CITATION DATABASE FOR JAPANESE PAPERS: A New Bibliometric Tool for Japanese Academic Society

Masamitsu NEGISHI, Yuan SUN and Kunihiro SHIGI
NII: National Institute of Informatics
2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8430 Japan
Email: negihshi@nii.ac.jp, yuan@nii.ac.jp

Abstract

The paper describes the construction and functions of the Citation Database for Japanese Papers (CJP) developed at the National Institute of Informatics, Japan (NII), and the Impact Factors of CJP's source journals. Then statistical analyses of multidimensional scaling on citation counts for the academic society journals to measure relationship among the societies are described. We also introduce a new citation navigation system, *CiNii*, which enables users to access various resources provided by NII, such as NACSIS Electronic Library Service (NACSIS-ELS) to get electronic full-text of journal articles through citation links. Recent political developments in Japan towards enhancement of scientific information infrastructure are also introduced with its implication to research evaluation systems incorporating citation analyses.

1 Introduction

Many bibliometric researches are based on analyses of data extracted from the Science Citation Index (SCI) and sometimes Social Science Citation Index (SSCI), Arts and Humanities Citation Index (A&HCI), produced by the Institute for Scientific Information (ISI). The ISI databases are no doubt very useful and powerful for evaluating research performance from an international perspective: international trend of research activities, position at the international research front and international research collaboration. However, for the assessment of research activities or for science policy making from a national perspective, they can not be sufficient (Moed, 2002). We need our own Japanese citation databases with a good coverage of Japanese journals with no language bias.

We, National Institute of Informatics (NII), formerly National Center for Science Information Systems (NACSIS), started to construct the Citation Database for Japanese Papers (CJP) in 1995, and release the service from January 2000. At present, the CJP database provides access to current and retrospective bibliographic information and cited references found in approximately 550 titles of Japanese academic society journals covering engineering, science, agriculture and medical science disciplines. The source of the journals is expected to be expanded to 1,000 titles in 2003.

In China, the Chinese Science Citation Database (CSCD) and Chinese Social Sciences Citation Index have also been developed by the Documentation and Information Center of Chinese Academy of Science and the Nanjin University respectively (Jin & Wang, 1999). This would prove that construction of non-English citation indices reflecting scientific activities in each country is important and necessary.

In the present paper, we describe the compilation process of the CJP and the searching functions. Then some results from statistical analyses on CJP including the Impact Factors and relationship among academic societies are discussed. The future image of the citation information system will also be depicted with its implication to research evaluation systems and the national science policy.

2 Situation of Japanese Academic Society Journals

Japanese research community holds a big population of 756,000 including researchers in universities, research institutions and industry. Some 57% of them are in industry forming a largest group, while 37% are in universities and 6% are in public or non-profit institutions (Statistics Bureau, 2002). A breakdown by fields of science gives an estimation that 87% are in natural sciences and the rest are working in humanities and social sciences.

Science Council of Japan (SCJ), an assembly of 210 prominent scientists, is operating an accreditation program for academic societies, which is related to its member election system (SCJ, 2003). The SCJ members of 3 year term are elected through voting by the acknowledged academic societies, where the societies are assigned certain voting rights and also the right to recommend candidates for the council. Thus the academic

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societies have a crucial role in forming the assembly, and the process of accreditation of societies by SCJ is also important. SCJ has established the criteria for the accreditation based on the number of society members, regularity of its publications, composition of its officials, etc.

Table 1 is derived by counting descriptions in "Directory of Academic Societies 2002-03" *(Gakkai Meikan)* compiled by a SCJ related foundation (Japan Science Support Foundation, 2001). Because some of the descriptions on publications for societies in literature and law are missing, we can assume more publications than those in the table. According to the figures in the table, more than 2,000 journals are published and around 340 of them are written in English language. Large societies are typically publish 3 publications, that is, a bulletin or magazine for communication among members, a journal for original research papers and an English language journal for overseas dissemination of scientific achievements of the members.

