

# Analysis of publication patterns in Korean library and information science research

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**Abstract** This study assessed research patterns and trends of library and information science (LIS) in Korea by applying bibliometric analysis to 159 Korean LIS professors' 2,401 peer-reviewed publications published between 2001 and 2010. Bibliometric analysis of publication data found an increasing trend for collaboration, robust publication patterns, increasing number of international publications, and internationalization of LIS in Korea. The maturation and internalization of LIS research was evidenced in increased number of publications in high impact journals (e.g., SSI, SSCI), growing participation in leading international conferences (e.g., ASIST, TREC), increasing proportion of Korean LIS faculty with international degrees, and high publication rates by professors with international degrees. Though limited in its evaluative power without citation data, publication data can be a rich source for bibliometric analysis as this study has shown. The analysis of publication patterns conducted by the study, which is a first step in our aim to establish a multi-faceted approach for assessing the impact of scholarly work, will be followed up in a future study, where the question of quantity versus quality will be examined by comparing publication counts with citation counts.

**Keywords** Bibliometric analysis · Publication patterns · Research productivity · Library and information science · Korea

## Introduction

Despite the popularity of citation analysis in bibliometrics research, publication counting is still one of the most widely used metrics for assessing the scholarly productivity of

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academic faculty members (Cronin 1984; Holmes and Oppenheim 2001; Moed 2005). This is especially true in Korea, where the coverage, availability, and robustness of citation indexes are somewhat limited. Before examining the question of quantity versus quality (e.g., publication count vs. citation count), we began our examination of library and information science (LIS) research in Korea with a bibliometric study of publications by LIS faculty in Korean universities. The study, which analyzed 2,401 peer-reviewed publications by 159 tenure-track professors from 34 LIS departments in Korea, extends prior research<sup>1</sup> by conducting a multi-faceted evaluation of research patterns using a readily available yet comprehensive data on scholarly output.

Analysis of publication data by year, author, affiliation and journal revealed interesting patterns in LIS research in Korea, some of which are: increasing trend for collaboration, robust research activity with foreign publications on the rise, and internationalization of LIS in Korea. Specifically, the study found higher rate of Korean LIS faculty with foreign degrees than previous years as well as the high publication rate of professors with non-domestic degree. The analysis of publication patterns conducted by the study, which is a first step in our aim to establish a multi-faceted approach for assessing the impact of scholarly work, is followed up in a second study that analyzes citation data to evaluate the quality of publications.

## Prior research

Most prior studies analyzing LIS publications in Korea focused on identifying research trends based on publication patterns. Han and Cho (1996) found that 91% of 684 papers published from 1970 to 1995 in the top four Korean LIS journals, namely *Journal of the Korean Society for Library and Information Science*, *Journal of the Korean Library and Information Science Society*, *Journal of the Korean Society for Information Management*, and *Journal of the Institute of Bibliography*, were by single authors. This pattern of sole authorship, though changing in recent years as the current study found, reflects the reluctance of Korean researchers towards collaboration, part of which may be affected by Korean universities' faculty performance evaluation criteria that favor sole authorship. Lee (2002), who examined 597 papers published in *Journal of the Korean Society for Library and Information Science*, *Journal of Korean Library and Information Science Society*, and *Journal of Information Management* between 1997 and 2001, found a decrease in sole authorship (74%) along with an accelerating publication rate in 2001. Lee attributes the rapid increase in publication counts to the publication frequency changes in key LIS journals, which began publishing quarterly instead of semi-annually in 2001.

In a related study, Sohn (2003) analyzed 2,271 papers published during 1957–2002 and found that 91% of the papers were published in the last 15 years of the 45-year period, 61% of which were in the last 8 years (1995–2002). Sohn offers as a possible cause the implementation of faculty research evaluation policy in Korean universities in the 1990s. Though Sohn's study illustrated the acceleration of publication activity in Korean LIS research in recent years, his findings should be interpreted with care since they are based on a mixture of peer-reviewed and non-reviewed papers. Further evidence of "publication acceleration" was given by Chung and Park (2011), whose study of 2,166 publications in

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<sup>1</sup> Prior research analyzed publications in a selected number of Korean journals or publications in international journals only.

four top Korean journals<sup>2</sup> from 2000 to 2009 was three times the size of Sohn's (2003) study sample of the preceding period (1985–1994). Instead of journal papers, Choi (1999) analyzed 767 LIS monographs published over 40 years (1957–1997) and found a steady increase in publication rate that doubled every decade until the 1990s. Choi's finding suggests the shift in publication venue from monographs to journals in the 90s when journal papers became more conducive to favorable evaluation of research output due to their shorter turnaround time (e.g., quarterly publication) and emphasis of journals in university faculty evaluation guidelines.

The decrease in sole authorship (54%) was also found to continue in Chung's (2009) study of 239 journal papers by 41 Korean LIS faculty members from 2003 to 2007. The decreasing rate of sole authorship reported in three studies—91% in 1970–1995 (Han and Cho 1996) to 74% in 1997–2001 (Lee 2002) to 54% in 2003–2007 (Chung 2009)—is certainly illustrative of a general trend, but is difficult to compare given the varying sample selection procedures. For instance, Chung's study sample consisted of a subset of papers (i.e., journal papers by 41 LIS professors) as opposed to all publications in top Korean LIS journals as were the cases with two previous studies. The trend of increasing publication counts and decreasing sole authorship, found to hold steady in the current study with comprehensive data, indicates the progress of LIS research in Korea towards collaboration and productivity.

