

Are Library and Information Science Journals Becoming More Internationalized? -- A Longitudinal Study of Authors' Geographical Affiliations in 20 LIS Journals from 1981 to 2003

Sin, Sei-Ching Joanna

School of Library and Information Studies, University of Wisconsin - Madison, Room 4217 Helen C. White Hall, 600 N. Park Street, Madison, WI 53706 sjsin@wisc.edu

This paper examines journal publications in the field of library and information science (LIS) to assess the level of internationalization in their publications authorship pattern. The international production and communication of scholarly knowledge is crucial to the growth of a discipline. Recent advancement in communication technology and the rise of globalization have led to the hope of a more balanced flow of scientific knowledge. Nevertheless, scholars also cautioned the possibility of a global digital divide and a widening knowledge gap. This study analyzed the geographical affiliations of authors in 20 international LIS journals to track the longitudinal changes in LIS authorship pattern. Findings suggest an increase in the internationalization of LIS authorships over the years. However, the LIS authorship distribution was still highly uneven in 2003 (Gini coefficient = 0.95). Economic power is still found to be a moderate predictor of publication performance. The findings of this study suggest that, at the moment of the writing, there is still room for the LIS field to be more internationalized. Further research is needed to identify the barriers in international scholarly communication and to explore the implications of such a communication pattern on scientific development and global equality.

Introduction

Research on the international flow of information, including scientific information, has flourished since the 1970s (Mawlana, 1986). White and McCain (1989), in their review of the mid-1970s to late-1980s bibliometrics literature, identified a growth of interest in using quantitative indicators to measure science and technology performance at the national level. Earlier studies of nations' research performances and of the international scientific information flow indicated an uneven production and distribution of scientific knowledge. Most papers published in international journals were written by authors in developed countries such as the United States (US) (Frame, Narin & Carpenter, 1977; Dore et al., 1996). In recent years, the advancement of information and communication technology (ICT) has made possible the compression of time-space (Harvey, 1989). Some scholars pointed out that technological advancement might help facilitate the globalization/internationalization of scholarship (Kohler, 2001; He & Spink, 2002). With ICT advancement such as the Internet, it might be easier for researchers around the world to share and publish their research findings. Nevertheless, there were concerns that researchers from developing nations might experience difficulties, such as language barriers, prejudice, and cultural imperialism (Gibbs, 1985; Dahdouh-Guebas et al., 2003), when they try to publish their research in prestigious journals. In order to fully explore the implications of ICT on international scholarly communication, one has to have empirical evidence of the status and trends in the global authorship pattern. An empirical and longitudinal analysis of journal publications is needed to uncover the changes in international scholarly publishing. This paper is an attempt to address the above research gap by identifying the general patterns and trends of LIS authors' geographical affiliations over the last twenty years. The focus is to examine whether there is a trend towards "internationalization of library and information science." In this paper, the term refers to the process where more researchers outside of the Western developed countries could participate in the international LIS research community, especially by publishing in prominent international journals. By identifying the longitudinal changes in the internationalization of LIS research publications, this study hopes to pave the way for further bibliometrics and social informatics studies. Future study could focus on identifying the factors and barriers in international scholarly communication, and to further explore the implications of such a communication pattern on knowledge sharing and on global development.

Literature Review

Findings in bibliometrics studies consistently point to the uneven production of scientific publications across the globe. Frame, Narin & Carpenter (1977) studied the 1973 Science Citation Index (SCI) and confirmed the dominance of the US in the research front. The US produced 103,780 articles; it was about 4 times the amount published by the second largest producer country, the United Kingdom (UK). Using the Gini coefficient, the authors examined the level of concentration in the world's research publications. They found that the production of mainstream science was heavily concentrated in a few science centers (Gini coefficient = 0.9082).

In recent decades we have seen the advancement of various communication technologies and the rise of globalization. In scholarly publications, researchers are increasingly in favor of publishing in international journals, such as those indexed by the Science Citation Index (SCI) and Social Science Citation Index (SSCI), over publishing in national/local journals. Zitt, Perrot & Barre (1998) described this trend using a model of transition. They suggested that researchers are moving from 'national' to 'transnational' publication. The authors purposely used the term transnational to "emphasize the dissymmetry of the process" (p.30). This transition could partly be explained by the researchers' attempt to seek higher visibility in the international research scene. The preference to gain wider readership by publishing in international journals is also noted by others (Bottle & Efthimiadis, 1984; He & Spink, 2002). The improvement in ICT in recent years has also made international publication potentially more efficient and feasible. He & Spink (2002) suggested that the growth of collaborative research and flow of information over the Web contributed to the increasing transnational nature of scholarly publishing.

On the other hand, scholars have also cautioned against over-optimism and technological determinism. Studies in social informatics highlighted the fact that ICT often leads to differential effects on different social groups (Sawyer & Eschenfelder, 2002). Scholars of the digital divide also underscored the notion that ICT would not automatically lead to better information flow. We might be experiencing a widening inequality gap (see for example, Wresch, 1996). In bibliometrics and in various disciplines, researchers have increasingly questioned claims about the internationalization of science. Many have started to empirically analyze the level of internationalization of their journals (e.g. Zitt & Bassecouard, 1998; Rey-Rocha & Martin-Sempere, 2004). Gutiérrez & López-Nieva (2001), for example, examined the degree of internationalization in 19 human geography journals for the period of 1991 to 1997. They found that the US and UK together accounted for more than 70% of the publications. The authors concluded that international human geography journals have not yet attained a high level of internationalization.