Table 1. Number of journals by the academic societies registered at Science Council of Japan. Source: "Directory of Academic Societies 2002-03" *(Gakkai Meikan)*

Field	N of Societies	N of Journals		
			Japanese	English
Literature	404	404	379	25
Law	50	42	40	2
Economics	105	142	129	13
Science	130	273	190	83
Engineering	129	399	327	72
Agriculture	145	213	176	37
Medicine	393	546	437	109
Total	1,356	2,019	1,678	341

However, almost all English language journals of Japanese academic societies have been suffering from their low circulation overseas in spite of the quality of their papers. The national government has been supporting those English journals by establishing a funding program and now 120 English journals are being published with this funding. The government together with NII also plans to enhance the support by establishing a new program in which electronification of publication or electronic journal approach should be introduced. They expect that current information and telecommunication technology would help to shrink the distance between Japan and the West, and to realize good circulation worldwide.

Besides the above problem of improving the circulation of Japanese academic journals in English language, we have another problem of improving utilization of papers written in Japanese mainly among Japanese researchers. The citation indexes compiled by ISI are giving us an efficient way to trace series of papers connected by the references. However ISI's indexes include limited number of world prominent journals mainly in English language, and incorporate few journals of Japanese academic societies. As is assumed with Table 1, we have a large number of scholarly papers which are written in Japanese language, many of them being published on Japanese society journals. For those papers there had not been any mean to trace citation chains, and a citation index type database for them would be expected to help their utilization and circulation.

3 Construction of Citation Database for Japanese Papers *(CJP)*

In 1995, NACSIS, the former name of NII, planed to compile a citation index type database for Japanese academic papers and got some funding from the government. At the beginning of the project, due to the limitation of budget, we selected 200 journals in science and engineering. The selection criteria included the followings: journals published by the SCJ registered societies, large societies being preferred, original paper journals rather than magazines being given high priority. A balance among fields was also considered to cover all the area in science and engineering.

The data input process consists of the two stages: (1) marking items in references in papers with designated colors to indicate authors, titles, volumes, numbers and pages; (2) keyboarding the items together with bibliographic data of the papers. As the style of reference greatly varies among journals, it took a lot of time to analyze them and to design practical operations.

Some of the problems we noticed there include the followings. (1) Variations in notation of author names: In some style only family names are noted while there are many cases where full names with given names are written. Note that Japanese names have no space to delimit the two parts. As we input them as they appeared on the originals, database users should search with family names and also full names to make their search comprehensive. (2) Variations in notation of journal titles: journal titles are often abbreviated, but the abbreviations are not unified and vary depending on the style of citing journals. For example

"電子情報通信学会誌" (Journal of IEICE: Institute of Electronics, Information & Communications Engineers) is abbreviated to "信学会誌" or "信学誌" etc. In order to help users to identify journals, we have been making a collation table by which the ID number for journals in "Union Catalog of Serials Database" is assigned. "Union Catalog of Serials Database" is the database compiled by NII to include all the journals held at Japanese university libraries, which now covers 262,000 titles with 3,830,000 holdings (NII, 2003a). CJP has grown to cover bibliographic and citation data of 498,000 papers from 550 journal in science, engineering, agriculture and medicine.

Searching *CJP* Database in *NACSIS-IR*

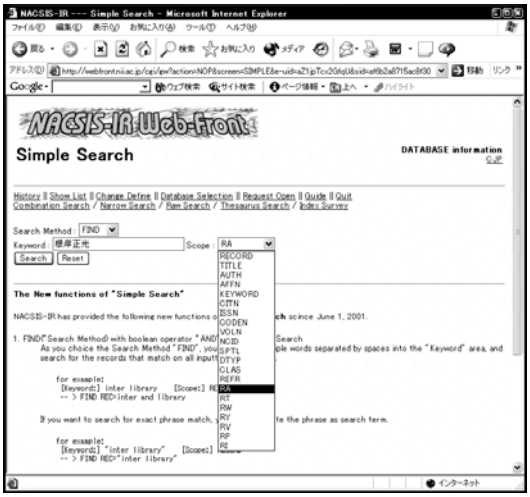

Figure 1-1. Searching CJP in NACSIS-IR. Specify a cited author as the search term in this case.

Figure 1-3. Display data for papers

Figure 1-2. Select papers in the list of searched titles.