To identify LIS research trends in Korea, some researchers focused their investigations on citation patterns instead of publication patterns. Chung (2001), who analyzed 8,371 references in 339 Korean LIS journal papers published between 1996 and 2000, found over two-thirds (68%) of references to be to English publications while less than one-third (30%) were to Korean publications. Chung identified the main document types of cited items to be journal and professional magazine articles (43%), monographs (33%), Web documents (13%), and dissertations (5%). The weakness in Chung's research, which is its limited data source of only two LIS journals, was addressed in a later study (Oh 2005) that examined over 30,000 references in 2,571 Korean LIS publications from 1946 to 2004. Oh found close to two-thirds of citations to be references to foreign LIS publications and 73% of all foreign references occurring in the last 4 years (1991–2004), thus showing that citing foreign publications was a relatively recent trend.

Cho and Han (2007) extended Oh's research by examining 33,352 references in 1,230 journal papers between 1996 and 2005. In comparison to Oh's sample that included peer-reviewed and non-reviewed publications over half a century, Cho and Han (2007) restricted their sample to faculty publications from five top Korean LIS journals in a recent decade. Among the main reference document types reported in their study, monographs (29%), journal articles (28%), reports (13%), and Web documents (10%), only the citations to journal articles were analyzed in-depth. In their study, the citation ratio of Korean to non-Korean journals were more even (48–52%) with the *Journal of American Society of Information Science and Technology* (JASIST) as the most cited international journal and the *Journal of the Korean Society for Library and Information Science* as the most cited Korean journal.

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<sup>2</sup> Top five LIS journals in Korea are *Journal of the Korean Society for Library and Information Science*, *Journal of Korean Library and Information Science Society*, *Journal of Information Management*, *Journal of the Institute of Bibliography*, and *Journal of the Korean BIBLIA Society for Library and Information Science*. Han and Cho (1996) chose the first four journals for their study while Chung and Park (2011) chose the *Journal of the Korean BIBLIA Society for Library and Information Science* instead of the *Journal of the Institute of Bibliography*.

Choi (2003) searched *Library and Information Science Abstracts* (LISA) and *Information Science Abstracts* (ISA) and found 74 publications by Korean authors in the period of 1971–2002. As a publication venue, JASIST was at the top with four papers, followed by *Information Processing and Management* (IP&M) and *Journal of Information* with three papers each. The cited document types in the order of frequency were journal papers (80%), monographs (10%) and conference proceedings (7%), which indicates a difference in citation pattern between international and Korean publications. The Korean to non-Korean reference ratio of 1:2, on the other hand, was more in keeping with that found in Korean publications. Choi's analysis of international publications by Korean LIS researchers revealed an important trend of internalization in Korean LIS research, where high impact international journals are increasingly favored as both publication venues and citation sources.

As can be seen in Table 1, prior studies of LIS research in Korea examined patterns in a subset of LIS publications. Though these studies are essential in understanding the evolution of Korean LIS research, they are burdened with two fundamental weaknesses; First weakness stems from the study data. Sampling from top few Korean journals or analyzing a handful of international LIS publications by Korean authors may not yield findings representative of overall patterns in Korean LIS research, nor are such sampling practices conducive to identifying emerging trends scattered across the publication landscape. Second, none of the key studies that investigate Korean LIS research go beyond the analysis of publications and their references to assess the quality of publications via methods such as citation analysis. This second weakness of Korean bibliometric studies is in radical contrast to mainstream bibliometric studies in the West, where assessment of publication quality is one of the focal points (Cronin 1984; Holmes and Oppenheim 2001; Moed 2005; Adkins and Budd 2006; Mukherjee 2010).

## Methodology

### Data collection

To address the weaknesses of prior research, we compiled a comprehensive list of Korean LIS faculty publications for the past 10 years. The publication data for the study, collected

**Table 1** Comparison of prior research by time period and study data

Study	Time period	Study data
Han & Cho (1996)	1970–1995	684 papers in 4 Korean LIS journals
Lee (2002)	1997–2001	597 papers in 3 Korean LIS journals
Sohn (2003)	1957–2002	2,271 papers from 5 Korean LIS journals, university publications, technical reports
Chung (2009)	2003–2007	239 papers from 4 Korean LIS journals
Chung & Park (2011)	2000–2009	2,166 papers in 4 Korean LIS journals
Chung (2001)	1996–2000	339 papers in 2 Korean LIS journals & 8,371 references
Oh (2005)	1946–2004	2,571 papers from 3 Korean LIS journals, library publications & 30,418 references
Cho & Han (2007)	1996–2005	1,230 papers in 5 Korean LIS journals & 33,352 references
Choi (2003)	1971–2002	74 papers by Korean authors listed in LISA, ISA & 694 references

in July of 2011, consists of 2,401 peer-reviewed publications from 2001 to 2010 by 159 tenure-track LIS faculty members in 34 Korean universities.<sup>3</sup> Publication data of 146 faculty members, who signed open access agreement with the National Research Foundation (NRF), were collected from NRF's Korean Researcher Information (KRI) system, while the remaining 13 faculty were contacted via email for their publication lists. Four of the 13 responded with their publication lists, and the data for 9 non-responders were collected from bibliographic databases of Korea Institute of Science and Technology Information's (KISTI) Science and Technology Society Village (STSV, <http://society.kisti.re.kr>) and Nurimedia's DBPIA (<http://www.dbpia.co.kr/>). After the initial data collection, the KRI data were double-checked with STSV, DBPIA, and NAVER<sup>4</sup> for validation, and international publication data (e.g., SSCI journal paper) were corrected and confirmed by searching Google Scholar. The data collection took 3 months (June–August 2011), followed by 1 month of data correction and validation.