In LIS, studies have been conducted to examine various authorship characteristics of LIS journals (e.g. Herubel, 1990; Buttlar, 1991;

Al-Ghamdi et al., 1998; Liptez, 1999). However, very few studies have explored in detail the degree of internationalization in LIS. Wormell (1998) is one of the exceptions that offered a more in-depth analysis of LIS journals' internationality. She questioned "How 'international' are the international journals?" The study examined 7 LIS journals and explored the relationship between the distribution pattern of authors, the citations and the journal subscriptions. The findings showed that articles were often cited by other researchers from the same region. The author suggested that the "core international LIS journals were not as international as their reputation claimed to be" (p.598). Cronin & Shaw's study (1999) echoed Wormell's argument. Analyzing 4 journals in terms of authors' geographic locations, citations, and acknowledgements to funding sources, Cronin & Shaw (1999) found that most authors came from North Atlantic countries (including the US, the UK, and Canada) (513 out of 716 articles). They also found that authors from the 'Rest of World' were more likely to be uncited (28%) than North Atlantic authors (14%).

Uzun (2002) focused on authors from developing countries (DCs) and the formerly socialist Eastern European Countries (EECs). He examined 21 LIS journals and found that only 7.9% of the articles are by authors from DCs or EECs. Their articles are more often published in less prestigious journals. He & Spink (2002) also emphasized the importance of studying foreign authors, as they recognized that scholarship is an increasingly international pursuit. They analyzed the geographic distribution of authorship in *Journal of the American Society for Information Science (JASIS)* and *Journal of Documentation (J Doc)*, and found an increased representation of foreign authors in both journals.

In sum, most studies suggested that knowledge production is uneven across countries. The US and the UK have been found to be dominant in the LIS field. Recent studies showed an increasing number of foreign authors contributed to LIS publications (Herubel, 1990; Nisonger, 1996; Al-Ghamdi et al., 1998; Liptez, 1999; Kohler, 2001; He & Spink, 2002). Kohler (2001), in his analysis of *JASIS*, identified trends of a "globalization of information science" (p.129).

It is important to note, however, that Kohler (2001) also cautioned against over-projecting these trends. A careful review of the literature would confirm that Kohler's concern is well-grounded. It might be difficult to generalize the findings of extant authorship studies, as these studies tend to be focused in scope. The generalizability of these studies might be limited by one or more of the following factors: 1) number of journals examined - as observed by Wilson (1999), authorships studies often focused on a small number of journals (e.g. Al-Ghamdi et al., 1998; Liptez, 1999); 2) period of time examined - studies might focus on a short time period (e.g. Raptis, 1992; Siddiqui, 1997); 3) type of authors examined - most of the studies examined only the first author (e.g.

Kohler, 2001; He & Spink, 2002) or focused on authors from particular regions (e.g. Uzun, 2002); and 4) geographic areas examined - most studies examined aggregated geographical regions instead of analyzing the research productivity of individual countries (e.g. Raptis, 1992; Cronin & Shaw, 1999). To identify general trends in LIS authorship distribution and to examine the degree of internationalization in LIS journals, research with a broader scope is called for.

Methods

This study examines 20 prominent LIS journals, all of which are indexed in the Social Science Citation Index (SSCI) and classified under the Information and Library Science category. They are the top 20 journals in terms of their journal impact as identified in the ISI Journal Citation Report (JCR) 2003. The list of selected journals can be found in Appendix 1.