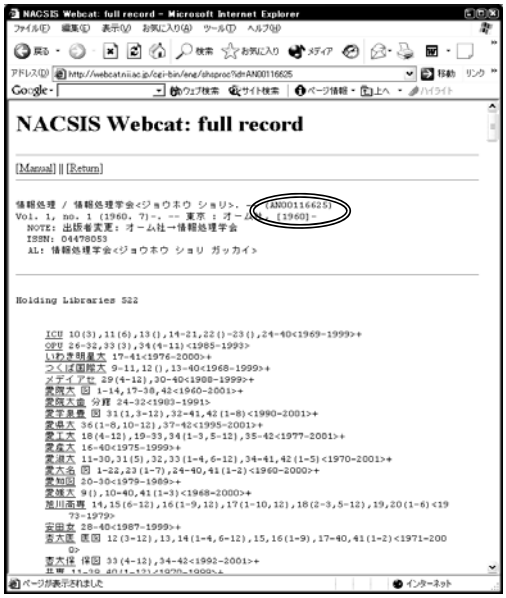

Figure 1-4. List of holdings at university libraries.

NACSIS-IR is the database service operated at NII since 1986 and now mounts 45 databases of scholarly information (NII, 2003b). CJP is serviced in its repertoire with a unified access interface enabling users to make combined searches among the databases. However CJP is unique when compared to the other bibliographic

databases as it holds citation data. NACSIS-IR provides a specialized access via citation data as follows. Users can specify author names (RA), publication years (RY), words in paper titles (RT), journal titles (RW), journal IDs (RI), volume numbers (RV) and pages (RP), or their combination as the search term (Fig. 1-1). The search gives a list of relevant papers (Fig. 1-2), and users can display the bibliographic and citation data for each paper (Fig. 1-3). Clicking journal IDs on the display when available leads users to Union Catalog Serials Database where they can check holdings of the particular issue of the journal at university libraries (Fig. 1-4).

NACSIS-IR provides the other route of access via citations, that is, browsing citations where users are given citation counts for papers together with variant forms of citations (Fig. 2-1, 2-2). By summing up citation counts of the variations, users should tell more precise number of times the paper cited.

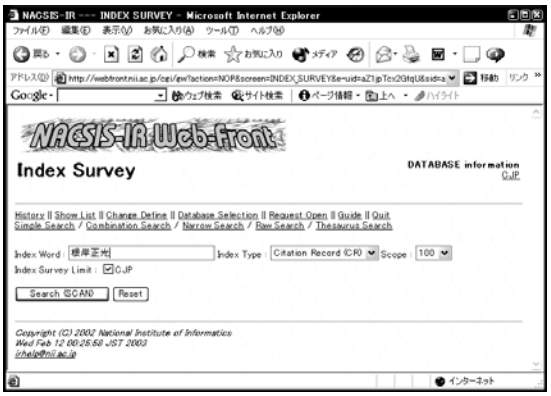

Figure 2-1. Browsing index for citation data. Specify a cited author to be searched.

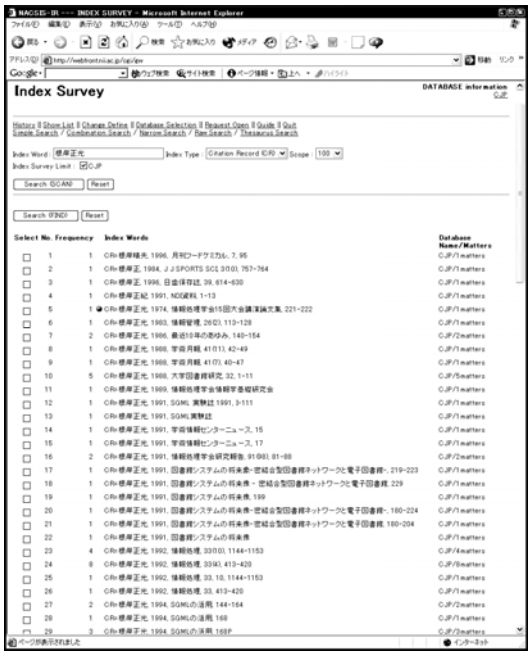

Figure 2-2. Browse citation data and citation counts.

Impact Factors of Japanese Society Journal and Their Implication to Research Evaluation

As has been touched upon, CJP was planed to make Japanese papers more usable by providing access through citations. However CJP now appears to be used more often for counting citations for papers, in parallel with the ISI databases. Japanese university system is in the process of reformation, that is typically denoted as "From a convoy to a competitive system." In 2001 the government announced its plan, TOP 30 or the COEs (Centers of Excellence) for the 21st Century, in which it would select 30 university departments in each fields and give them additional funds for the promotion of their research activities. With this program, research evaluation for universities has been given actuality, and researchers at universities have rapidly become conscious about citation counts and the Impact Factors as objective measures for their performance (Negishi, 2001). In this circumstance, we are now in the process of compiling statistics on CJP like the impact factors for Japanese society journals. For the efficient preparation of statistics, an efficient automatic unification process of citations by matching notation variations in citations is crucial, and we are now developing the system as is described later.

