# Scientific, technological and medical journal publication in Japan

**The scale of journal publication in the fields of science, technology and medicine (STM) in Japan has been determined from a merged title list of bibliographic databases and electronic journal sites. In 2005 there were 2,655 scholarly journals in active publication along with a similar number of university bulletins and several hundred university periodicals. The journals were mostly published by academic societies, which is clearly different from the situation in Europe and the USA. Among these journals, 964 titles were online on either J-STAGE, NII-ELS, Medical Online, or American/European publisher sites. The degree of digitization was high for English-language journals (80.3%), but much lower for Japanese-language journals (29.6%). Journal coverage by major bibliographic databases was also analyzed. The English-language journals were fairly well indexed (67.8%) by at least one of the four main databases, MEDLINE, SCI, CA, or Scopus.**

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## Introduction

Tenopir[1] found from *Ulrich* that there were 180,200 journal titles published in 2003, of which 43,500 were scholarly journals, 21,000 of them being peer-reviewed. She also noted that 34,500 titles were online and that 6,500 were published as CD-ROMs; after removing duplicates, it seemed safe to say that 37,500 were in electronic format. Her estimate was that the number of peer-reviewed journal titles in electronic form was 14,600 and that 11,000 of these were online. A report prepared for the Association of Learned and Professional Society Publishers (ALPSP) and STM[2] in 2006 said that there were 23,000 scholarly journals in the world and 1.4 million articles were published annually. (It is not clear that these numbers include serials published in non-European languages such as Chinese and Japanese.) The present author studied the number of periodicals in China and found that more than 9,100 titles were already online[3].

The National Diet Library (NDL) of Japan collects most of the serials published in Japan as a legal requirement. Its website indicates that the number of serial titles (including newspapers) in the Japanese language that it has collected is 130,000 together with 50,000 in foreign languages[4]. These numbers, however, include titles that have ceased publication, and others that have changed their names, so they do not tell us how many are still active. NDL also indexes serials in science and technology in the *Directory of Japanese Scientific Periodicals*, which contains 6,798 records (27 April 2008)[5]. Many scholarly journals published in Japan have been indexed by bibliographic databases, produced in both Japan and overseas. There have been a few studies published about how many are actually covered by foreign databases[6–9]. These studies, however, are neither comprehensive, nor current.

The purpose of the present study is to investigate scholarly journal publication in Japan in the area of science, technology and medicine (STM), and to find how many of the journals are already online. The study also investigates the coverage of Japanese scholarly journals by major bibliographic databases.

## Methodology

### *Collecting serials lists*

Database producers in Japan collect scholarly journals and index them for their bibliographic databases. Three database producers kindly gave the author the lists of journals they indexed in 2005 (Table 1).

| Database producer | No of titles | Corresponding databases | Contents |
|---|---|---|---|
| Japan Science and Technology Agency (JST) | 6,387 | JSTPlus | science and technology articles in the world |
| | | JMEDPlus | medical articles published in Japan |
| Japana Centra Revuo Medicina (Ichushi) | 2,283 | Ichushi | medical articles published in Japan |
| Japan Pharmaceutical Information Center | 417 | JAPIC | pharmacology articles published in Japan |

*Table 1. Journal titles indexed in Japanese databases (2005)*

In addition, journal lists (as shown in Tables 2 and 3), which are available publicly from the database/electronic journal provider sites, were used. Some journals of Japanese academic societies are now published by European/American publishers, and may not be included in these lists of journals. Such titles were sought in foreign database lists, such as CA, MEDLINE, SciSearch and Scopus.

*Creating a merged list*

A comprehensive serial list has been developed by merging the lists above. Where records in those lists contain ISSNs, it was not difficult to merge multiple records of the same journal to create a single record. It was necessary to match journal titles and publisher names to merge titles when any of the records did not contain ISSNs. Journal catalogs such as the National Diet Library's NDL-OPAC[10] and NACSIS Webcat[11] were consulted in analyzing this data. Sometimes missing ISSNs were found, but quite often these titles did not have ISSNs in the first place. The lists contain duplicate records for a single journal title (or ISSN) due to differences in the coverage periods, publishers, or journal subdivisions depending on the database producers' policy. Those with the same ISSN are considered as the same journal. On the other hand, some journals continue to use the old ISSN even after they have changed their titles. In such cases, they were considered to be different journals.