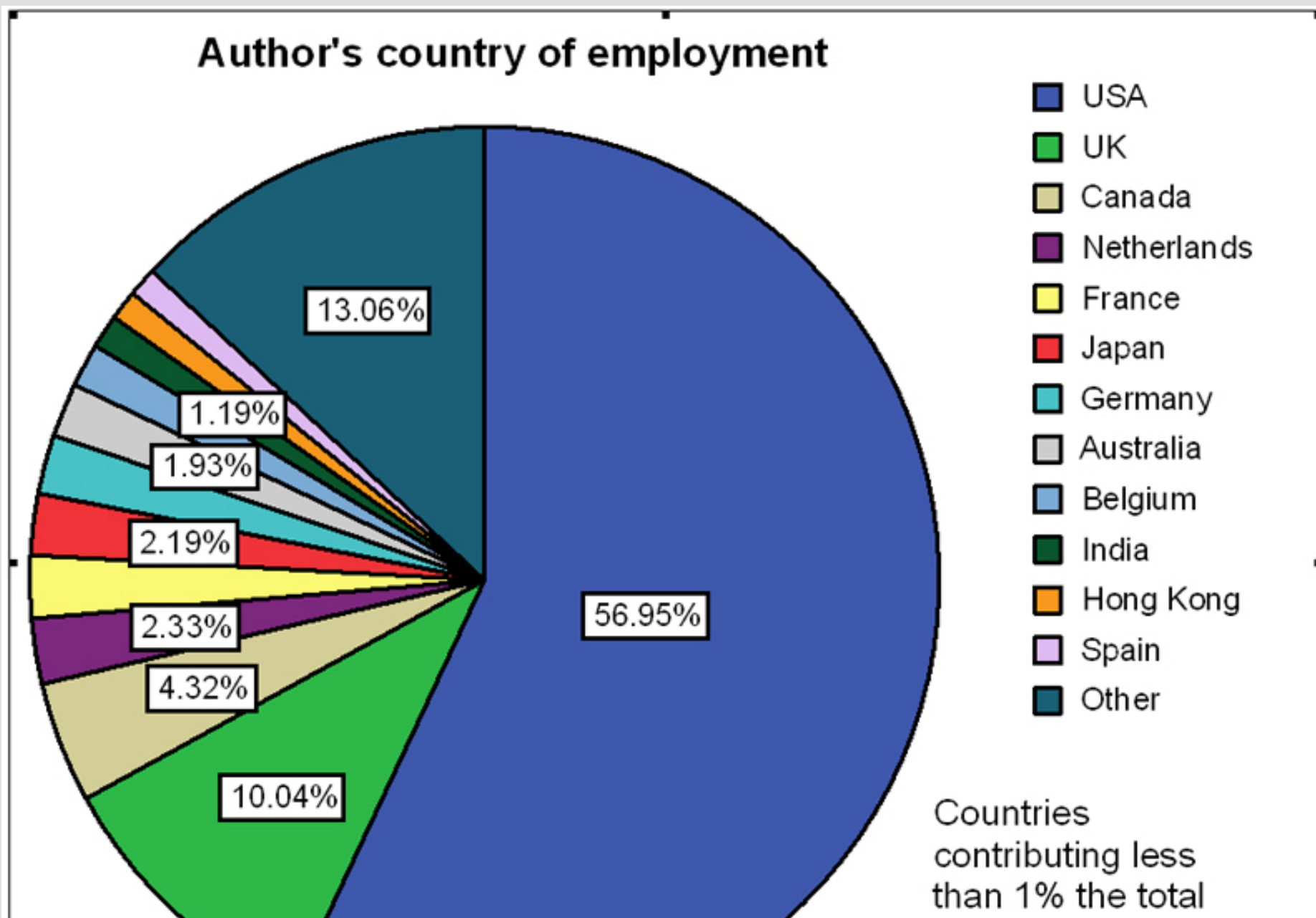
The bibliographical data of all research articles published in the selected journals from 1981 to 2003 were identified from the ISI Web of Knowledge database. All substantial research papers were then selected for this study. A research paper is operationally defined as a paper in the category of 'Article,' 'Review' or 'Bibliography' in the ISI database. Articles classified as 'Editorial materials,' 'Meeting abstract,' 'Book review' etc. were not included.

This paper focuses on the following bibliographic data: article's year of publication, the author's correspondence address, number of times the article was cited, the journal title and the journal's country of publication. These bibliographic data were extracted using Microsoft Access. An author's geographical affiliation is coded based on his/her country of employment as indicated in the correspondence address. Data were processed and analyzed using SPSS. Gini coefficients were calculated using the Gini Excel macro developed by Dagum and his colleagues (n.d.)

Results

The dataset contains 12,511 research papers. The full author count method was used in counting authors' contributions¹ Coauthors

were fully credited (i.e. count 1 for every coauthor country). The dataset yields a total of 17,095 author counts, and these contributing authors came from 92 countries. The pie chart below shows the countries' shares of LIS publications for the whole dataset (Fig.1). Table 1 lists the 10 most productive countries. Table 2 shows the longitudinal changes in the top 10 rankings in 5-year intervals.



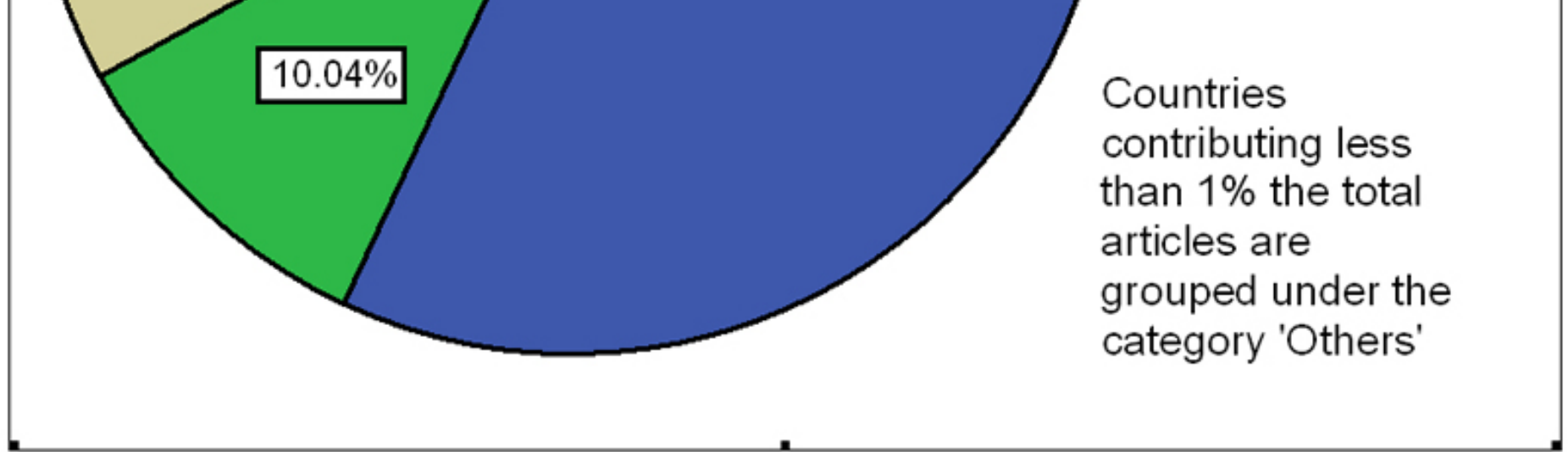


Figure 1: Author's country of employment

Table 1. Most productive countries, 1980-2003

Rank	Country	Count	Percent	Cumulative Percent
1	USA	9735	56.95	56.95
2	UK	1717	10.04	66.99
3	Canada	739	4.32	71.31
4	Netherlands	398	2.33	73.64
5	France	382	2.23	75.88
6	Japan	374	2.19	78.06
7	Germany	359	2.10	80.16
8	Australia	330	1.93	82.09
9	Belgium	265	1.55	83.64
10	India	204	1.19	84.84

