Achievement Data of Each Researcher

In this subsection, we explain how we arrived at their achievement data. For achievement data written in Japanese, we used CiNii Articles, which enable searching for information on academic articles published in academic society journals, university research bulletins, or articles included in the National Diet Library’s Japanese Periodicals Index Database in Japan. We classified each Japanese research achievement data into Japanese bulletin papers, presentations in domestic (Japanese) conference, and Japanese journal papers. Research achievement data were categorized under Japanese bulletin papers if the journal name of the sample researchers’ achievements includes

the term ‘bulletin (Kiyo)’ or the journal was listed in the bulletin list provided by the National Institute of Informatics (NII) [11]. Research achievement data were classified as presentations in Japanese conferences if the journal name included characteristic words such as ‘proceedings’; the other research achievement data were classified as Japanese papers.

On the other hand, for the many researchers whose research achievements were written in English, we used the Scopus database, which is the world largest abstract and citation database of peer-reviewed literature of scientific journals, books, and conference proceedings. We used the English name of each researcher obtained from the KAKEN database to obtain the achievement data of each from the Scopus database. When analysing their research achievement, we excluded researchers from our sample if their English names were not found in the KAKEN database. In addition, we excluded researchers from our sample if only the initial letters of their English name were registered on the KAKEN database (for example, ‘Tanaka K.’), or over 40 same name researchers were registered in the Scopus Affiliation Identifier’, because the probability of persons with identical names being included was high.

Using the data obtained by the above methods, we examined each sample researchers’ number of (1) Japanese journal papers, (2) Japanese bulletin papers, (3) presentations in Japanese conference, and (4) English research achievements. The number of sample researchers for English research achievements was 1,542 and the values in parentheses in Table I show the number of sample researchers we used for analyses of their English research achievements.

TABLE I. THE NUMBER OF SAMPLE RESEARCHERS IN EACH FIELD

Research Fields		
Informatics	68	(54)
Environmental science	64	(56)
Complex systems	195	(156)
Humanities/Social sciences	36	(33)
Humanities	158	(127)
Social sciences	238	(185)
Interdisciplinary science and engineering	39	(34)
Mathematical and physical sciences	114	(94)
Chemistry	69	(55)
Engineering	235	(187)
Biological sciences	54	(43)
Biology	77	(67)
Agricultural sciences	88	(77)
Medicine, dentistry, and pharmacy	745	(550)
No field data	27	(7)
Undeterminable	2	(1)

#### C. Methods of Analyses

We analysed the (i) the number of received KAKENHI projects, (ii) the researchers’ role (principal investigator or not), and their (iii) research achievements. We explain our method in this order.

First, we analysed the number of KAKENHI projects received by each researcher to clarify the overall tendencies and those of each field.

Second, we analysed the researchers’ role (as principal investigators or not). More specifically, we calculated the ratio of the KAKENHI projects in which they were/were not principal

investigators to the total number of KAKENHI projects received by each researcher. We also calculated the ratio of researchers who received KAKENHI only as principal investigators to those who received the grant only as non-principal investigators. We calculated them for each field as well and clarified the tendencies of each field.

Finally, we analysed the research achievements. We first calculated the number of research achievements and then the Pearson's product-moment correlation coefficient and Spearman's rank correlation coefficient between the number of KAKENHI projects received and the number of research achievements. Finally, we clarified whether there are researchers who had received KAKENHI many times although their research achievements were few. To do this, we calculated the sum of the number of Japanese journal papers and the number of English research achievements, and then calculated the difference between this sum and the number of KAKENHI projects received.

#### IV. RESULTS

In this section, we show the results concerning the researchers' (i) number of received KAKENHI projects, (ii) role (as principal investigators or not), and (iii) research achievements, in this order.