Table 2. Citations and impact factors (IF) for Japanese society journals in CJP.

Field	N of journals	N of papers (98-99) (A)	Times cited from papers 2000 (B)	Self-citations (C)	IF (B/A)	Ratio of self-citation (C/B)
Science	84	13,622	2,042	1,017	0.15	0.50
Engineering	190	62,342	13,002	6,143	0.21	0.47
Agriculture	29	5,948	1,113	651	0.19	0.58
Medicine	53	13,734	1,959	1,297	0.14	0.66
Total	356	95,646	18,116	9,108	0.19	0.50

In the course of the development of more automated system, we calculated the impact factors (IF) for Japanese society journals included in CJP where manual inspections was heavily incorporated. The impact factor for year 2000 is defined as number of times papers of 1998 and 1999 in a journal were cited from all the paper of 2000 in the database, divided by number of papers of 1998 and 1999. Thus the impact factor means average number of citations from all papers in 2000 to a paper in a journal in 1998 and 1999. In our survey, 103,500 citations of year 2000 to papers of 1998/99 were checked and the cited journals in 87,606 citations were identified with the IDs of "Union Catalog of Serials Database." To summarize, 87,606 citations from 29,648 papers in 543 journals were found to go to papers on 7,027 journals. Table 2 shows basic statistics from the survey, denoting that 95,646 papers in 356 journals in CJP database were cited 18,116 times.

We find here that the IFs are rather small when compared to those of ISI's JCR (Journal Citation Reports - 2000 Science Edition), mainly because of the difference in the journal coverage. ISI covers world prominent journals of high citations, while CJP embraces only Japanese society journals, and citations are counted within this limited world. As is seen in the above figures, only 21% of citations (18,116 / 87,606) from Japanese society journals come back to themselves, and many of the others are assumed to go to the foreign journals.

The IFs for medical and biological journals should generally be large when compared to those for journals in science and engineering, because the number of citations in a paper in biosciences is large. On the contrary, Table 2 shows that IF of engineering is largest and that of medicine is smallest. This seems to reflect the number of journals covered in CJP as it includes 190 titles in engineering and 53 in medicine. Here again we should confirm the importance of journal coverage in assessing impact factors.

Table 3. Journals with high impact factors in CJP

Journal (J: in Japanese; E: in English)	N of papers (98-99) (A)	Times cited from papers 2000 (B)	Self-citations (C)	Impact Factor
Journal of the Geological Society of Japan (J)	178	137	45	0.77
CAJ Proceedings of Cement & Concrete (Japan Cement Association) (J)	167	115	51	0.69
Journal of the Iron and Steel Institute of Japan (J)	289	180	60	0.62
Japanese Journal of Applied Physics. Pt. 1: Regular Papers & Short Notes (Japan Society of Applied Physics) (E)	3037	1648	820	0.54
Journal of the Acoustical Society of Japan (J)	242	125	29	0.52
Journal of the Society of Naval Architects of Japan (J)	281	137	70	0.49
Transactions of the Japan Society of Mechanical Engineers. A (J)	816	394	53	0.48
Journal of Magnetics Society of Japan (J)	785	371	224	0.47
Journal of the Robotics Society of Japan (J)	397	182	79	0.46
ISIJ International (Iron and Steel Institute of Japan) (E)	361	160	82	0.44
Japan Analyst (Japan Society for Analytical Chemistry) (J)	277	122	56	0.44
Proceedings of Annual Conference (Japan Concrete Institute) (J)	1100	463	337	0.42
Journal of the Japan Society of Powder and Powder Metallurgy (J)	423	176	120	0.42
Journal of the Japan Society of Precision Engineering (J)	640	250	130	0.39
Transactions of Information Processing Society of Japan (J)	792	291	116	0.37
Chemical & Pharmaceutical Bulletin (Pharmaceutical Society of Japan) (E)	703	257	209	0.37
Bioscience, Biotechnology and Biochemistry (Japan Society for Bioscience, Biotechnology, and Agrochemistry) (E)	952	347	186	0.36
Journal of the Ceramic Society of Japan (J)	493	178	99	0.36
Journal of the Japanese Society for Horticultural Science (J)	400	144	83	0.36
City Planning Review. Special issue: Papers on City Planning (City Planning Institute of Japan) (J)	309	111	72	0.36