To normalize data quality, only peer-reviewed publications were included in the study; For Korean publications, papers published in journals listed in NRF's Korean Citation Index (KCI) were selected since one of the criteria for KCI journals is peer-review (Ko et al. 2011). For international publications,<sup>5</sup> papers published in journals listed as peer-reviewed in *Ulrich's Periodicals Directory* (<https://ulrichsweb.serialssolutions.com>) and conference proceedings<sup>6</sup> listed as peer-reviewed in conference websites were selected. International conference proceedings were included in the study because the most heavily published LIS area of information science (Sohn 2003; Oh 2005) is closely related to computer engineering (Chung 2001; Oh 2005), where 19.6% of references are conference proceedings (Liséé et al. 2008). The final study data, consisting of 2,401 peer-reviewed papers<sup>7</sup> (2,230 Korean journal papers, 111 international journal papers, and 59 international conference proceedings) authored by 159 LIS faculty members in 34 Korean universities over the past decade (2001–2010), represents the most comprehensive coverage of recent scholarly activity by LIS researchers in Korea.

### Data analysis

To uncover research patterns and trends in Korea LIS research, the publication data were analyzed by year, author, affiliation and journal. 159 LIS professors in the study were examined by age and institution where they received their doctorate degrees to ascertain the relationship between author characteristics and scholarly productivity. 2,401 papers were analyzed by year to identify publication trends, by author and affiliation to assess the research productivity per author and university, and by journal to investigate preferred publication venues and research area.

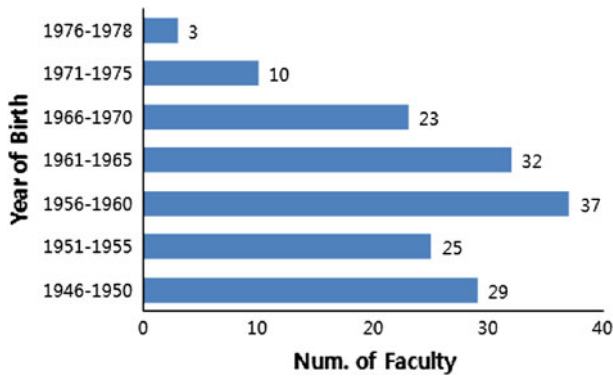
<sup>3</sup> Kyungil university, established in 2010, was excluded from the study.

<sup>4</sup> Naver (<http://www.naver.com>) is the most popular search portal in Korea with a market share of over 70%.

<sup>5</sup> International publications written in languages other than English (e.g., Chinese, Japanese, German) were excluded from the study.

<sup>6</sup> Conference papers with five pages or less were excluded from the study.

<sup>7</sup> In the case of a paper with multiple authors, each author in the study sample was counted as having published that paper.



**Fig. 1** Distribution of LIS faculty by birth year

## Findings

### LIS faculty

The average age of LIS professors in Korea as of 2011 was 51.7 with a range of 32 years (33–65 years old). As expected, mid-forties to mid-fifties age range (1956–1965) has the highest concentration of LIS faculty at 43% (Fig. 1). When the age of Korean LIS faculty is considered in conjunction with the time of their doctoral degree award, an interesting phenomenon is revealed. As the figures below show, the distribution of faculty across age does not quite map to the distribution across Ph.D year; While faculty are more evenly distributed across age groups, there is a sharp increase in doctoral awards in 1991. In fact, 150 (90%) of 155<sup>8</sup> LIS professors with doctoral degrees received their Ph.Ds after 1990 (Fig. 2). The spike in Ph.D awards reflects the maturation of Korean LIS graduate program in the nineties. LIS doctoral program in Korea was first established in 1974 at Sungkyunkwan University, producing the first batch of LIS Ph.Ds in 1978 (Song 2010). In the early years when doctoral program was not commonplace in universities, a doctoral degree was not required to become a faculty in Korean universities. Ph.D became a requirement for incoming faculty as doctoral programs became widespread, and it became a de facto standard for existing faculty to return to school to earn their doctorates.

Table 2 shows the distribution of Korean LIS faculty by the countries where they received their doctoral degrees. The majority of the 48 professors (31%) with non-Korean Ph.Ds earned their doctorates in the U.S., followed by U.K., France, and Germany. The ratio of domestic to foreign Ph.Ds reverses sharply after 1990 as LIS doctoral programs in Korea stabilize. The proportion of LIS faculty with foreign degrees, however, shows a steady increase after the mid-90s (21% in 1996–2000, 39% in 2001–2005, 42% in 2006–2010), which reflects a recent trend in Korean universities for favoring international degrees when hiring faculty.

Table 3 shows the LIS faculty distribution by universities where they received their doctoral degrees. According to a prior study Song (2010), Yonsei University awarded the most LIS Ph.Ds over the last decade (2001–2010) among Korean universities, followed by Chungang University, Sungkyunkwan University, and Ewha Womans University. Table 3, which displays the number of domestic doctoral graduates between 2001 and 2010 that

<sup>8</sup> Four of 159 LIS faculty in the study received only master's degrees.

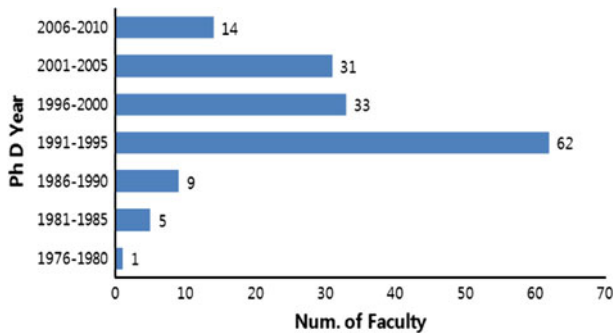


Fig. 2 Distribution of LIS faculty by Ph.D award year

Table 2 Distribution of LIS faculty by countries of Ph.D award

Ph.D award year	Domestic (%)	International (%)	Distribution of foreign countries	Total (%)
1976–1980	0 (0.0)	1 (0.7)	U.S.A.(1)	1 (0.7)
1981–1985	1 (0.6)	4 (2.6)	U.S.A.(3), France(1)	5 (3.2)
1986–1990	5 (3.2)	4 (2.6)	U.S.A.(4)	9 (5.8)
1991–1995	48 (31.0)	14 (9.0)	U.S.A.(13), Germany(1)	62 (40.0)
1996–2000	26 (16.8)	7 (4.5)	U.S.A.(6) U.K.(1)	33 (21.3)
2001–2005	19 (12.3)	12 (7.7)	U.S.A.(8), U.K.(3), France(1)	31 (20.0)
2006–2010	8 (5.1)	6 (3.9)	U.S.A.(5), U.K.(1)	14 (9.0)
Total	107 (69.0)	48 (31.0)	U.S.A.(40), U.K.(5), France(2), Germany(1)	155 (100)