##### A. Results Concerning the Number of Received Projects

Table II shows the number of KAKENHI projects received by all sample researchers. It shows that the mean and median of the number of KAKENHI projects received were 5.7 and 3, respectively, and when the research roles were limited to principal investigators (i.e., only in the case of researchers as principal investigators), the mean and median were 2.5 and 1, respectively.

TABLE II. THE NUMBER OF RECEIVED KAKENHI PROJECTS

	All Projects	Principal Investigator	Non-Principal Investigator
Mean	5.7	2.5	3.2
Median	3	1	2
Mode	1	1	1
Minimum	1	0	0
Maximum	67	27	45

Table III shows the results of each field. The mean of the KAKENHI projects received by researchers in the mathematical and physical sciences and chemistry fields was over 8 (8.3 and 8.1, respectively). The median of the KAKENHI projects received by researchers in the field of chemistry was 7.0, and it was higher than that in any other field. Researchers who received KAKENHI in the field of chemistry were shown to receive more projects under KAKENHI than researchers of the other fields did. Concerning principal investigators, the median of the number of received projects in chemistry and biology fields was 3, and these were the highest among all fields. For non-principal investigators, the median of the number of received projects in humanities/social sciences, mathematical and physical sciences, and chemistry fields was 3, and these were the highest among all fields.

##### B. Results Concerning the Role

In this subsection, we tried to clarify the tendencies focusing on principal and non-principal investigations.

Table IV shows the ratios of projects as principal investigators and as non-principal investigators of all KAKENHI projects received by our sample researchers. Table V shows the ratios of researchers who received KAKENHI only as principal investigators and received KAKENHI only as non-principal investigators. In Table IV, 'All research fields' represents the results for all the sample researchers, and the results for each field are shown in the rows below 'All research fields'.

Table IV shows that the median ratios of the KAKENHI projects received as non-principal investigators to all the KAKENHI projects received in the fields of humanities/social sciences, humanities, social sciences, and mathematical and physical sciences was over 60% (66.7%, 66.7%, 62.0%, and 62.0%, respectively). These ratios were higher than those in the other fields. In addition, Table V shows that the ratios of researchers who had never received KAKENHI as principal investigators in humanities and social sciences were over 29% (29.1%, 30.7%, respectively.). These results suggest that the researchers in the field of humanities and social sciences tend to receive KAKENHI frequently in collaborative projects.

##### C. Results Concerning Research Achievements.

Table VI shows the mean and median of the number of research achievements (Japanese journal papers, Japanese bulletin papers, presentations in Japanese conference, and English research achievements) for each research field. Table VI shows that concerning Japanese journal papers, the median of research achievements in the fields of biological sciences was 51.0, and it was higher than that of the other fields. Concerning English research achievements, the median of research achievements in the fields of mathematical and physical sciences (88.0) was the highest. It was also shown that the median of English research achievements in the fields of (1) Humanities/Social sciences, (2) humanities, (3) social sciences, and (4) interdisciplinary science and engineering was under 10 (7.0, 2.0, and 3.0, respectively).

Table VII shows the Pearson correlation coefficient between the number of KAKENHI projects received and the Spearman's rank correlation coefficient. In these tables, 'J-Paper', 'J-bulletin', 'J-Presen', and 'E-achieve' represent the number of Japanese journal papers, Japanese bulletin papers, presentations in Japanese conference, and English research achievements, respectively. KAKENHI, KAKENHI as Principal Investigators, and KAKENHI as Non-principal Investigators represent the number of all KAKENHI projects received by the all sample researchers, the number of KAKENHI projects received by sample researchers as principal investigators, and the number of KAKENHI projects received by sample researchers as non-principal investigators, respectively.