Table 2. Changes in Top 10 countries

Rank	Country, average number of author counts per year, percentage share of author counts									
	1980 - 1984		1985-1989		1990-1994		1995-1999		2000-2003	
1	USA	127.6 (61.76%)	USA	236.8 (58.30%)	USA	364.6 (58.83%)	USA	621.8 (56.13%)	USA	745.25 (55.17%)
2	UK	24.6 (11.91%)	UK	52.6 (12.95%)	UK	63.6 (10.26%)	UK	107.2 (9.68%)	UK	119.25 (8.83%)
3	Japan	13.6 (6.58%)	Canada	21.2 (5.22%)	Canada	29 (4.68%)	Canada	42.6 (3.85%)	Canada	55.5 (4.11%)
4	Canada	10.6 (5.13%)	Japan	19.8 (4.87%)	Germany	17.4 (2.81%)	France	29.8 (2.69%)	Netherlands	35.75 (2.65%)
5	Hungary	3 (1.45%)	Netherlands	7.8 (1.92%)	France	15.6 (2.52%)	Netherlands	27.6 (2.49%)	France	29 (2.15%)
6	Poland	2.6 (1.26%)	Hungary	6.4 (1.58%)	Netherlands	14.4 (2.32%)	Germany	27.4 (2.47%)	Australia	27.75 (2.05%)
7	Australia,	2 (0.97%)	India	6 (1.48%)	Japan	11.4 (1.84%)	Australia	27.2 (2.46%)	Germany	25 (1.85%)
8	France		France	5.8 (1.43%)	Australia	10.6 (1.71%)	Belgium	19.2 (1.73%)	Belgium	24.5 (1.81%)
9	India	1.8 (0.87%)	Germany	5.4 (1.33%)	Belgium	9.6 (1.55%)	Japan	17.8 (1.61%)	Hong Kong	23.25 (1.72%)
10	Germany, Nigeria	1.6 (0.77%)	Belgium	4.4 (1.08%)	Italy	7.8 (1.26%)	India	16 (1.44%)	Taiwan	22.75 (1.68%)

Authorship Distribution

Number of countries contributing to LIS publications

The data indicate that more scholars from different countries have been publishing in international LIS journals. In 1980, the research papers came from 8 countries, including the US, the UK, Canada, Australia, Japan, Chile, Italy and Mexico. In 2003, papers were contributed by authors from 51 countries (Fig. 2).

