

# **The Development of China's Scholarly Publications in Library and Information Science, 1979-2009: an Analysis of ISI Literature**

Chengzhi Wang

C.V. Starr East Asian Library, Columbia University, New York, New York, USA. E-mail: cw2165@columbia.edu

## **Purpose**

No scholarly publications have systematically studied the evolution and growth of China's scientific papers of library and information science published in English language and covered by ISI during the reform era starting in 1979. This paper is intended to fill in the gap.

## **Design/methodology/approach**

This study surveys ISI library and information science papers authored by researchers of China during 1979-2009 and quantitatively presents the development of scholarly publications authored by researchers from China. 30 years of data of ISI literature are collected and analyzed, and the paper conducts international comparison of research productivity among leading Asian countries.

## **Findings**

The paper finds out the patterns and trends of papers authored by Chinese authors, particularly the top subject areas and top journals that Chinese papers are highly represented. Besides, the paper makes international comparison between China and other major Asian countries such as India, Japan, and Korea in terms of library and information science research outputs represented in ISI literature. China has become the leader in terms of research productivity of library and information science.

## **Research limitations/implications**

This study focuses on English-language journal articles only. Only journals meeting ISI inclusion criteria are reviewed and analyzed. The possible accidental inaccurate entries in original ISI data have not been checked for accuracy and consistency for each journal article record.

## **Originality/value**

The paper provided an example of using the powerful ISI databases of citation indexes, particularly ISI SCCI in a cautious and critical way. It empirically presents the overall upward development of China's scholarship of library and information science. Either Greater China Area as a whole or Mainland China alone has become the leader in the scholarly publications in library and information ahead of India, Korea and Japan.

**Keywords:**

ISI SSCI, China, Library and Information Science, Journal publications, Country research productivity, International comparison

**Paper Type: Research Paper**

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## **Introduction**

The era of reform and opening up to outside world from 1979 to present has witnessed China's rapid development in almost all important, particularly in economy, education, and science and technology. What about the development in the scholarship of library and information science during this era?

Research papers studying China's scientific performance in a variety of disciplines have been made increasingly available in ISI literature in recent years. In China, more and more papers researching Chinese-language scholarly publications of library and information science have been published. However, so far few researchers have systematically studied the evolution and growth of China's library and information science scientific papers published in English language and covered by ISI over a course of three decades during the reform era.

The article aims to explore the historical development and current status of English-language research publications of the nature of library and information science by Chinese authors published in ISI journals during 1979 to 2009. It is hoped that this study will help improve the understanding of international visibility and status of China's research productivity in library and information science. Specifically, the article intends to answer the following research questions:

- How many scholarly articles by authors of China have been published? What is the development like in different years and different periods of the three decades?
- What are the top subject areas of the general category Information Science and Library Science these research papers focused on?
- What are the top journals that published these research publications by researchers of China?
- What about China's development in comparison with other important countries in Asia, particularly India, in terms of country productivity in the scholarship of library and information science?

## **Literature Review**

The well-known ISI citation index databases are made up of three databases. They are Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), and Arts & Humanities Citation Index (A&HCI). Recent years witnessed increasingly available scholarly publications studying China's scientific performance in a wide variety of disciplines in and outside of ISI literature. For instance, Guan & Gao (2008) studied Chinese research performance in the field of bioinformatics. He & Guan (2008) conducted a case study of a leading computer journal and evaluated its Chinese research publications. The relatively new journal of Scientometrics contributed greatly to scientometrical studies, particularly with international emphasis on the emerging economies like China.

Besides specific disciplines, China's overall research performance has been increasingly studied too. Zhou & Leydesdorff (2006) found that China emerged as a leading national in science. Consequently, whether or not the dominant position of the U.S. was challenged became a valid research question (Leydesdorff & Wagner, 2009). Many research publications in this regard were naturally on topics of international comparison and international cooperation.

Aside from science and technology, China's research performance in social sciences and humanities has also been increasingly researched. Comprehensive studies in a given period of time were conducted, for instance, Zeng (2006) conducted macro examination and analysis of China's research publications included in both SSCI and A&HCI during 1997-2004. Yao & Kang (2007) not only studied China's education research publications in SSCI, but also offered recommendations to internationalize Chinese educational research publications and make them more visible to international research communities. Researching the country as a whole at macro-level, Zhou & Glanzel (2009) studied China's relatively rapid growth of research performance in social sciences as a whole.