As a result of the analysis, a list of 20,548 titles was developed. Individual records contain an ISSN (or online ISSN), when available, as a record key. Otherwise, a unique key was added for the purpose of this study.

| Provider | Name | No of titles | Date downloaded | Contents | URL |
|---|---|---|---|---|---|
| Nichigai Associates, Inc. | Serials indexed for the Journal Index Database | 27,498 | 1/8/2006 | serials collected by National Diet Library and more | http://www.nichigai.co.jp/database/jnl/top.html |
| National Institute of Informatics (NII) | Citation Database for Japanese Papers (CJP) Journal List | 1,628 | 17/9/2006 | selected scholarly journals published in Japan | http://ci.nii.ac.jp/cinii/pages/cinii-db.html |

*Table 2. Journal lists downloaded from database websites*

| Provider | Name | No of titles | Date downloaded | Contents | URL |
|---|---|---|---|---|---|
| National Institute of Informatics (NII) | Electronic Library Service (ELS) Journal List | 1,058 | 28/4/2007 | scanned scholarly journals published by society publishers in Japan | http://ci.nii.ac.jp/cinii/pages/cinii-db.html |
| National Institute of Informatics (NII) | Electronic Library Service Research (ELS) Bulletin List | 5,059 | 17/9/2006 | scanned university and research institute bulletins published in Japan | http://ci.nii.ac.jp/cinii/pages/cinii-db.html |
| Japan Science and Technology Agency (JST) | J-STAGE Journal List | 512 | 17/5/2007 | electronic journals from society publishers in Japan | http://info.jstage.jst.go.jp/data/library/journals_list_ja.zip |
| National Diet Library (NDL) | WARP Electronic Journals | 1,527 | 20/4/2008 | links to electronic journals available on the web | http://warp.ndl.go.jp/WABibSearch.php |

*Table 3. Journal lists downloaded from electronic journal websites*

## Analysis

### *Identifying scholarly journals in science, technology and medicine*

The journal list thus created contains many serials in the humanities, arts and social sciences. The fields in Table 4 were used to identify serials in those disciplines by their journal titles. Sometimes journal web pages have had to be consulted to understand their topic coverage. All other serials that were not considered to be in these fields were classified as being in the STM disciplines.

The serials were next classified into journal types, as defined in Table 5. This was done mainly by looking at serial titles, but when necessary by visiting the corresponding journal websites. Here 'scholarly journals' means those which publish peer-reviewed articles. But, as this was not always evident from serial titles, journals published by scholarly societies were generally considered as 'scholarly'. University colleges/schools in Japan often have their own, independent, academic societies, and publish journals with peer-reviewed articles. As many (not all) of such societies are not open to outside researchers, such journals have been categorized here as 'university journals' and not 'scholarly journals'. University bulletins are published directly by universities and their colleges or schools. Commercial publishers in Japan are quite different from those in Europe or the USA in that they do not publish very many scholarly journals; so most of the serials that they publish have been classified as 'magazines'.

| Area | Code | Field | Area | Code | Field |
|---|---|---|---|---|---|
| art | ART | performing arts | social sciences | BUS | business or management |
| | MUS | music | | ECM | economics |
| | DRA | dramas or movies | | LAW | law |
| humanity | EDU | education (except STM) | | POL | politics, governments, local administrations, international relations, etc. |
| | LAN | language or linguistics | | LBR | labor |
| | LIT | literature, novels | | SOC | sociology, human relations, crimes, or statistics |
| | PHL | philosophy | | SVC | welfare services (except care practices) |
| | PSY | psychology (except experimental or clinical) | | AGR | agriculture, fishery, or forestry (except practices or technologies) |
| | REL | religion | | LIF | household arts (except scientific aspects) |
| | CUL | culture, museum (except art or scientific) | misc. | none | multi-fields or unclassifiable |
| | LIB | libraries or archives | | | |
| | GEO | geography | | | |
| | HIS | history or archeology | | | |
| | SPT | sports (except sports sciences) | | | |