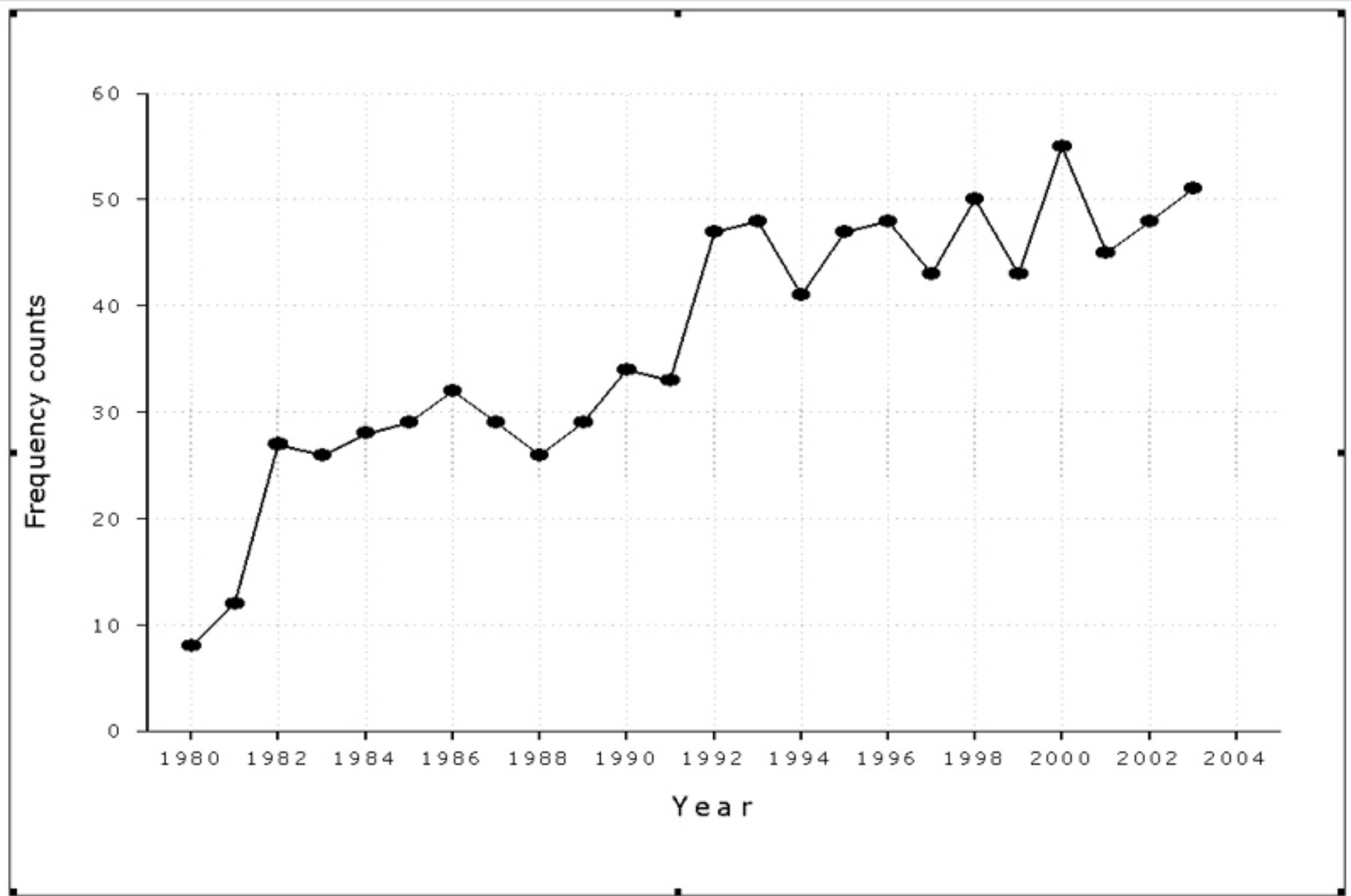


Figure 2: Number of countries contributing to LIS publications

Number and percentage share of international authors

An international author is defined as an author affiliated with institutes outside of a journal's country of publication. Papers written by at least one international author are considered as international papers. For this sample set, the number of international papers and international authors are, in general, on the rise. (Fig.3). In 1980, there were 28 international papers in the selected LIS journals, involving 28 international authors. In 2003, there were 432 international papers with 703 international author counts. A best fit line is calculated using linear regression, and it suggests that the number of international paper has a rising trend (slope = 18.6). But these increases can be partially attributed to: 1) Increases in contributions from international authors; 2) Increases in the number of journals indexed in the database; and 3) Increases in the number of research articles published per issue. (In 1980, for example there was an average of 35 articles per journal. In 2003, the average was 38.)