For example, Table VII shows that the Pearson's correlation coefficient between the number of KAKENHI projects received and the number of Japanese journal papers in the informatics field was 0.06. There is almost no correlation between the two. The table shows that the correlation between the number of KAKENHI projects received and their research achievements was not so high. However, some tendencies were observed. For example, in the 'All research fields' row, correlation coefficients

TABLE III. THE NUMBER OF KAKENHI PROJECTS RECEIVED IN EACH RESEARCH FIELD

Research Fields	All Projects		Principal Investigator		Non-Principal Investigator	
	Mean	Median	Mean	Median	Mean	Median
Informatics	7.6	3	3.1	1.5	4.5	2
Environmental science	6.9	4	2.9	2	4.0	2
Complex systems	5.6	3	2.4	1	3.2	2
Humanities/Social sciences	7.1	5	2.4	2	4.8	3
Humanities	4.8	3	1.9	1	2.9	1.5
Social sciences	4.7	3	1.9	1	2.8	2
Interdisciplinary science and engineering	5.9	4	3.0	2	2.9	2
Mathematical and physical sciences	8.3	5	3.1	2	5.3	3
Chemistry	8.1	7	4.5	3	3.6	3
Engineering	7.1	5	3.1	2	4.0	2
Biological sciences	4.9	2	2.8	1.5	2.1	1
Biology	7.1	5	3.7	3	3.4	2
Agricultural sciences	6.3	4	2.8	1.5	3.5	2
Medicine, dentistry, and pharmacy	5.5	3	2.4	1	3.1	2

for English research achievements were higher than those for other research achievements. In Table VII, every correlation coefficient was under 0.2 in the row ‘All research fields’, but correlation coefficients of English research achievements columns (KAKENHI, KAKENHI as Principal Investigators, and KAKENHI as Non-principal Investigators) were 0.29, 0.29, and 0.24, respectively). In Table VIII, correlation coefficients of English research achievements were higher than those of other types of research achievements (Japanese journal papers, Japanese bulletin papers, and presentations in Japanese conference) in the KAKENHI and KAKENHI as Principal Investigators columns.

On the other hand, a higher correlation coefficient is seen between the number of KAKENHI projects received and research achievements in some types. For example, in the KAKENHI and KAKENHI as Principal Investigators columns, the Pearson’s correlation coefficient between the number of KAKENHI projects received and English research achievements was higher than 0.4 in the fields of humanities/social sciences and chemistry. Concerning Spearman’s rank correlation coefficient, similar tendencies were observed in the fields of chemistry and agricultural sciences. In addition, the Pearson’s correlation coefficients between the number of KAKENHI projects received and Japanese journal papers were higher than 0.4 in the fields of interdisciplinary science and engineering for both the KAKENHI and KAKENHI as Principal Investigators columns. A similar tendency was observed in the fields of chemistry.

Finally, we investigated whether researchers who had received KAKENHI many times had fewer research achievements. As previously mentioned in subsection C of section III, we calculated the sum of the number of Japanese journal papers and the number of English research achievements, and then calculated the difference from the number of KAKENHI projects received. We subtracted the number of Japanese journal papers and English research achievements from the number of research achievements, and Table IX anonymously shows the researchers for whom this value was 5 or more. In this table, the number of KAKENHI projects received is placed under the (a) number of KAKENHI received column. We also place the number of KAKENHI projects received as principal investigators in parentheses in the same column; ‘(a)-(b)-(c)’ represent the number of KAKENHI projects received minus the number of Japanese journal papers and English research achievements. We also provide the number of Japanese bulletin papers and presentations in

Japanese conference just for information. For example, researcher A received KAKENHI projects 23 times, and he or she published 12 Japanese journal papers, and has 0 English research achievements. The table also shows that a researcher B neither published Japanese journal papers nor showed any English research achievements; however, he or she received KAKENHI as principal investigator three times. If we do not limit the role (principal investigators or not), he or she received KAKENHI 10 times. Incidentally, he or she published 2 Japanese bulletin papers. This table also shows that 7 out of 11 researchers listed in this table were researchers in the fields of mathematical and physical sciences. In these fields, research achievements may not be emphasized or it may be difficult to estimate whether the researcher can publish the research achievement based only on their application documents.