Table 3 lists highly cited journals in CJP showing the IFs for journals in Japanese language for the first time. Journal of the Geological Society of Japan on the top of the list is one of the old academic journals first published in 1893. This journal reveals to be often cited by Memoirs of the Geological Society of Japan, another publication of the society, and Journal of Geography (Tokyo Geographical Society), another old journal since 1889, and also by itself. "Japanese Journal of Applied Physics, Part. 1: Regular Papers & Short Notes by Japan Society of Applied Physics" at the 4th, one of the prominent Japanese journals covered by ISI, gets IF of 0.54 in CJP, while that in JCR 2000 is 1.16. The same situation can be seen for Chemical & Pharmaceutical Bulletin of Pharmaceutical Society of Japan with its IF in CJP 0.37 and that of JCR 1.12. Anyway we have here a relative measure to evaluate Japanese journals among them which could be applied to various aspects including our science policies in the future.

4 A Statistical Analysis on Electricity and Electronics Related Society Journals

We made a citation analysis on the journals published by the 5 electricity and electronics related societies, i.e. Institute of Electronics, Information & Communications Engineers (IEICE), Institute of Electrical Engineers of Japan (IEEJ), Institute of Image Information and Television Engineers (ITE), Information Processing Society of Japan (IPSJ) and Society of Instrument and Control Engineers (SICE), upon request by IEICE in 1999 (Negishi, 1999). The 5 societies are cooperative as frequently holing joint conferences. In the analysis, we collected very preliminary statistics for their citations from CJP in its early stage, just showing the applicability of CJP to these analyses. Now we are making the same type of analysis on thsee journals again upon the request by IEICE on a comprehensive basis, as is described here.

Table 4. Citations to / from journals published by electricity and electronics related societies in Japan. (Number of citations from papers in year 2000 to papers in 1998-99)

Citing Society (Journal)	Cited Society (Journal)																						
	1 IEICE	2 IEEJ	3 ITE	4 IPSJ	5 SICE	6 JSAP	7 ASJ	8 MSJ	9 JSPE	10 JSME	11 ISCIE	12 RSJ	13 JSAI	14 JAMIT	A IEEE	B AIP	C APS	D SPIE	E OSA	F JCG	G SID	H NE	Total
1 Institute of Electronics, Information & Communications Engineers	**824**	30	23	123	10	84	57	13	1	3	2	4	17	35	573	73	21	35	34	16	2	13	1993
2 Institute of Electrical Engineers of Japan	61	**585**	4	14	30	31	2	21	14	5	10	7	1	1	117	16	13	13	12	2		5	964
3 Institute of Image Information and Television Engineers	127	7	**97**	23	1	34	1	19			2	1	6		88	35	29	32	13	2	18	3	538
4 Information Processing Society of Japan	73	3	5	**197**		1	1			1		2	12		12				1			2	310
5 Society of Instrument and Control Engineers	15	32	3	6	**86**				6	8	21	14	2		18			7	9				227
6 Japan Society of Applied Physics	42	13		1	1	**897**		24	1					4	140	421	228	129	87	101	5		2094
7 Acoustical Society of Japan	27	10		16	3	32	**474**		1	4			5		5	1	2						580
8 Magnetic Society of Japan	7	54				18		**224**							94	26	76	1	1			1	502
9 Japan Society for Precision Engineering	4	6	3	3	7	18			**130**	25		5			2	8	1	5	6		2		225
10 Japan Society of Mechanical Engineers	4	6		4	20				25	**78**	5	29			5		3					1	180
11 Institute of Systems, Control and Information Engineers	19	16	2	4	34		1		1	19	**45**	21	3		10							1	176
12 Robotics Society of Japan	7	5	2	1	12				1	14	4	**79**	3										128
13 Japanese Society for Artificial Intelligence	8	1		32	6				1	1	2	1	**22**					1					75
14 Japanese Society of Medical Imaging Technology	6			3		1								**19**	2			8					39
Total	1224	768	139	427	210	1116	536	301	181	158	91	163	71	59	1066	580	373	231	163	121	27	26	8031

IEEE Institute of Electrical and Electronics Engineers / AIP: American Institute of Physics / APS: American Physical Society / SPIE: International Society for Optical Engineering / OSA: Optical Society of America / JCG: Journal of Crystal Growth (North-Holland) / SID: Society for Information Display / NE: NIKKEI Electronics (Nikkei Business Publications)

Table 4 is a summary of citation counts to and from the journals published by electricity and electronics related societies in Japan, where counts are summed up by society. For example, IEICE publishes 5 Japanese language journals and 4 English language journals, and all the citations from papers in them in year 2000 to those papers in 1998/1999 or self-citations are 824. Citations from IEICE journals to IEEJ journals are 30, whereas the citations from IEEJ to IEICE are 61. The table also contains the other societies than the 5 which are revealed to be closely connected to them by citations, such as Japan Society of Applied Physics and IEEE.