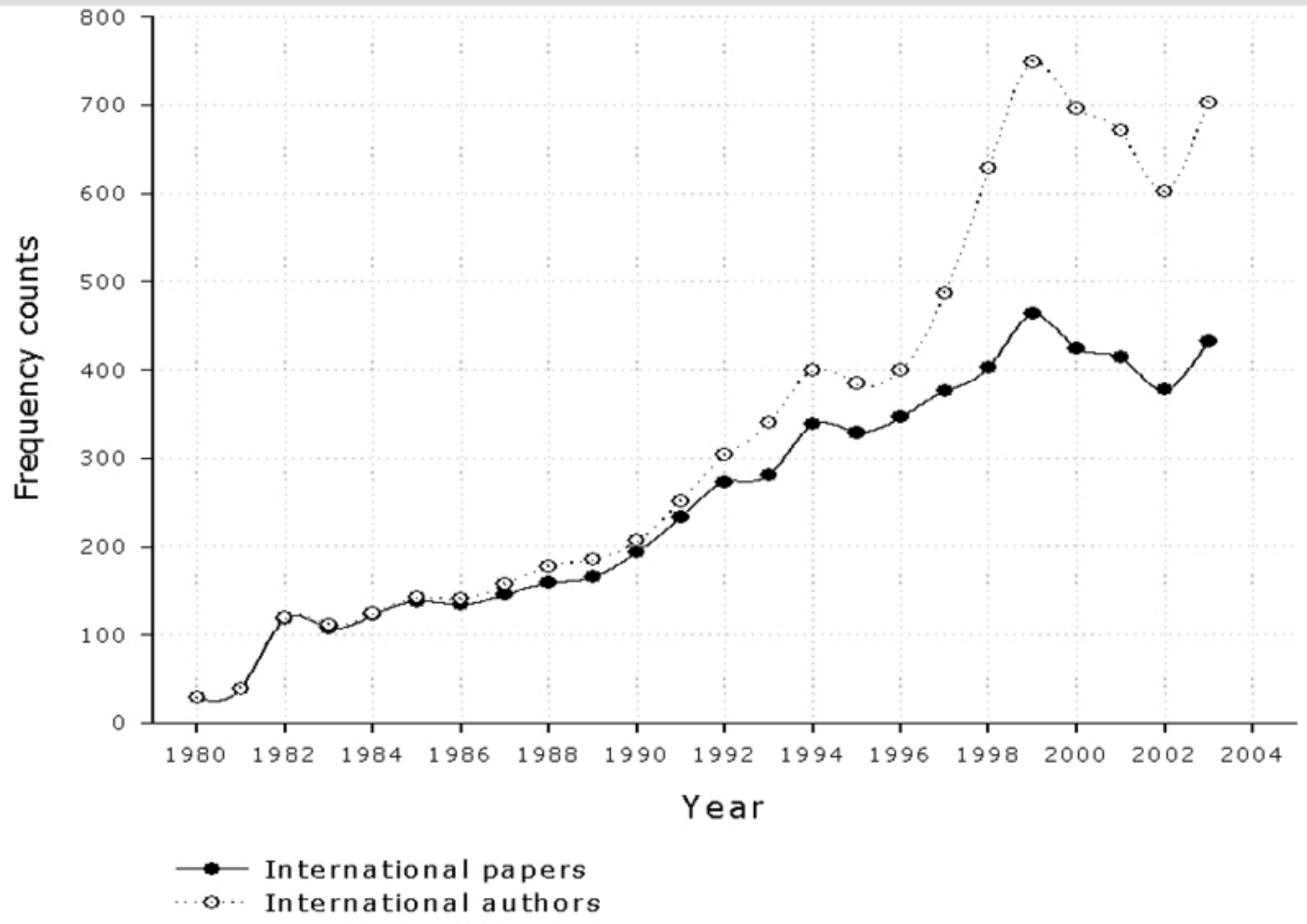


Figure 3: Number of international papers and international authors by year

To take into account the increases in the number of journals and research articles being published per year, the percentage share of international authors is tabulated for this dataset. The result presents a slightly different picture (Fig. 4). The changes in percentage share of international authors fluctuated more than what is suggested by using actual counts. The percentage share was 40 % in 1980 and rose to 58% in 1993. The percentages rose and fell quite markedly afterward. In 1998, the percentage share started to rise again, and it climbed back to 56% in 2003. Overall, the regression line shows a trend of increase in the percentage share of international authors. Compared to the increase in actual counts, however, this increase is moderate (slope = 0.583).

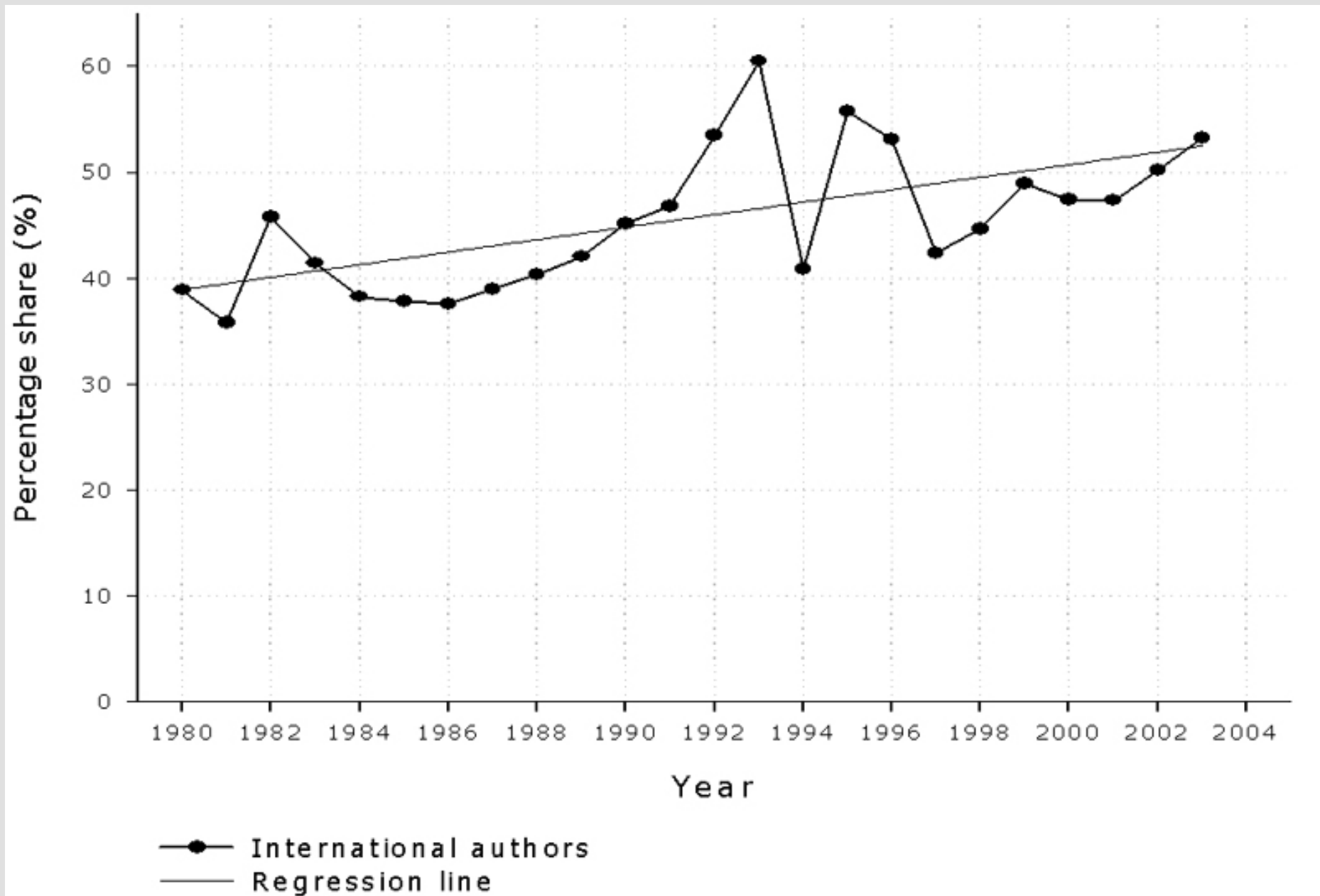


Figure 4: Percentage share of international authors by year

Measure of concentration in LIS publications - Gini coefficient

While the percentage share of international authors has a moderate rising trend, the finding should be interpreted with care. The increases in actual counts or percentage share of international authors do not necessarily suggest that knowledge production in LIS research is now more evenly distributed. International papers could also come from nations that were already well-established in the field. Papers written by UK researchers that are published in the US, for example, are considered as international papers. It is thus necessary to not only investigate the counts and share of international authors, but also to examine the pattern of distribution in LIS authorship.