## V. CONCLUSIONS

In this paper, we investigated the researchers who received KAKENHI with a focus on the number of KAKENHI projects received, the tendencies concerning the role, and their research achievements. The results suggested that the researchers in humanities and social sciences tend to receive KAKENHI in collaborative projects. In addition, the correlation between the number of KAKENHI projects received and the research achievements of the recipients was not high; however, in some research fields, such as chemistry, higher correlation coefficients were observed. Some researchers whose research achievements were very few received KAKENHI many times, especially in the fields of mathematical and physical sciences.

In the future, we would like to broaden the number of sample researchers and expand the definition of research achievements, such as the number of citations of the papers or the number of books published. Furthermore, we hope to focus not only on research achievements but also on other factors such as their age and role in affiliations or societies to clarify in greater detail the method of awarding Japanese grants for scientific research.

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- [9] The list has four level (i.e., (i) categories, (ii) areas, (iii) disciplines and (iv) research fields), and each level has 4, 14, 79, and 321 classifications, respectively. In this paper, the second level (i.e., areas) were used to examine the difference depending on research fields.
- [10] They are 'Wide area' and 'Aging'.
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TABLE IV. THE RATIO OF PROJECTS RECEIVED AS PRINCIPAL INVESTIGATORS AND NON-PRINCIPAL INVESTIGATORS FOR ALL KAKENHI PROJECTS RECEIVED

Research Fields	Principal Investigator		Non-Principal Investigator	
	Mean	Median	Mean	Median
All research fields	46.8%	46.7%	53.2%	53.3%
Informatics	47.0%	42.3%	53.0%	57.7%
Environmental science	40.6%	44.2%	59.4%	55.8%
Complex systems	47.2%	45.5%	52.8%	54.5%
Humanities/Social sciences	37.2%	33.3%	62.8%	66.7%
Humanities	42.3%	33.3%	57.7%	66.7%
Social sciences	42.5%	38.0%	57.5%	62.0%
Interdisciplinary science and engineering	51.9%	50.0%	48.1%	50.0%
Mathematical and physical sciences	42.9%	38.0%	57.1%	62.0%
Chemistry	53.0%	56.5%	47.0%	43.5%
Engineering	43.6%	42.9%	56.4%	57.1%
Biological sciences	60.1%	61.8%	39.9%	38.2%
Biology	58.6%	60.0%	41.4%	40.0%
Agricultural sciences	39.1%	42.9%	60.9%	57.1%
Medicine, dentistry, and pharmacy	49.6%	50.0%	50.4%	50.0%

TABLE V. THE RATIO OF RESEARCHERS WHO RECEIVED ONLY AS PRINCIPAL INVESTIGATORS AND ONLY AS NON-PRINCIPAL INVESTIGATORS

Research Fields	Only play role as Principal Investigator	Only play role as Non-Principal Investigator
All research fields	22.1%	24.6%
Informatics	25.0%	26.5%
Environmental science	10.9%	26.6%
Complex systems	22.1%	23.6%
Humanities/Social sciences	8.3%	11.1%
Humanities	21.5%	29.1%
Social sciences	21.8%	30.7%
Interdisciplinary science and engineering	33.3%	23.1%
Mathematical and physical sciences	14.0%	17.5%
Chemistry	14.5%	15.9%
Engineering	15.3%	25.1%
Biological sciences	37.0%	16.7%
Biology	20.8%	7.8%
Agricultural sciences	8.0%	26.1%
Medicine, dentistry, and pharmacy	24.8%	22.1%
No field data	29.6%	70.4%