Numerous publications on the subjects of scholarly communications and research performance have been published. Directly relevant to this study are Park (2008), which studied Asian and Pacific Region authorship of leading library and information science journal articles, Jing, Lang & Hu (2009), which intended to study China's development in library and information science during the era of reform and opening to outside world, and Mukherjee (2010), which evaluated research publications in library and information science journals. All three studies used ISI SSCI database in different degree. While Park (2008) and Mukherjee (2010) relied on ISI SSCI for collecting and analyzing data for the periods of 1967 to 2005 and 2001-2007 respectively, Jing, Lang & Hu (2009) actually used it only as a reference and analyzed nine library and information science journals included in both SSCI and SCI. Yearly growth and change were not presented, international comparison was not conducted. Thus, the findings of Jing, Lang & Hu (2009) were not comprehensive at all and far from presenting the whole picture of China's research performance in library and information science during the era. Both Park (2008) and Mukherjee (2010) found that China as a leading country with largest number of research publications in library and information science. However, Jing, Lang & Hu (2009) stated that the number of China's research publications was very limited without offering qualified justification. Hence, it is necessary and useful for this study to make in-depth examination and analysis of research publications over a course of three decades.

### **Methodology and Data Collection**

As mentioned above, the ISI citation index databases include three databases. SCI-EXPANDED covers citations from 1899 to present, SSCI covers citations from 1956 to present, A&HCI covers citations from 1975 to present. Of its four dozens or so Subject Categories, ISI SSCI lists the Subject Category of Information Science and Library Science, which includes about 60 library and information science journals. Thus, the database of ISI SSCI is identified and used to collect the data of journal articles for our

purpose of analysis. The search scope covers only topics of Information Science and Library Science. The Language is English, and the Document Type is restricted to Article only. The time span is limited to 1979-2009, which is the era of reform and opening to outside world in China.

In this article, while Mainland China and Republic of China (Taiwan) are self-evident, the Country of China (or China All in tables and figures) is meant to be the Greater China Area, including Taiwan, Hong Kong and Macao after Hong Kong and Macao were transferred to China. All journal articles by authors who listed China in their official author affiliations and addresses and indexed by ISI under the Country of China have been collected for analysis. Articles by authors from Taiwan who may put Taiwan only in their official author affiliations and addresses are also included for aggregation for China as a whole. Articles by multiple authors of different countries are also included if one or more authors have China in their listed official affiliation or addresses, be it Mainland China, Taiwan, Hong Kong or Macao.

### **Data Analysis and Findings**

The improved web features and tools associated with the database of Web of Science were utilized. However, such improved features and tools such as “Analyze Results” were used selectively with great caution, particularly for collecting data and conducting analysis for Mainland China. In order to achieve accurate analysis, the author depended largely on checking each searched result, tallying the results manually, and making necessary adjustments or even calculating independently.

Table 1 shows the development of LIS research publications by year during 1979-2009. The total number of articles in China, including Hong Kong, Taiwan and Macau is 303. The number of research publications increased quickly from only one in 1980 to double digit (11) starting in 1997, to 44 in 2009. The recent decade in the 21<sup>st</sup> century witnessed the rapidest growth, culminated in 2009 with 44 articles, or about 14.47% of the total publications in three decades. During the 1980s, only 14 articles, or about 4.24%, were published. During the 1990s, 62 articles, or 20.46% of the total were published. But, during 2000-2009, a total 227 articles, or 74.92% were published.

TABLE 1. The growth of library and information science research publications of China by year, 1979-2009.