As the columns from IEEE (A) to NE (H) for the cited societies list the related external societies which are not covered by CJP, only cited counts for them appear, depicting that IEEE journals get highest citations of 573 from IEICE journals when self-citations are excluded. The identical situations are found for the other journals that the foreign journals get more citations rather than Japanese journals. This should pose a problem from the view point of promoting activities of Japanese academic societies. In order to make their activities more visible worldwide, the 5 societies are said to be planning to publish a joint journal in English language, to attract both Japanese and foreign authors and readers.

With this concern, we tried to depict relationship among the 14 societies covered by CJP applying statistical techniques on the citation data in Table 4. Citation counts in the rows and columns 1 through 14 in Table 4 are

interpreted as represent closeness between societies. The data can be considered to form a similarity data matrix indicating that pairs of societies with more citations have more similarities. Here Multidimensional Scaling (MDS) analyses are expected to give pictures where the 14 societies are placed with appropriate distances representing their communication network.

Prior to the analyses, the raw similarity data are needed to be converted into distance data indicating dissimilarity of each society pair. Firstly, dissimilarities were calculated by multiplying raw data with –1 and setting the smallest dissimilarity equal to zero. Figure 3 shows the two-dimensional map constructed from the converted distance values using the SPSS ALSCAL procedure under the assumption of interval measurement. The societies are placed along a smooth contour in the order of information processing (IPSJ), electronics & communication (IEICE), physics (JSAP), electricity (IEEJ), mechanical engineering (JSPE, SICE, JSME), going through systems & control (ISCIE), robotics (RSJ), artificial intelligence (JSAI) and back to the information processing. It seems to illustrate a kind of communication network around these academic societies.

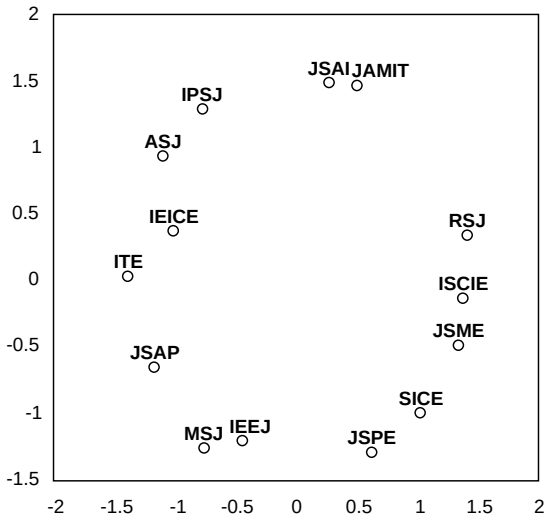

Figure 3. Positions of 14 societies derived from a multidimensional scaling analysis.

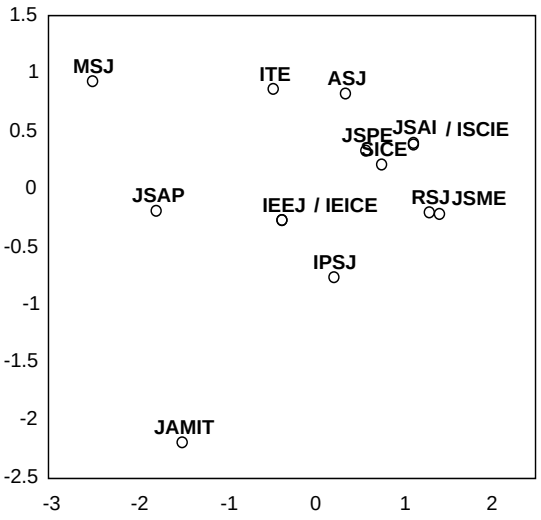

Figure 4. Another positioning of the societies with a different distance model.