TABLE VI. THE NUMBER OF RESEARCH ACHIEVEMENTS

Research Fields	Japanese journal papers		Japanese bulletin papers		Presentation in Japanese conference		English research achievements	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
All research fields	63.7	25	8.1	2	15.6	1	79.0	33
Informatics	78.3	45	6.0	1	25.9	9	90.9	45.5
Environmental science	78.3	45	6.0	1	25.9	9	90.9	45.5
Complex systems	79.4	30	11.4	1	31.3	8	92.9	45
Humanities/Social sciences	52.2	22	10.2	3	10.9	2	60.4	17
Humanities	53.6	17.5	11.5	6	5.3	0.5	30.4	7
Social sciences	49.4	18.5	14.5	8.5	6.4	0	51.4	2
Interdisciplinary science and engineering	49.9	22	17.1	9	7.5	0	32.3	3
Mathematical and physical sciences	63.8	17	4.7	0	35.3	19	124.7	88
Chemistry	54.2	11	7.5	1	43.7	6	110.9	56.5
Engineering	46.2	14	4.4	0	17.7	2	124.3	72
Biological sciences	100.3	51	7.2	1	53.2	23	110.9	60
Biology	31.5	7.5	2.8	0	7.5	0	70.5	29
Agricultural sciences	53.4	20	4.6	0	10.8	2	62.7	41
Medicine, dentistry, and pharmacy	76.4	44.5	5.4	1	16.9	4	84.0	35

TABLE VII. PEARSON'S CORRELATION COEFFICIENTS BETWEEN THE NUMBER OF KAKENHI PROJECTS RECEIVED AND RESEARCH ACHIEVEMENTS

Research Fields	KAKENHI &				KAKENHI as Principal Investigators &				KAKENHI as Non-Principal Investigators			
	J-Paper	J-bulletin	J-Presen	E-achieve	J-Paper	J-bulletin	J-Presen	E-achieve	J-Paper	J-bulletin	J-Presen	E-achieve
All research fields	0.17	0.07	0.13	0.29	0.16	0.05	0.14	0.29	0.15	0.07	0.10	0.24
Informatics	0.06	0.02	0.10	0.21	0.08	0.03	0.14	0.33	0.04	0.02	0.07	0.13
Environmental science	0.32	0.28	0.16	-0.06	0.38	0.35	0.27	0.04	0.24	0.21	0.07	-0.11
Complex systems	0.16	-0.01	0.17	0.30	0.14	0.01	0.18	0.32	0.14	-0.02	0.13	0.23
Humanities/Social sciences	0.39	0.15	-0.03	0.50	0.44	0.17	0.06	0.48	0.34	0.13	-0.07	0.49
Humanities	0.13	0.17	0.04	0.06	0.14	0.20	0.06	0.11	0.10	0.12	0.02	0.02
Social sciences	0.18	0.19	0.02	0.13	0.16	0.26	0.05	0.07	0.16	0.12	0.00	0.14
Interdisciplinary science and engineering	0.52	0.20	0.35	0.38	0.56	0.27	0.20	0.45	0.35	0.06	0.48	0.19
Mathematical and physical sciences	-0.08	0.07	0.10	0.19	-0.01	0.05	0.13	0.02	-0.10	0.06	0.07	0.23
Chemistry	0.24	0.03	-0.02	0.44	0.17	-0.02	-0.02	0.50	0.25	0.10	-0.01	0.18
Engineering	0.27	0.16	0.17	0.32	0.25	0.13	0.16	0.35	0.21	0.14	0.13	0.21
Biological sciences	-0.01	-0.15	-0.10	0.40	0.01	-0.10	-0.05	0.51	-0.03	-0.15	-0.12	0.08
Biology	0.07	0.00	0.19	0.29	0.05	-0.03	0.17	0.25	0.06	0.03	0.15	0.23
Agricultural sciences	0.25	-0.08	0.21	0.32	0.23	-0.11	0.21	0.31	0.24	-0.03	0.18	0.30
Medicine, dentistry, and pharmacy	0.18	0.06	0.15	0.36	0.14	0.03	0.16	0.30	0.18	0.08	0.11	0.34