became LIS faculty, shows a slightly different order of Yonsei University, Pusan National University, Sungkyunkwan University, and Chungang University. The seeming discrepancy between the number of doctoral graduates and the number of faculty produced by universities suggests a weak correlation between the size of doctoral program and the rate of faculty placement in Korean universities. As for international degrees, 48 LIS faculty in Korea received their Ph.Ds in 28 universities (18 in the U.S., five in U.K., two in France, one in Germany). The majority of international degrees were awarded in the U.S., with five Ph.Ds each in Indiana University Bloomington, Rutgers University, and the University of Wisconsin-Madison, followed by four in Florida State University and three each in Case Western University and Syracuse University.

LIS publications by year

The scholarly output of LIS faculty in Korea for the past decade is represented in Table 4. LIS faculty in Korea published on average 1.5 papers per person each year, 1.4 of which was domestic and 0.1 was international. For all faculty examined as a whole, this translates into an annual average of 223 domestic journal papers, 11 international journal papers, and six international conference proceedings. The annual average of 223 domestic papers is a marked increase from those reported in prior studies, which reported annual averages of 63 domestic papers in 1967–2002, 173 in 1995–2002 (Sohn 2003), and 134 in 1996–2004

**Table 3** Distribution of LIS faculty by universities of Ph.D award

Domestic			International	
School	Ph.Ds	Recent Ph.Ds (2001–2010)	School	Ph.Ds
Chungang University	34	2	Indiana University Bloomington	5
Yonsei University	31	13	Rutgers University	5
Sungkyunkwan University	22	3	University of Wisconsin-Madison	5
Pusan National University	8	4	Florida State University	4
Ewha Womans University	6	1	Case Western Reserve University	3
Others (4 Schools)	5	4	Syracuse University	3
			Others (20 Schools)	23
Total	107	27	Total	48

**Table 4** LIS publication counts by year

Publication year	Domestic	International		Total (%)
	Journal paper (%)	Journal paper (%)	Conference paper (%)	
2001	151 (6.3)	7 (0.3)	2 (0.1)	160 (6.7)
2002	171 (7.1)	10 (0.4)	4 (0.2)	185 (7.7)
2003	173 (7.2)	8 (0.3)	4 (0.2)	185 (7.7)
2004	210 (8.7)	6 (0.3)	7 (0.3)	223 (9.3)
2005	217 (9.0)	10 (0.4)	9 (0.4)	236 (9.8)
2006	240 (10.0)	10 (0.4)	13 (0.5)	263 (11.0)
2007	234 (9.8)	17 (0.7)	9 (0.4)	260 (10.8)
2008	268 (11.2)	13 (0.5)	4 (0.2)	285 (11.9)
2009	303 (12.6)	16 (0.7)	6 (0.2)	325 (13.5)
2010	264 (11.0)	14 (0.6)	1 (0.0)	279 (11.6)
Total	2,231 (92.9)	111 (4.6)	59 (2.5)	2,401 (100)

(Oh 2005). The increasing rate of publication by LIS faculty is also evident in annual counts of Table 4. LIS research activity in Korea, which saw a sharp surge in mid-1990s with a large number of LIS Ph.Ds (Fig. 2), began accelerating in 2000 when major LIS journals began publishing quarterly and universities implemented faculty evaluation policies that emphasized research productivity (Sohn 2003; Oh 2005; Chung and Park 2011). The slight dip in publication counts in 2007 and 2010 (Table 4) may be due to stabilization of LIS research activity along with changes in the faculty pool.<sup>9</sup>

Figure 3 charts the data in Table 4 to illustrate the changes in publication counts over time. The charts show a general increase in publication counts each year with occasional dips. International publications seem to be less monotonic than the domestic counterpart with a recent trend of decrease. Compared to 74 international publications listed in LISA and ISA from 1971 to 2002 Choi (2003), however, 170 international papers in the past

<sup>9</sup> The official faculty retirement age in Korea is 64.