*Table 4. Fields in the humanities, arts, and social sciences*

| Journal type | Definition |
|---|---|
| scholarly journal | contains original articles and published mostly by academic societies |
| university journal | contains original articles and published by universities or research institutes |
| university bulletin | contains articles by researchers of the university |
| research institute bulletin | contains articles by researchers of the research institute |
| hospital bulletin | contains case reports of practitioners of the hospital |
| data compilation | such as those from observatories, farms, etc. |
| corporate journal | contains articles by researchers of the company |
| meeting abstracts or presentations | contains meeting abstracts, preprints or presentations |
| magazine | contains no original articles |
| newsletter | newsletters or PR magazines |
| miscellaneous | technical reports, white papers, book series, supplementary volumes, or books |

*Table 5. Journal types*

| Academic field | No of titles | Serial type | No of titles | | No of English-language titles | |
|---|---|---|---|---|---|---|
| | | | | Active in 2005 | | Active in 2005 |
| humanities, arts and social sciences | 7,781 | scholarly journal | 1,437 | | 26 | |
| | | university bulletin | 4,156 | | 59 | |
| | | other | 2,188 | | 18 | |
| science, technology and medicine | 12,768 | scholarly journal | 2,899 | 2,655 | 416 | 315 |
| | | university journal | 603 | | 83 | |
| | | university bulletin | 2,886 | | 33 | |
| | | other | 6,379 | | 88 | |
| Total | 20,549 | Total | 20,549 | | 723 | |

*Table 6. Final journal list*

As a result, the merged list was found to contain 2,899 scholarly journals, 603 university journals and 2,886 university bulletins, as shown in Table 6. Article languages for these journals were also determined. It has to be noted that, because a journal has an English-language title, it does not always mean that all the articles are English-language.

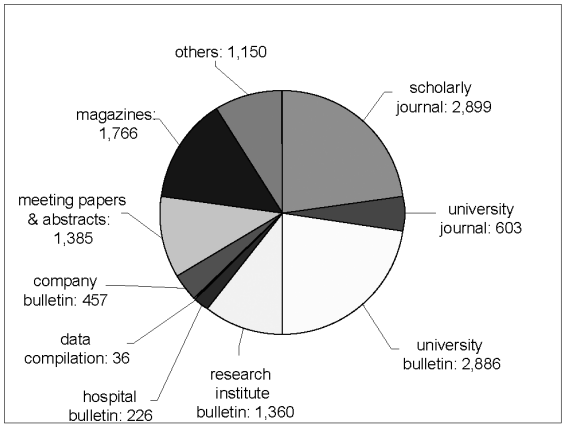


*Figure 1. Serial type distribution of science and technology serials in the merged list*

For 2,899 scholarly journals, it was determined whether they were actively published in 2005. It appears then that 2,655 titles were being actively published in 2005, of which 315 were English-language journals. Of these latter, 227 were published by domestic publishers. Another 124 were produced by foreign publishers – such as Elsevier, Springer, Blackwell, etc.– but were owned by Japanese academic societies. All the analyses below have been conducted on those 2,655 active titles.

*Electronic journals published in Japan*

There are five major electronic journal sites in Japan, as shown in Table 8.

As PierOnline and MF-Finder were not in business in 2005, the analysis that follows was conducted for the other three. The numbers of electronic journals published on J-STAGE, NII-ELS and Medical Online are compared in Table 9.