The dataset shows that for the period of 2000 to 2003, the top 2 countries (US and UK) contributed to 64% of all articles (Table 2). It suggests that the authorship distribution was still uneven. To have a more precise measure of the level of concentration in research publications, this paper argues for the use of summary statistics such as the Gini coefficient. The use of such an index would allow us to quantify the degree of concentration. It will allow researchers to measure the changes in authorship distribution over the years, and also to compare the level of concentration across journals and disciplines.

The Gini coefficient is one of the most commonly used measures of concentration/inequality. It is widely used, for example, in the measures of income inequality. The coefficient is a summary statistic of the Lorenz curve, a cumulative frequency curve that compares the distribution of a variable with the distribution that represents a state of perfect equality. The coefficient can range from 0 (indicating complete equality) to 1 (indicating complete inequality). Brown (1994) provides one of the formulas for calculating the Gini coefficient (Fig. 5).

$$G = \left| 1 - \sum_{k=0}^{k=n-1} (X_{k+1} - X_k)(Y_{k+1} + Y_k) \right|$$

Figure 5: Gini coefficient. Brown's formula.

G represents the Gini coefficient. For this study, X is the cumulated proportion of the country variable, and Y is the cumulated proportion of the number of LIS publications. The Gini coefficient of authors' geographic distribution for each year from 1980 to 2003 is calculated. At 1980, the Gini coefficient of LIS publication distribution was 0.9890, and in 2003, it was 0.9527. Fig. 6 shows the changes in Gini coefficient over the years. The regression line shows that the degree of concentration is decreasing over the year (slope = -.0013). It has to be underscored that the degree of concentration is still tremendously high in 2003. The degree of concentration in LIS research publication in 2003 is even higher than the level of concentration reported in Frame, Narin & Carpenter's study (1977) of the 1973 Science Citation Index (Gini coefficient = 0.9082).