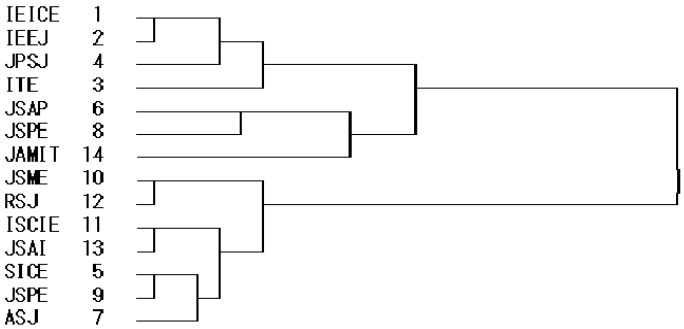

Figure 5. Dendrogram suggesting a grouping of societies based on their coordinates in Fig. 4.

To get further insight into the structure of the data, we adapted a different method to transform the raw proximities. Figure 4 shows another MDS map which displays a different view of the journal co-citation dataset in table 4. In this case, dissimilarities were calculated simply by taking the inverse of the raw similarity data after replacing zero citation with 0.01. Model for ratio scale in the ALSCAL procedure was used. Although the STRESS (fitness index) = 0.69 is a little large, comparing with the first transformation (0.33), which indicates larger lack-of-fit between the fitted distances and the original proximity values, the figure seems to give a fairly reasonable and interpretable configuration.

In this figure we see IEICE (electronics, information and communication), IEEJ (electricity) and somewhat

IPSJ (information) are relatively close to each other meaning that these societies have stronger communication tie, while RSJ (robotics), SICE (instrument), ISCIE (systems and control) are forming another cluster. Meanwhile, we have JSAP (physics) and MSJ (magnetic) on the left. There seems to be the "Physics - Electricity/Electronics - Mechanical Engineering" dimension from down-left to up-right of the figure.

To examine how the societies are grouped together, we applied clustering analysis as well. The dendrogram shown in Figure 5 was determined by submitting the coordinates of the two-dimensional MDS solution of the above to the SPSS hierarchical clustering procedure with Ward's method. The figure suggests the following society grouping:

1. a cluster of societies on electricity, electronics and information, such as Institute of Electronics, Information and Communication Engineers (IEICE), Institute of Electrical Engineers of Japan (IEEJ), Information Processing Society of Japan (IPSJ) and Institute of Image Information and Television Engineers (ITE).
2. a cluster of societies of mechanical engineering, including Japan Society of Mechanical Engineers (JSME), Robotics Society of Japan (RSJ), Institute of Systems, Control and Information Engineers (ISCIE), Japanese Society for Artificial Intelligence (JSAI), Society of Instrument and Control Engineers (SICE), Japan Society for Precision Engineering (JSPE) and Acoustical Society of Japan (ASJ).
3. a cluster of physics consisting of Japan Society of Applied Physics (JSAP) and Magnetic Society of Japan (MSJ) with Japanese Society of Medical Imaging Technology (JAMIT) a little apart from them.

As is already mentioned, the electricity related 5 societies seem to be thinking of joint publication of an English language journal. In order to promote societies' activities, these joint projects would be quite effective. The groupings derived from citation links such as the above give some suggestions for potential joint projects based on an objective measure of citation links. Those types of analyses on citation data from various aspects should be positively explored.

However the previous examples illustrate that using different way to convert original similarity data into distances will conduct fairly different MDS configuration. Note also that sometimes higher-dimensional spaces may be needed in order for the fitted distances to sufficiently match the original similarity data. The selection of data transformation method and interpretation of the reduced space are obviously important, and we are in our way to carry out the research in more detail.

5 Future Direction of *CJP* Database and Policy Development for Electronic Scientific Communication

In 2001, the Council for Science and Technology to the Minister of Education, Culture, Sports, Science and Technology (MEXT) publicized a report titled "Enhancing Infrastructure for Circulating Scholarly Information," covering various aspects of scholarly information circulation including acquisition of foreign electronic journals at university libraries, transmission of information from universities and academic societies, transmission of Japanese information abroad (Negishi, 2002; The Council for Science and Technology, 2002). In the report, NII is expected to play crucial roles for enhancement of academic information infrastructure. Along with this line, NII has launched a portal system for academic contents, *GeNii* (Global Environment for Networked Intellectual Information), in 2002 making Japanese scholarly information more efficiently accessible worldwide by providing researchers with unified interface to various types of databases which have been serviced at NII (NII, 2003c).