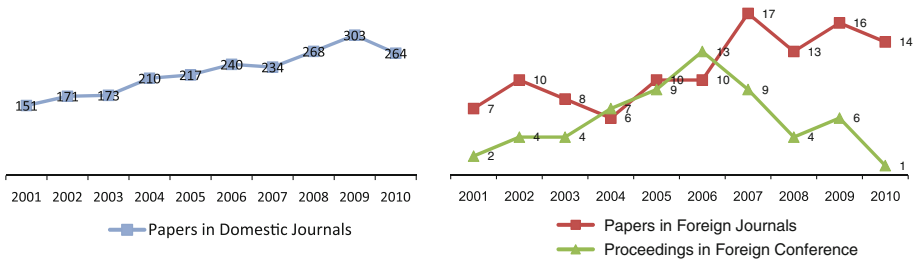


Fig. 3 Domestic and international publications by LIS faculty in Korea

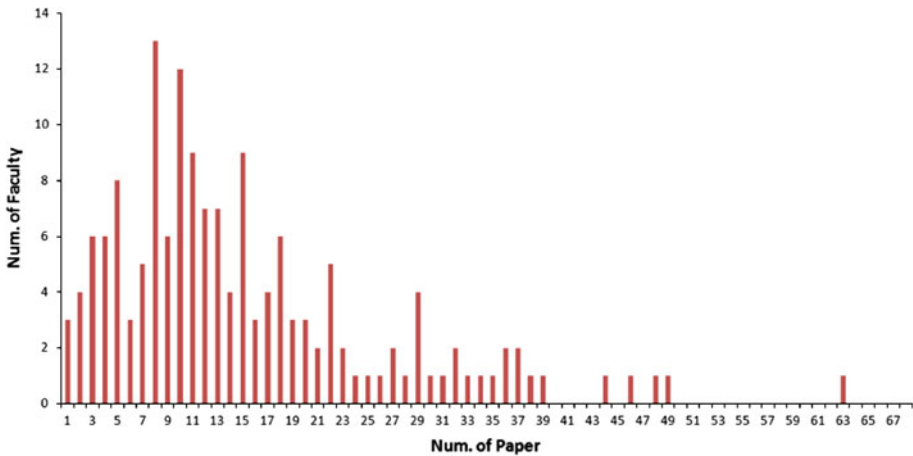


Fig. 4 Distribution of LIS faculty over publication count

10 years can be regarded as an encouraging indicator of Korean LIS researchers’ move towards internalization.

LIS publications by author

Figure 4 displays the distribution of LIS faculty over publication counts. There were 67 faculty members (42%) who authored 10 or less papers in the last 10 years, 55 faculty members (35%) with 11–20 publications, 20 (13%) with 21–30 papers, 12 (8%) with 31–40 papers, 4 (2%) with 41–50 papers, and 1 faculty member with over 60 papers.

Publication counts by faculty age group are shown in Table 5. The most productive age group, born between 1961 and 1965 (i.e., mid to late-forties), produced 18.6 papers per author in the past 10 years, followed by those born between 1956 and 1960 (i.e., early to mid-fifties) who produced 18.2 papers per author. These two age groups, who are faculty in their mid-forties to mid-fifties, generated over half (53%) of LIS publications in the study. When the outliers<sup>10</sup> are considered separately within each age group (Table 6), additional patterns emerge. The most prolific authors (i.e., outliers) are scattered across all age groups

<sup>10</sup> An outlier in Table 6 is defined as a faculty member with 29 or more publications, which is approximately double the mean publication count. A publication count of 29 is chosen instead of 30 because there are four faculty with 29 publications.

**Table 5** LIS publication counts by faculty age group

Year of birth	Num. of faculty (%)	Num. of paper (%)	Num. of paper per faculty
1946–1950	29 (18.2)	256 (10.7)	8.8
1951–1955	25 (15.7)	337 (14.0)	13.5
1956–1960	37 (23.3)	674 (28.1)	18.2
1961–1965	32 (20.1)	594 (24.7)	18.6
1966–1970	23 (14.5)	408 (17.0)	17.7
1971–1975	10 (6.3)	106 (4.4)	10.6
1976–1980	3 (1.9)	26 (1.1)	8.7
Total	159 (100)	2,401 (100)	15.1

except for the last two groups, who likely have not yet reached their peak research level due to their relative youth. Faculty within 10 years of retirement (birth year 1946–1955) in general has low publication counts. Does this phenomenon reflect the research productivity cycle of Korean LIS faculty or is it simply a historical artifact? In other words, do faculty publish less frequently after a certain point (e.g., after tenure<sup>11</sup>) or do pioneers in Korean LIS research have different publication patterns (e.g., books) than their successors? Both factors may have contributed to the outcome shown in Table 5; Faculty productivity may indeed dwindle as retirement draws near and older LIS faculty who had neither the advantage of numerous publication venues nor the pressure to publish journal articles in their early years may have developed a more leisurely style of publishing. Another study in 10 years time will either refute or validate such a conjecture.

Table 7 shows publications counts by Ph.D award year and Table 8 shows the same data with outliers in parenthesis. Without the outliers, average publication counts increase all but monotonically with the Ph.D award year. In other words, the more recent the year of doctoral degree, the more productive the faculty member. Examination of publication counts by faculty age and their Ph.D year thus suggests that recent education and career maturity are key factors for faculty productivity. It should be noted that these two seemingly incompatible factors are not mutually exclusive in the case of Korean LIS faculty since many of them returned to doctoral programs after already having served as faculty.

There were 1.77 authors per paper in the study with 53% of 2,401 papers published by a single author and 47% by multiple authors. In earlier studies, sole authorship was 90% of the study data for the period of 1970–1995 (Han and Cho 1996), 74% for 1997–2001 (Lee 2002), and 54% for 2003–2007 (Chung 2009). Figure 5 displays the shift toward multiple authorships over time, which may be a reflection of LIS changing from humanities research to project-driven social and natural sciences research (Han and Cho 1996; Lee 2002).

### LIS publications by university

This section analyzes publication data by faculty affiliation (Table 9), school of doctorate degree (Table 10), whether the doctoral education took place in Korea or not (Table 11). Tables showing school rankings are meant to demonstrate how different bibliometrics can produce different evaluative outcomes.

When the total number of faculty publications by LIS department is used to rank universities, Chungang University is at the top, followed by Pusan National University,

<sup>11</sup> The typical faculty lifecycle in Korea consists of 2 years as an instructor, 6 years as an assistant professor, 6 years as an associate professor, and a full professor at which point tenure is granted.