TABLE VIII. SPEARMAN'S RANK CORRELATION COEFFICIENTS BETWEEN THE NUMBER OF KAKENHI PROJECTS RECEIVED AND THE RESEARCH ACHIEVEMENTS

Research Fields	KAKENHI &				KAKENHI as Principal Investigators &				KAKENHI as Non-Principal Investigators			
	J-Paper	J-bulletin	J-Presen	E-achieve	J-Paper	J-bulletin	J-Presen	E-achieve	J-Paper	J-bulletin	J-Presen	E-achieve
All research fields	0.30	0.10	0.25	0.31	0.24	0.04	0.22	0.33	0.27	0.11	0.20	0.22
Informatics	0.42	0.31	0.31	0.27	0.32	0.15	0.27	0.26	0.35	0.31	0.23	0.23
Environmental science	0.28	0.22	0.28	0.06	0.24	0.18	0.26	0.01	0.23	0.20	0.13	0.04
Complex systems	0.35	0.04	0.27	0.27	0.26	0.01	0.26	0.28	0.29	0.04	0.19	0.18
Humanities/Social sciences	0.30	0.31	0.31	0.38	0.22	0.28	0.27	0.38	0.30	0.30	0.29	0.29
Humanities	0.43	0.39	0.19	0.14	0.32	0.30	0.21	0.21	0.38	0.34	0.13	0.02
Social sciences	0.30	0.28	0.08	0.14	0.26	0.30	0.08	0.14	0.22	0.19	0.03	0.10
Interdisciplinary science and engineering	0.32	0.16	0.64	0.06	0.10	0.20	0.39	0.08	0.42	0.10	0.53	0.01
Mathematical and physical sciences	0.01	0.23	0.17	0.17	0.17	0.20	0.22	0.16	-0.08	0.18	0.10	0.14
Chemistry	0.44	0.12	0.23	0.49	0.45	0.09	0.23	0.55	0.32	0.17	0.21	0.20
Engineering	0.43	0.20	0.35	0.39	0.36	0.20	0.30	0.40	0.37	0.12	0.28	0.26
Biological sciences	0.26	-0.15	0.06	0.37	0.13	-0.05	0.08	0.37	0.31	-0.14	0.04	0.28
Biology	0.33	0.15	0.22	0.47	0.16	0.04	0.15	0.39	0.45	0.26	0.32	0.45
Agricultural sciences	0.23	0.02	0.09	0.44	0.17	-0.03	0.09	0.42	0.30	0.14	0.11	0.37
Medicine, dentistry, and pharmacy	0.31	0.10	0.23	0.38	0.23	0.04	0.21	0.39	0.28	0.10	0.19	0.30

TABLE IX. LIST OF RESEARCHERS WHO RECEIVED KAKENHI PROJECTS MANY TIMES AND HAD RELATIVELY FEW RESEARCH ACHIEVEMENTS

	Research Fields	(a) The number receiving KAKENHI	(b) Japanese journal papers	(c) English research achievements	(a) - (b) - (c)	Japanese bulletin papers	Presentation in Japanese conference
A	Medicine, dentistry, and pharmacy	23 (23)	12	0	11	0	0
B	Mathematical and physical sciences	10 (3)	0	0	10	2	0
C	Mathematical and physical sciences	14 (2)	0	5	9	0	0
D	Mathematical and physical sciences	42 (9)	8	26	8	3	0
E	Humanities	23 (10)	16	0	7	10	0
F	Mathematical and physical sciences	14 (3)	0	7	7	24	0
G	Mathematical and physical sciences	22 (8)	12	3	7	3	6
H	Mathematical and physical sciences	15 (2)	4	5	6	15	0
I	Mathematical and physical sciences	11 (3)	5	0	6	1	8
J	Humanities	7 (4)	2	0	5	36	0
K	Social sciences	13 (9)	7	1	5	63	0