CJP is utilized as the core database to coordinate scientific papers, authors / researchers, projects, societies, etc. through citations. In establishing those links, unification of bibliographic and citation records by fuzzy match processing to absorb variations in descriptions and merge them to unified forms is crucial. However efficient matching technique for large-scale Japanese data has not been be developed. NII is making research and development for it, and is well on the way of solution with a matching system for CJP citations based on the Support Vector Machine algorism being developed.

CiNii (Citation Information by NII), a component of GeNii, is now on the web on an experimental basis. As is depicted on Figure 6-1, CiNii gives links to citing and cited papers for each paper and direct users to their page images stored in NII's Electronic Library Service (NACSIS-ELS) (Fig. 6-2) (NII, 2003d). NII plans rapid enhancement of GeNii and CiNii to cover various types of contents at universities as well as at NII, and co-operation with ISI would also be discussed.

Due to the long-lasting economic difficulties, Japanese policy makers are quite interested in research evaluation for efficient investment to research projects which would bring some technological evolution and strengthen the national competitiveness in the worldwide scene. The citation oriented systems such as CJP and CiNii are expected to work for the aim in the two ways as follows. First, they will accelerate research process by efficiently providing research information among researchers. Secondly they will provide some evaluation measures which lead research polices at the national and local governments, universities, research institutions and industry, effective to prioritize prospective fields. Now citation related systems are more and more attracting

a great deal of attention in the country.

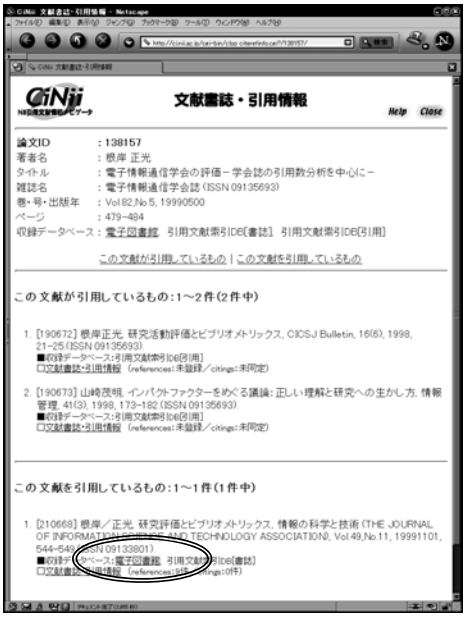

Figure 6-1. Searching citations in *CiNii.* Sample display for a paper with citing and cited information.

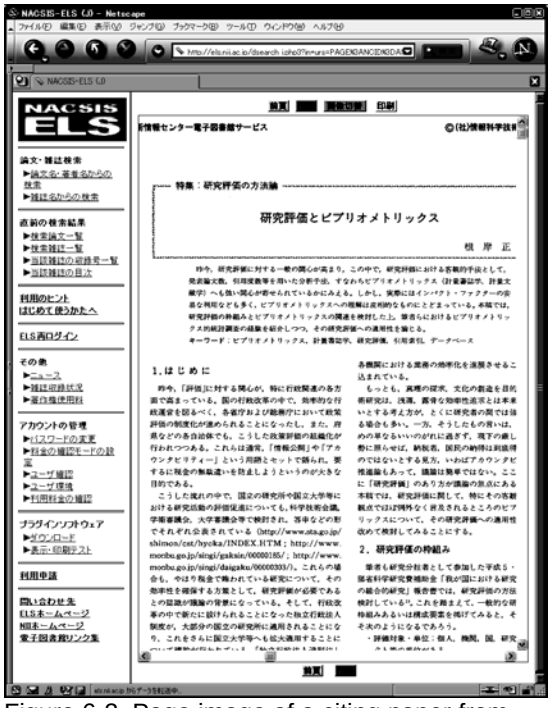

Figure 6-2. Page image of a citing paper from NACSIS-ELS.

6 Conclusion

In this paper, the construction and functions of the Citation Database for Japanese Papers (CJP) for Japanese academic society journals and the Impact Factors of the journals were described. Based on the citation data extracted from the CJP, we analyzed the relationship among Japanese academic societies, which suggested the potentiality of applying CJP database for further bibliometric research. No doubt, CJP should become a very useful and indispensable bibliometric tool for Japanese scholarly community, and is expected to play important role in research evaluation and science policy making in Japan as well.

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