**Table 6** LIS publication counts by faculty age group with outliers separated

Year of birth	Num. of faculty	Num. of paper	Num. of paper per faculty
1946–1950	27 (2)	173 (83)	6.4 (41.5)
1951–1955	21 (4)	202 (135)	9.6 (33.8)
1956–1960	30 (7)	412 (262)	13.7 (37.4)
1961–1965	26 (6)	375 (219)	14.4 (36.5)
1966–1970	20 (3)	291 (117)	14.5 (39.0)
1971–1975	10 (0)	106	10.6
1976–1980	3 (0)	26	8.7
Total	137 (22)	1,585 (816)	11.6 (37.1)

Outlier (faculty with 29 or more publications) data are in *parenthesis*

**Table 7** LIS publication counts by Ph.D award year

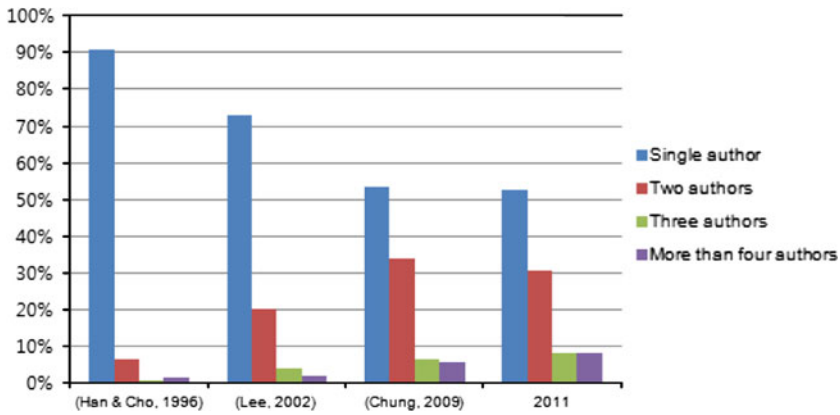
Year of Ph.D	Num. of faculty (%)	Num. of paper (%)	Num. of paper (per faculty)
1976–1980	1 (0.6)	37 (1.6)	37.0
1981–1985	5 (3.2)	87 (3.7)	17.4
1986–1990	9 (5.8)	114 (4.8)	12.7
1991–1995	62 (40.0)	970 (40.9)	15.6
1996–2000	33 (21.3)	551 (23.3)	16.7
2001–2005	31 (20.0)	466 (19.7)	15.0
2006–2010	14 (9.0)	144 (6.1)	10.3
Total	155 (100)	2,369 (100)	15.3

32 publications authored by four faculty members without doctoral degrees were excluded from the table

**Table 8** LIS publication counts by Ph.D award year with outliers separated

Year of Ph.D	Num. of faculty (%)	Num. of paper (%)	Num. of paper (per faculty)
1976–1980	0 (1)	0 (37)	0.0 (37.0)
1981–1985	3 (2)	19 (68)	6.3 (34.0)
1986–1990	9 (0)	114	12.7
1991–1995	52 (10)	564 (406)	10.8 (40.6)
1996–2000	26 (7)	319 (232)	12.3 (33.1)
2001–2005	29 (2)	393 (73)	13.6 (36.5)
2006–2010	14 (0)	144	10.3
Total	133 (22)	1,553 (816)	11.7 (37.1)

Chongju University, and Keimyung University (Table 9). Rankings change when publication counts are separated into domestic and international papers. For instance, Keimyung University, at rank 4 by total publication counts, drops to rank 7 for domestic while rising to the top rank for international publication counts. Ranking by international publications also brings to top ranks previously unseen universities such as Myongji University, Sungkyunkwan University, and Duksung Women's University. The marked difference between rankings by domestic and international counts illustrates how publication venues differ across universities. Keimyung University and Kyungpook National University in



**Fig. 5** Number of authors per paper reported in studies

**Table 9** LIS publication counts by faculty affiliation

Rank	Num. of papers	Num. of domestic papers	Num. of international papers	Num. of papers per faculty
1	Chungang U (179)	Chungang U (177)	Keimyung U (26)	Chungang U (35.8)
2	Pusan National U (151)	Pusan National U (146)	Myongji U (26)	Chongju U (32)
3	Chongju U (128)	Chongju U (126)	Ewha Womans U (16)	Konkuk U (28)
4	Keimyung U (121)	Chungnam National U (104)	Kyungpook National U (15)	Pusan National U (21.6)
5	Chungnam National U (114)	Daegu U (103)	Yonsei U (12)	Keimyung U (20.2)
6	Ewha Womans U (110)	Chonnam National U (97)	Chungnam National U. (10)	Yonsei U (20.2)
7	Daegu U (108)	Keimyung U (95)	Sungkyunkwan U (8)	Myongji U (19.5)
8	Yonsei U (101)	Ewha Womans U (94)	Duksung Women’s U (7)	Chungnam National U (19)
9	Chonnam National U (99)	Kyonggi U (91) Hansung U (91)	Daegu U(5)	Kyonggi U (18.4)
10	Kyonggi U (92) Kyungpook National U (92)		Jeonju U (5) Konkuk U (5) Pusan National U (5)	Ewha Womans U (18.3)

particular benefit from publications by international faculty members. University rankings by publication counts per faculty are similar to those by total publication counts except for Konkuk University and Myongji University, whose small faculty size puts them at disadvantage. Konkuk University has only two faculty members and Myongji University has four faculty members while the average faculty count of top ten universities by total number of publication is 6.2.