Altogether, 964 journals (36.3%) were published as electronic journals in 2005 out of 2,655 (Table 9) scholarly journals in the STM fields. The percentage is high (80.3%) for English-language journals, but low (29.6%) for Japanese or mixed-

| Type | ISSN | Serial title | Publisher |
|---|---|---|---|
| scholarly journal | 0021-521X | *Japanese Journal of Physiology* | Physiological Society of Japan |
| university journal | 0021-6968 | *Jikeikai medical journal* | Jikei University School of Medicine |
| university bulletin | 0385-1443 | *The Bulletin of Kanagawa Dental College* | Kanagawa Dental College |
| research institute bulletin | 0020-3157 | *Annals of the Institute of Statistical Mathematics* | Institute of Statistical Mathematics |
| hospital bulletin | 1346-9878 | *Tokushima Red Cross Hospital Medical Journal* | Tokushima Red Cross Hospital |
| data compilation | 1347-3093 | *NIMS Structural Materials Datasheet* | National Institute of Materials Science |
| company bulletin | 1348-3447 | *NTT Technical Review* | NTT |
| meeting papers & abstracts | 1013-9826 | *Proceedings of the Electronics Division Meeting of the Ceramic Society of Japan* | Ceramic Society of Japan |
| magazines | 1346-602X | *AIST Today* | National Institute of Advanced Industrial Science |

*Table 7. Serial type samples*

| Name | Provider | No of records* | URL |
|---|---|---|---|
| J-STAGE | Japan Science and Technology Agency (JST) | 472 | http://www.jstage.jst.go.jp/ |
| NII-ELS | National Institute of Informatics (NII) | 6,526 | http://ci.nii.ac.jp/journal/society/all_jp.html |
| Medical Online | Meteo Inc. | 715 | http://www.meteo-intergate.com/ |
| PierOnline | Sunmedia Co., Ltd. | 8 | https://www.pier-online.jp/ |
| MF-Finder | Igaku-Shoin Ltd. | 33 | http://ej.islib.jp/ejournal/ |

* Based on their websites in April 2008: not necessarily the number of journals.

*Table 8. Major electronic journal sites in Japan*

| | No of all serials | No of serials in STM fields | No of scholarly journals | No of scholarly journals published in 2005 | | |
|---|---|---|---|---|---|---|
| | | | | Total | Japanese-language or mixed | English-language |
| NII-ELS | 5,559 | 2,915 | 473 | 350 | 285 | 65 |
| J-STAGE | 380 | 370 | 343 | 328 | 214 | 114 |
| MedOnline | 565 | 556 | 345 | 336 | 304 | 32 |
| Subtotal * | | | | 840 | 681 | 159 |
| Published by foreign publishers | 147 | 143 | 136 | 125 | 1 | 124 |
| Total electronic journals * | | | | 964 | 682 | 282 |
| Total scholarly journals | | | | 2,655 | 2,304 | 351 |
| % of electronic journals | | | | 36.3 | 29.6 | 80.3 |

* Duplicates removed

*Table 9. Number of serials on various electronic journal sites*

language journals. The distribution of Japanese or mixed-language journals and English-language journals between domestic and foreign sites is shown in Figures 2 and 3.

*Coverage of Japanese journals by major databases*

Coverage of Japanese journals was determined for four major STM databases, i.e., MEDLINE, Science Citation Index (SCI), CA and Scopus (see Table 10). For MEDLINE, SCI and CA, the corresponding STN files were searched and analyzed to determine whether Japanese journals were actually indexed in 2005 by these databases. For Scopus, the Scopus Title List <http://www.info.scopus.com/detail/what/titles.asp> was downloaded in November 2006. It was assumed that journals marked as 'Active' in the list were indexed in 2005.

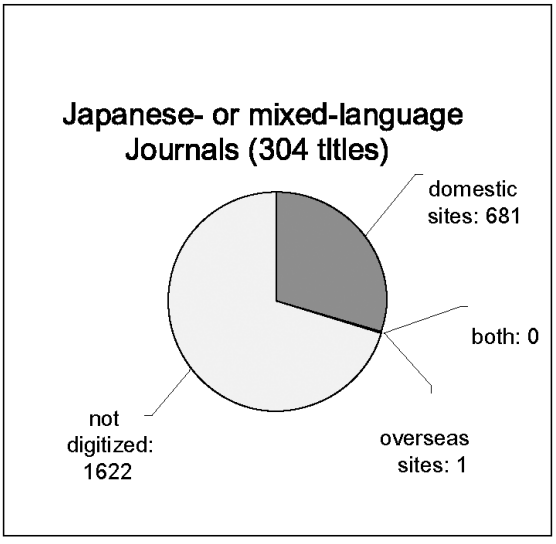


*Figure 2. Distribution of Japanese or mixed-language journals between domestic and overseas electronic journal sites*