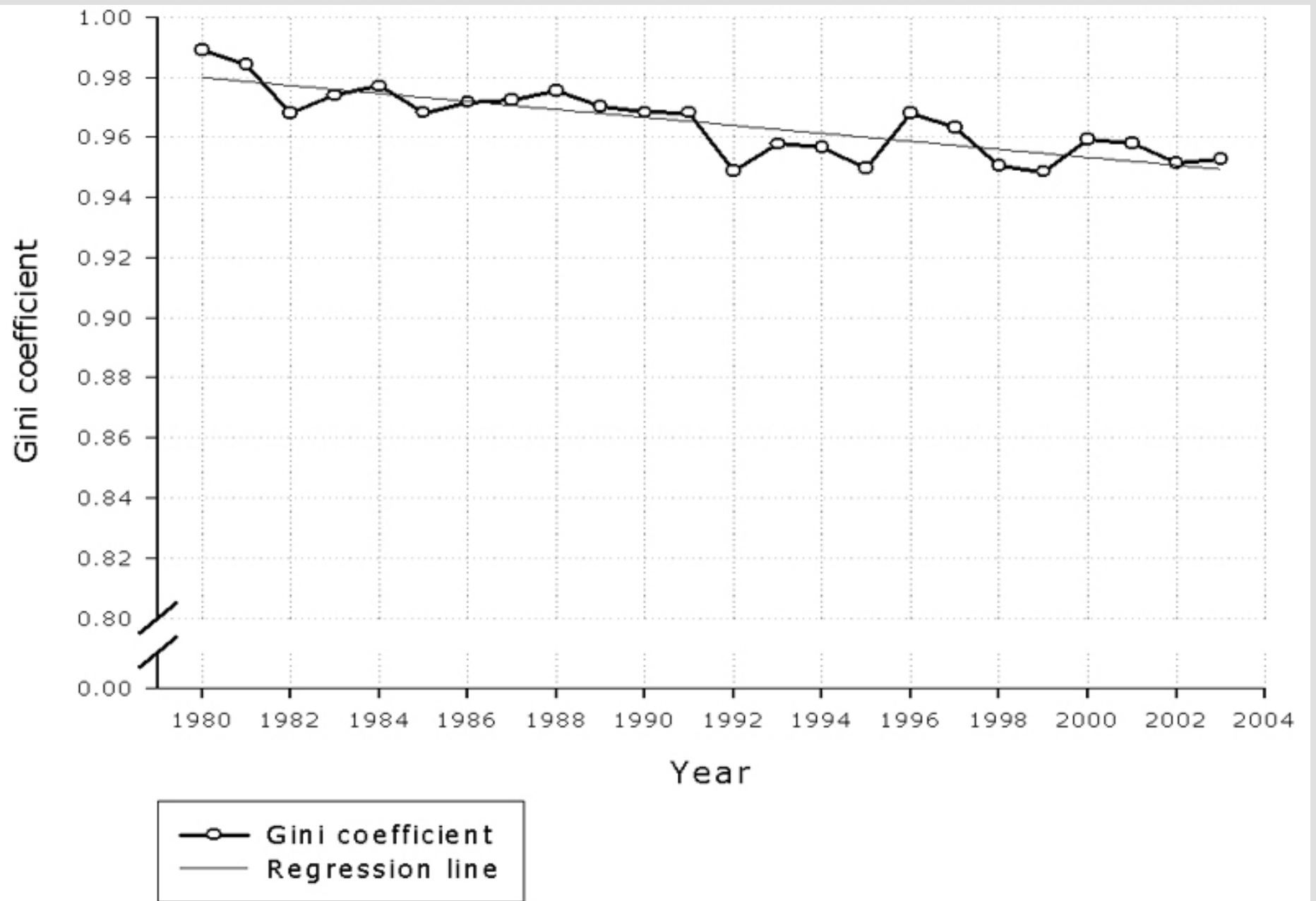


Figure 6: Gini coefficient by year

Economic power and LIS publication activities

The above analysis shows that in 2003, the authorship geographic distribution in LIS is still highly uneven. Further analysis is needed to identify the pattern and factors behind this uneven distribution. Among different variables, a country's economic power, especially in terms of per capita economic activity, has been found to be a good predictor of knowledge production (Price, 1978). Research from developing countries is found to be less represented in high impact journals (Cronin & McKenzie, 1992; Uzun, 2002). The following section offers a preliminary analysis of the relationship between a country's economic activities and its research publication performance.

A regression analysis was performed with GNI (Gross National Income) per capita in 2003² as an independent variable, and the number of authors having their article published in 2003 as a dependent variable. The result was significant ($F(1,90) = 10.69, p < .05$). GNI per capita explained about 10.6% of the variance in number of publications. The result indicated that in the year 2003, research activities and publication are still significantly related to a country's economic power. Low-income countries still tended to produce a lower number of publications.

The economic power of a country might also be correlated to the impact of an author's work. In bibliometrics, the number of times an article is being cited is often considered as a proxy of the influence of an article. Cronin & Shaw (1999) suggested that articles from developing countries are often less cited. The results of this dataset agree with Cronin & Shaw's observation. Based on the World Bank's classification scheme (2004b), countries in this dataset are classified as either high-income, middle-income or low-income. On average, articles from the high-income group were cited 3.84 times, middle-income group were cited less (2.82 times), and low-income group were cited the least (2.21 times). A regression analysis was conducted to further test the relationship between a country's economic power and the impact of its research. The 2003 GNI per capita was entered as the independent variable, while the average number of times cited was used as the dependent variable. The result was significant ($F(1,90) = 11.40; p < .05$). GNI explained 11.2% of the variation in average number of times cited.

Discussion and Conclusion

The goal of this paper is to examine the level of internationalization in LIS research publication. Through descriptive and inferential statistics, the study has identified the following patterns of LIS publications:

1. More international authors are publishing their research findings in the selected journals. Nevertheless, the Gini coefficient showed that although the degree of concentration in LIS research publication is slightly declining, the distribution remains highly uneven. Western nations, especially the United States and the United Kingdom, have dominated and are still dominating LIS research front.
2. Statistical analyses have revealed that economic power and research activities are significantly related. High-income countries tend to publish more articles, and their publications tend to get cited more often than those of low-income countries.

The findings of this study suggest that there was some increase in internationality of LIS research. This coincides with the findings of other longitudinal authorship studies such as Liptez (1999) and He & Spink (2002). At the same time, this paper also provides a slightly different picture of the LIS internationality: 1) The geographic distribution of authors in the selected intentional journals is still highly uneven; and 2) The trend towards internationalization is quite slow.

The uneven authorship distribution identified above indicates that more research is needed to uncover the causes behind this pattern. Further studies could compare the level of internationalization of different journals. Factors such as the availability and accessibility of information technology, researchers' level of participation in international professional organizations (invisible colleges), and other historical, geographical and linguistic differences are also worth examining. The findings showed that research from developing countries is less visible and less cited. Cole & Cole (1973) found that when comparing works of roughly equivalent quality, researchers could be influenced by factors other than the substantive content of the work itself. Authors employed at a prestigious department/institute were more likely to be perceived favorably. Following this line, it seems that authors in low-income countries might be placed in a less advantageous position. How to overcome this barrier is a topic that should be further investigated.

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Notes

¹Various counting methods have been used in bibliometrics studies. In the Straight or first-author count option, for example, only the first author is credited for the publication, all other co-authors are excluded. This study prefers the full author count method, so that all authors are credited. More detailed analysis of different author count methods can be found in Harsanyi (1993) and Egghe, Rousseau & Van Hooydonk (2000).[Back](#)

²The GNI per capita data are obtained from World Bank's World Development Indicators. It was formerly known as GNP per capita (World Bank, 2004a).[Back](#)

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Appendix 1: List of selected journals

Rank	Title	Publisher country
1	Annual Review of Information Science and Technology	United States
2	MIS Quarterly	United States
3	Journal of the American Medical Informatics Association	United States
4	Information Systems Research	United States
5	Information & Management	Netherlands
6	Journal of Documentation	United Kingdom
7	Journal of the American Society for Information Science and Technology [Formerly: Journal of the American Society for Information Science]	United States
8	College & Research Libraries	United States
9	Scientometrics	Netherlands
10	Journal of Management Information Systems	United States
11	Information Processing & Management	United Kingdom
12	Journal of Information Science	United Kingdom
13	International Journal of Geographical Information Science [Formerly: International Journal of Geographical Information System]	United Kingdom
14	Journal of Health Communication	United States
15	Library Resources & Technical Services	United States
16	Government Information Quarterly	United States
17	International Journal of Information Management	United Kingdom
18	Telecommunications Policy	United Kingdom
19	Library and Information Science	Japan
20	Library & Information Science Research	United States

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