Table 10 ranks universities where LIS faculty received their doctoral degrees. As was the case in Table 9, ranking by total publication count is influenced by the size of unit

**Table 10** LIS publication counts by Ph.D institution

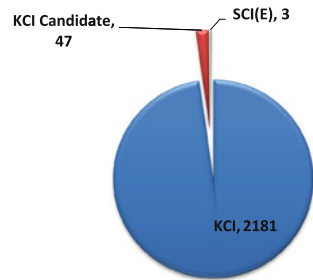
Rank	Total num. of Papers	Num. of domestic papers	Num. of international papers	Num. of papers per faculty
1	Chungang U (543)	Chungang U (536)	U of North Carolina at Chapel Hill (22)	U of California at Los Angeles (30.5)
2	Yonsei U (444)	Yonsei U (427)	U of Wisconsin at Madison (19)	Case Western Reserve U (27)
3	Sungkyunkwan U (319)	Sungkyunkwan U (301)	Sungkyunkwan U (18)	U of Wisconsin at Madison (24.2)
4	Pusan National U (140)	Pusan National U (138)	Yonsei U (17)	U of Texas at Austin (22)
5	U of Wisconsin at Madison (121)	U of Wisconsin at Madison (102)	Rutgers U (15)	U of Illinois at Urbana-Champaign (20)
6	Indiana U Bloomington (86)	Indiana U Bloomington (85)	Case Western Reserve U (13)	Syracuse U (18)
7	Rutgers U (83)	Case Western Reserve U (68)	U of Manchester (12)	U of Northumbria at Newcastle (18)
8	Case Western ReserveU (81)	Rutgers U (68)	U of Michigan at Ann Arbor (11)	U of Sheffield (18)
9	Ewha Womans U (57)	Syracuse U. (45)	Syracuse U (9)	Pusan National U. (17.5)
10	Syracuse U (54)	U of Texas at Austin (42)	Chungang U (7)	Indiana U Bloomington (17.2)

**Table 11** LIS publication counts by Ph.D location (Domestic vs. International)

	Num. of faculty	Num. of domestic papers	Avg. num. of domestic papers	Num. of international papers	Avg. num. of international papers
Domestic Ph.D	111	1,547	13.9	44	0.4
International Ph.D	48	684	14.3	126	2.6
Total	159	2,231	28.2	170	3.0

being measured.<sup>12</sup> Chungang University with 34 LIS faculty alumni, Yonsei University with 31, and Sungkyunkwan University with 22 are at the top ranks by both total publication count and domestic publication count. The fact that alumni from three universities, consisting of 56% of LIS faculty in the study, account for 54% of publications in the study speaks for the efficacy of these institutions as breeding grounds for LIS faculty. Ranking by international paper count, on the other hand, is dominated by international universities. One would expect that faculty who were educated in international settings would be more adept at publishing in international venues. What is surprising is the ranking by LIS alumni's average publication count, where nine of top ten ranked universities are international. While ranking by total publication count identified three domestic universities as top producers of Korean LIS faculty, ranking by publication count per faculty established international universities as training grounds for effective LIS researchers. Table 11, which

<sup>12</sup> The rank order of total publication counts in Table 10 closely approximates that of LIS faculty alumni counts.

**Fig. 6** Domestic journal type

displays the summary comparison of domestic versus international categories both in Ph.D institution and publication venue, shows that internationally educated faculty on the average are more productive in domestic as well as international publication venues.

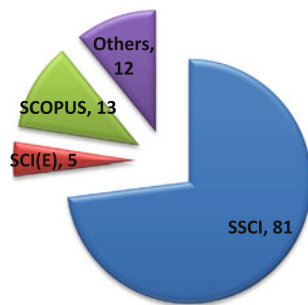
### LIS publications by journal

Analysis of publication venues can reveal insights into the research landscape. As Figs. 6 and 7 shows, all but a fraction of papers in the study were published in journals of relative importance. 98% of 2,231 domestic journal papers were published in KCI journals, a domestic equivalent of SCI journals, along with three papers in journals indexed in both KCI and SCI (*Bulletin of the Korean Chemical Society*, *Korean Journal of Parasitology*, *the Korean Journal of Chemical Engineering*). 89% of 111 international journal papers were published in SSCI, SCI, or Scopus journals, which attest to the quality of international publications by Korean LIS researchers.

92% of domestic journal papers in the study are published in the six journals shown in Table 12. Considering the wide range of subject areas in LIS, such concentration of publication venues may indicate the need for diversification in research and/or publication venues. The international journal most favored by Korean LIS faculty is *Journal of the American Society for Information Science and Technology* (JASIST)<sup>13</sup> with 15 publications, followed by *Library and Information Science Research* with 11, *Electronic Library* with 9, *Scientometrics* with eight, and *Journal of Information* with six papers. The fact that nine of top ten international journals in Table 13 are listed in SSCI and four of top five journals have impact factor greater than 1.0 suggest that LIS researchers in Korea prefer to publish in international journals of high impact. Table 14 shows LIS publications in top five international journals (impact factors >1) by universities. School rankings by top international LIS journal paper counts are comparable to those by total international LIS publication counts (Table 9) except for Kyungbook National University, who had five journal papers (two in *International Journal of Systems Science* and three low impact journal papers) out of 15 international publications (i.e. ten conference papers), Chungnam National University, who had three low impact journal papers out of ten international publications, and Sungkyunkwan University, who had five low impact journal papers out of eight international publications.

Notably, Keimyung University had 20 conference papers in addition to three high impact and three low impact journal papers while Myungji University had seven conference papers in addition to eight high impact and 11 low impact journal papers.

<sup>13</sup> Journal of the American Society for Information Science was aggregated with JASIST.

**Fig. 7** International journal type**Table 12** Domestic journals by LIS publication counts

Journal	Num. of papers
1 Journal of Korean Library and Information Science Society	559
2 Journal of the Korean Society for Library and Information Science	486
3 Journal of the Korean Society for Information Management	444
4 Journal of the Korean BIBLIA Society for Library and Information Science	227
5 Journal of the Institute of Bibliography	204
6 Journal of Information Management	138
7 Journal of Records Management & Archives Society of Korea	54
8 SEOJHAKBO	14
9 The Korean Journal of Archival Studies	10
10 Inmunhak Nonchong (Kyungsoong University)	10
Others (55 journals)	85
Total	2,231

International conference papers shown in Table 15 reflects a recent trend for counting conference proceedings<sup>14</sup> as important publication venues (Glanzel et al. 2006; Lisée et al. 2008). For cutting edge research, where time is of essence, quick turnaround of conferences may be preferable to extended publication cycle of social science journals for initial validation and feedback of research findings to proceed to subsequent stages.