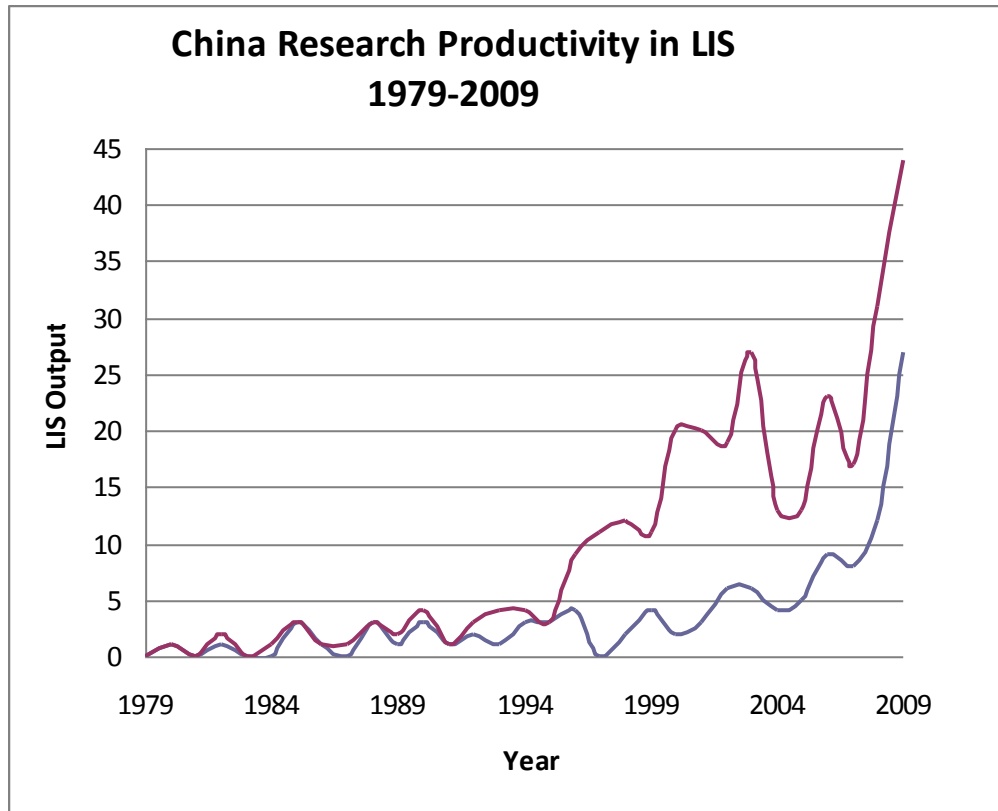
<b>Year</b>	<b>Mainland China</b>	<b>China All</b>
1979	0	0
1980	1	1
1981	0	0
1982	1	2
1983	0	0
1984	0	1
1985	3	3
1986	1	1
1987	0	1

1988	3	3
1989	1	2
1990	3	4
1991	1	1
1992	2	3
1993	1	4
1994	3	4
1995	3	3
1996	4	9
1997	0	11
1998	2	12
1999	4	11
2000	2	20
2001	3	20
2002	6	19
2003	6	27
2004	4	13
2005	5	13
2006	9	23
2007	8	17
2008	12	31
2009	27	44
Total	115	303

Of the total of 303 articles, authors from Mainland China, or including researchers from Mainland China, published 115 articles. In similar growth pattern, the number of research publications by, or including, authors from Mainland China increased quickly from only one in 1980 to 27, or 23.48% of the total 115, in 2009. Just like China as a whole, the recent decade in the 21<sup>st</sup> century witnessed the rapidest growth, culminated in 2009 with 27 articles. During the 1980s, only 10 articles, or 8.70%, were published. During the 1990s, 23 articles, or 20.00% of the total were published. But, during 2000-2009, a total 82 articles, or 71.30% were published.

Figure 1 shows the growth and change of research publications of China as a whole and Mainland China over the course of three decades. China as a whole experienced a relatively big dip in around 2004, Mainland China experienced a dip in 2007. 2008-2009 witnessed the biggest growth of scholarly publication in library and information science.

FIG 1. The growth of library and information science research publications of China, 1979-2009.



As far as Subject Area is concerned, while all journal articles collected are of the general Subject Category of Information Science and Library Science, the research emphasis on subject areas of Information Science and Library Science varies, ranging from Computer Science, Information Systems to Law Librarianship, of course with those emphasizing on conventional library and information service included. Table 2 shows the top subject areas of the 303 journal publications. While the subject area of conventional Library Science & Information Science has 95 articles, or about 31.35% of the total 303 articles, the subject area of Computer Science, Information Systems has 123 articles, the largest number of publications, or 40.59%, of the total. The subject area of Computer Science, Interdisciplinary Applications has 19 articles, or about 6.27%.

TABLE 2. Subject areas of library and information science research publications of china, 1979-2009.

Subject Area	Record Count	% of Total
Computer Science, Information Systems	123	40.59%
Information Science & Library Science	95	31.35%
Management	47	15.51%
Computer Science, Interdisciplinary Applications	19	6.27%
Education & Educational Research	7	2.31%
Geography	4	1.32%
Geography, Physical	4	1.32%
Communication	2	0.66%

Telecommunications	2	0.66%
Information science & library science	303	100.00%

The similarity of development trends of journal publications between China as a whole and Mainland China was observed in Figure 1. However, Table 3 shows that the emphasis on subject areas by authors of Mainland China is different from that of China as a whole. Again, all journal articles collected are in the general Subject Category of Information Science and Library Science, but the top subject areas of journal publications by authors of Mainland China have changed. Conventional subject area of Library Science & Information Science has 63 articles, or about 54.78% of the total 115 articles, topping all other subject areas; the subject area of Computer Science, Information Systems has 21 articles, or 18.26% of the total. The subject area of Computer Science, Interdisciplinary Applications has 16 articles, or about 13.91%.