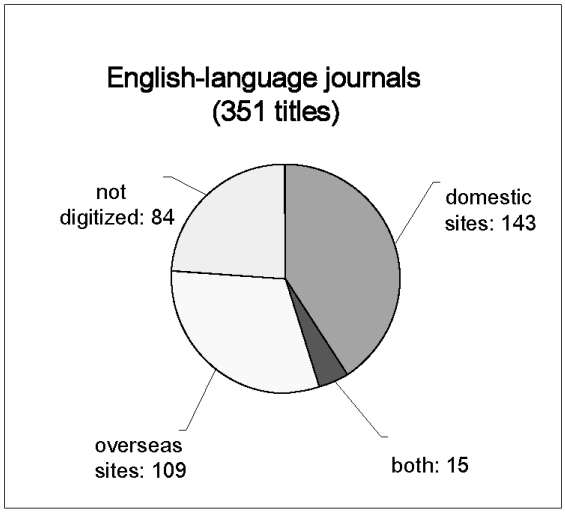


*Figure 3. Distribution of English-language journals between domestic and overseas electronic journal sites*

| | No of all serials | No of serials in STM fields | No of scholarly journals | No of scholarly journals published in 2005 | | |
|---|---|---|---|---|---|---|
| | | | | Total | Japanese-language or mixed | English-language |
| MEDLINE | 181 | 181 | 145 | 145 | 54 | 91 |
| SCI | 168 | 168 | 150 | 146 | 32 | 114 |
| CA | 1,199 | 1,193 | 509 | 509 | 353 | 156 |
| Scopus | 529 | 508 | 382 | 377 | 160 | 217 |
| Number of scholarly journals covered | | | | 665 | 427 | 238 |
| Total scholarly journals | | | | 2,655 | 2,304 | 351 |
| % of journals covered by databases | | | | 25.0% | 18.5% | 67.8% |

*Table 10. Coverage of Japanese journals by major databases*

| | No of English-language journals | Published by domestic publishers | Published by foreign publishers |
|---|---|---|---|
| MEDLINE | 91 | 38 | 53 |
| SCI | 114 | 74 | 40 |
| CA | 156 | 91 | 65 |
| Scopus | 226 | 110 | 107 |
| Total number of journals covered | 238 | 130 | 108 |
| Total number of journals | 351 | 227 | 124 |
| % of journals covered | 67.8 | 57.3 | 87.0 |

*Table 11. Coverage of English-language journals by major databases*

CA had the greatest coverage of scholarly journals published in Japan, followed by Scopus, SCI and MEDLINE. (SCI and MEDLINE do not cover many because they implement rigorous screening when selecting journals.) It also has to be noted that CA indexed many non-scholarly serials, such as university and research institute bulletins and magazines, in addition to scholarly journals. Out of 238 English-language journals covered by these databases, 43 were indexed by all four databases.

Thus 67.8% of all English-language scholarly journals published in Japan were indexed by one or more major databases. The percentage was much higher for those published by foreign publishers (87.0%) than for those from domestic publishers (57.3%). It has to be noted also that Scopus covered all English-language journals published by foreign publishers except one. (See Table 11)

## Conclusion

There were 2,899 scholarly journals, 603 university journals and 2,886 university bulletins published in the STM fields in Japan (including journals, magazines and university bulletins) in 2005. Scholarly Japanese journals are mostly published by academic societies. Among the 2,899 scholarly journals, 2,655 titles were being actively produced in 2005, of which 964 titles were online, either on J-STAGE, NII-ELS, Medical Online, or American/European publisher sites. The degree of digitization was relatively high (80.3%) for 351 English-language titles, but low (29.6%) for 2,304 Japanese-language titles. English-language journals were fairly well indexed (67.8%) by major bibliographic databases, while Japanese or mixed-language journals were much less covered (18.5%). It is expected that all the English-language journals will be digitized, and coverage of Japanese-language journals by A&I databases will be improved soon.

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