## Discussion

This study assessed research patterns and trends of library and information science in Korea by applying bibliometric analysis to 159 LIS professors' 2,401 peer-reviewed publications published between 2001 and 2010. Bibliometric analysis of publication data found an increasing trend for collaboration (52.75% of total publications with single authors and 47.25% with multiple authors), robust publication patterns (average 1.51 publications per year), and increasing number of international publications (170 publications) in research. Study results also suggested internationalization of LIS in Korea.

<sup>14</sup> Domestic conference papers, which are typically not peer-reviewed, are excluded from the study. Some international conference proceedings, on the other hand, have the acceptance level comparable to those of journals (e.g. Proceedings of the ASIST Annual Meeting: 30%).

**Table 13** International journals by LIS publication counts

	Journal	Num. of paper	Citation index	Impact factor
1	Journal of the American Society for Information Science and Technology (JASIST)	15	SSCI	2.137
2	Library & Information Science Research (LISR)	11	SSCI	1.362
3	Electronic Library	9	SSCI	0.489
4	Scientometrics	8	SSCI	1.905
5	Journal of Information Science (JIS)	6	SSCI	1.406
6	IFLA Journal	5		
7	Information Processing & Management (IPM)	4	SSCI	1.673
8	Journal of Academic Librarianship	4	SSCI	0.87
9	College & Research Libraries	3	SSCI	0.683
10	Information Research-an international electronic journal	3	SSCI	0.822
11	Interlending & Document Supply	2	SSCI	0.308
12	Journal of Education for Library and Information Science	2		
13	Journal of Scholarly Publishing	2	SSCI	0.521
14	Knowledge Organization	2	SSCI	0.552 <sup>a</sup>
15	Library Hi Tech	2	SSCI	0.413
16	Library Trends	2	SCOPUS	
17	LIBRI	2	SSCI	0.365
18	Portal: libraries and the academy	2	SSCI	0.87
19	Program: electronic library and information systems	2	SSCI	0.596
20	International Journal of Systems Science	2	SCIE	0.948
21	D-Lib Magazine	2	SCOPUS	
	Others (21 journals)	21		
Total		111		

<sup>a</sup> 0.552 is a 2009 impact factor. Knowledge Organization was not included in 2010 SSCI

Specifically, the study found a higher proportion of Korean LIS faculty with international degrees than previous years as well as a higher publication rate by professors with international degrees than those with domestic degrees. The maturation and internalization of LIS research in Korea are also evidenced in increased number of publications in high impact journals (e.g., SSI, SSCI), growing participation in leading international conferences (e.g., ASIST, TREC), and a recent preference for internationally educated Ph.Ds as incoming faculty.

In addition to discovering trends and patterns in LIS research in Korea, the study examined the research productivity of LIS departments in Korea by ranking them with various bibliometric measures. Analysis of schools ranked by the total number of publications (authored by their LIS faculty alumni) led to the discovery of domestic universities that are top producers of LIS faculty in Korea. Similar analysis of rankings by publication count per faculty established international universities as fostering grounds for productive LIS researchers. School rankings, which differ across bibliometrics, is perhaps one of the most interesting outcomes of the study. Marked differences in rankings demonstrate that different bibliometrics can produce different evaluative outcomes, thus highlighting the perils of blindly applying bibliometrics without proper consideration of the purpose and object of evaluation.



**Table 14** International LIS publications by university (top five journals)

Journal (impact factor)	MGU	DWU	KGU	EHU	JJU	YSU	KMU	KKU	SLU	CGU	DGU	Total
JASIST (2.137)	5	1	2	3		2	1		1			15
Scientometrics (1.905)			1		5	1					1	8
IPM (1.673)		1	1			1	1					4
JIS (1.406)			2			1		2	1			6
LISR (1.362)	3	4		2			1			1		11
Total	8	6	6	5	5	5	3	2	2	1	1	44

*CGU* Chungang U, *DGU* Daegu U, *DWU* Dulsung Women's U, *EHU* Ewha U, *JJU* Jeonju U, *KMU* Keimyung U, *KKU* Konkuk U, *KGU* Kyonggi U, *MGU* Myongji U, *SLU* Sila U, *YSU* Yonsei U

**Table 15** International conferences by LIS publication counts

	Conference	Num. of papers
1	Proceedings of the ASIST annual meeting	19
2	Lecture notes in computer science	10
3	Proceedings of the text retrieval conference	7
4	Aslib proceedings	3
5	Proceedings of SPIE—the international society for optical engineering	2
	Others (18 conference)	18
Total		59

Which bibliometric measure most closely approximates the true research productivity? In order to properly address this question, we must first consider what the rankings by different bibliometrics signify. Bibliometric measures represent quantitative abstractions of qualitative aspects, such as impact and quality. Even productivity, which is widely measured in quantitative terms, is ultimately a qualitative characteristic. The research productivity of a department, for example, cannot be represented in absolute terms like the average age of faculty. Setting aside for the moment inherent weaknesses of publication count as a research productivity measure, we are still faced with issue of whether factors such as department size and publication type should be considered in tandem. Do we consider departmental size as an integral characteristic and thus consider larger departments with more total publication counts to be more productive or should we normalize in terms of size by using per capita counts? Such questions, which incidentally are outside the scope of this study, demand careful inquiry and inspection. For now, it suffices to say that different measures can produce different rankings of research productivity.

The analysis of publication patterns conducted by the study, which is a first step in our aim to establish a multi-faceted approach for assessing the impact of scholarly work, will be followed up with analysis of references and citations to evaluate the quality of publications. Though limited in its evaluative power without citation data, publication data can be a rich source for bibliometric analysis as this study has shown. In the follow-up study, we will examine the question of quantity versus quality by comparing publication counts with citation counts.

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