TABLE 3. Subject Areas of library and information science research publications of Mainland China, 1979-2009.

Subject Area	Record Count	% of Total
Information Science & Library Science	63	54.78%
Computer Science, Information Systems	21	18.26%
Computer Science, Interdisciplinary Applications	16	13.91%
Education & Educational Research	7	6.09%
Management	4	3.48%
Geography	4	3.48%
Information Science & Library Science	115	100.00%

As far as Source Titles are concerned, the top 10 journals in terms of publication count are listed in Table 4. The top two journals are Electronic Library, which published 48 publications, or 15.84% of the total 303 publications, and Information & Management, which published 44 articles, or 14.52% of the total 303 publications. They are followed by Information Processing & Management, International Journal of Information Management, Scientometrics, and Journal of the American Society for Information Science and Technology, with 22, 19, 19, and 16 publications respectively. College & Research Libraries ranked the 10<sup>th</sup>, with 9 articles published. In total, the top 10 journals published 210 articles, accounting for 70% of the total of 303 articles during the past three decades.

TABLE 4. Top journal titles of library and information science research publications of China, 1979-2009.

Source Title	Record Count	% of 303
Electronic Library	48	15.84%
Information & Management	44	14.52%
Information Processing & Management	22	7.26%
International Journal of Information Management	19	6.27%
Scientometrics	19	6.27%
Journal of the American Society for Information Science and	16	5.28%



Technology		
Libri	12	3.96%
Online Information Review	11	3.63%
Library Collections Acquisitions & Technical Services	10	3.30%
College & Research Libraries	9	2.97%
<b>Top 10 Journals Total</b>	<b>210</b>	<b>69.31%</b>

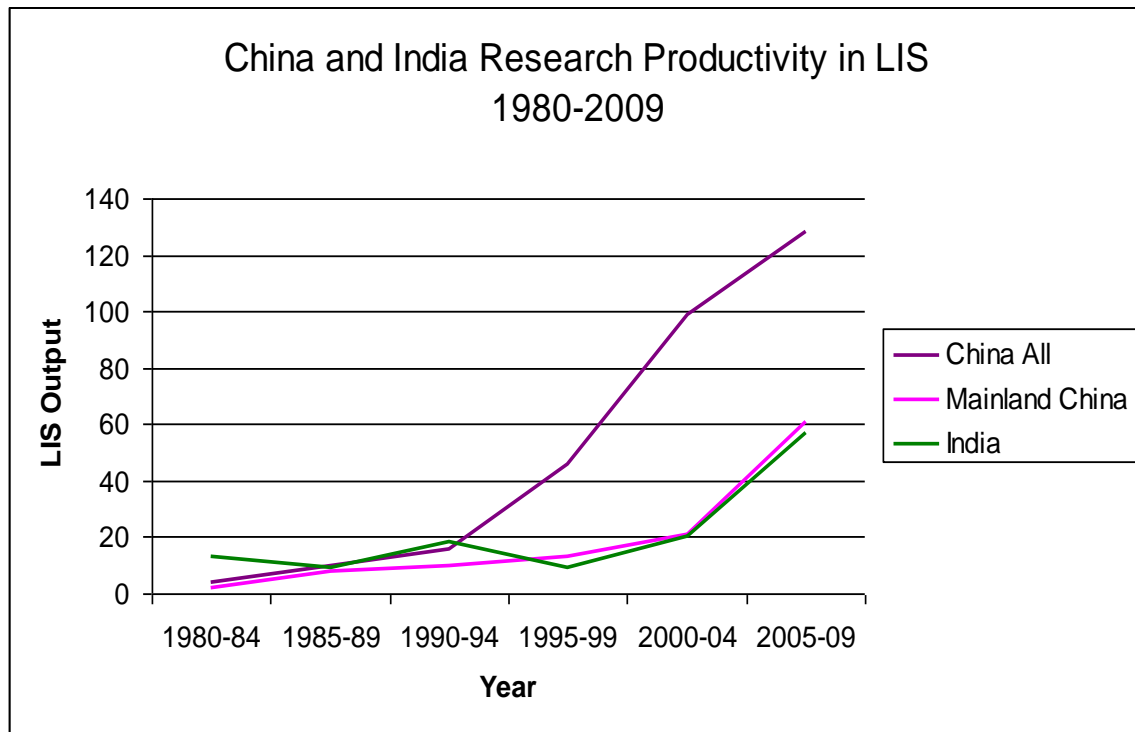
The top journals titles for authors of Mainland China are listed in Table 5. The first two journals are Electronic Library, which published 18 publications, or 15.65% of the total 115 publications, and Scientometrics, which published 16 articles, or 13.91% of the total 115 publications. They are followed by Information Processing & Management, International Journal of Information Management, Scientometrics, and Journal of the American Society for Information Science and Technology, which published 9, 7, 6, 6 and 5 articles respectively. Information & Management, Information Processing & Management, International Journal of Geographical Information Science, International Library Review, and Journal of Information Science published 4 articles each. In total, the top 12 journals published 87 articles, accounting for about 76% of the total of 115 publications during 1979-2009.

TABLE 5. Top Journal titles of library and information science research publications of Mainland China, 1979-2009/

<b>Source Title</b>	<b>Record Count</b>	<b>% of 115</b>
Electronic Library	18	15.65%
Scientometrics	16	13.91%
Libri	9	7.83%
Journal of The American Society for Information Science and Technology	7	6.09%
College & Research Libraries	6	5.22%
Journal of Education for Library & Information Science	6	5.22%
Library Collections Acquisitions & Technical Services	5	4.35%
Information & Management	4	3.48%
Information Processing & Management	4	3.48%
International Journal of Geographical Information Science	4	3.48%
International Library Review	4	3.48%
Journal of Information Science	4	3.48%
<b>Top 12 journals Total</b>	<b>87</b>	<b>75.65%</b>

In comparison with other important countries in Asia such as India in terms of country research productivity during the three decades, China as whole fared better than India. China had a total of 138 journal publications. Mainland China started in a disadvantaged position, but overtook India in the middle 1990s (see Figure 2). Both China as a whole and Mainland China fared much better than Korea and Japan, which published 85 and 58 journal articles of library and information science respectively. From Figure 2, the momentum of rapid growth of both China as a whole and Mainland China in terms of research productivity, especially during the period of 2005-2009, has turned China (either China as a whole or Mainland China) to be a significant leader in the scholarship of library and information science.

FIG 2. China and India Research Productivity in LIS, 1980-2009



### Discussion and Conclusion

Despite having answered the research questions with important findings as above, this study has its limitations. First, this study focused on English-language journal articles only. Books, journal articles in non-English languages, or other types of articles of scholarly nature such as editorials, commentaries, or book reviews, were purposefully left out. The general ISI subject category of Information Science & Library Science covers only about 60 journals; many others have been left out. Only journals meeting ISI inclusion criteria were reviewed and analyzed. Though normally those journals covered in ISI have high-quality representation of scholarship in Information Science & Library Science, hundreds of other journals in Information Science & Library Science were excluded. Needless to say, there are numerous research publications meeting the highest international scholarly standards in Chinese-language journals of Information Science & Library Science based in Mainland China, Taiwan and Hong Kong. Unfortunately, however, they were excluded for review and analysis in this study. It would be interesting and useful to include those journal publications to examine China's contribution to the scholarship of library and information science more comprehensively.

In addition, as reported in literature, there were a number of examples of inaccurate entries in ISI data which probably resulted from unavoidable human errors in processing and indexing journal article records. Without meticulously checking for accuracy and consistency for each journal article record, the author is not sure if the Information Science & Library Science data collected for this study is perfectly free from such errors.

A number of related issues such as research cooperation between authors of China and those of foreign countries and the research cooperation among authors of Mainland China, Taiwan and Hong Kong, institutional productivity of leading institutions and individual productivity of most prolific authors, and the exploration of reasons behind significant change were not addressed in this paper. The controversial but generally useful journal assessment indicators, particularly impact factor, were not examined either.

Despite its limitations, this study is significant in several aspects. Not only the research questions were addressed and answered adequately, it also provided an example of using the powerful ISI databases of citation indexes, particularly ISI SSCI. Equally important, it provided an example of collecting, correcting, analyzing ISI data cautiously and critically. The analysis of historical evolution and change empirically presented the overall upward development of China's scholarship of library and information science. The top subject areas in which researchers published most and the top journals in which the authors published most were identified. Compared with India, China as a whole had much higher research productivity in library and information science; and Mainland China had higher research productivity in library and information science than India in recent years. Thus, China, either as a whole or Mainland China, has become the leader in the scholarly publications in library and information ahead of India, Korea and Japan. It is hoped that in future, China's scholarship of library and information science will experience even greater development with higher quality scholarly publications.

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