National and international research collaboration network in South Korea: An analysis of library and information science journals (2015–2024)

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ABSTRACT

This study analyses the structure and collaboration patterns of co-authorship networks in library and information science (LIS) journals published in South Korea and internationally from 2015 to 2024. South Korean journals were categorised into Korean-language and English-language publications, while international journals included all articles and a subset article authored by Korean researchers. This classification enabled a comparative analysis of the structures of collaboration and the impact of co-authorship. The results show that international journals have more authors per article and higher research collaboration than South Korean journals. Among the international journals, articles by Korean researchers showed a high degree of international co-authorship, indicating a growing trend towards global collaboration. Korean journals had more single-authored articles and collaborations within the same institution, with limited international participation. An analysis of the impact of co-authorship on the number of citations found that articles involving collaborations across multiple institutions and disciplines tended to receive more citations. An analysis of the Simpson Diversity Index (SDI) demonstrated higher interdisciplinary diversity in international journals with Korean authors than in Korean journals, reflecting broader academic engagement. A correlation analysis of institutional productivity rankings between Korean and international journals found no significant relationship, suggesting different patterns of collaboration. These findings emphasise the need to expand international co-authorship and promote interdisciplinary collaboration in Korean LIS research. Building a more open and inclusive research environment in Korean journals is crucial to attract diverse authors. This study provides a basic insight into the trends of co-authorship and offers strategies to improve the international visibility and impact of Korean LIS research.

Keywords: *Co-authorship; Research collaboration; Collaboration patterns; Library and information science (LIS); Bibliometrics; Simpson Diversity Index.*

INTRODUCTION

Library and Information Science (LIS) is an interdisciplinary field that examines the entire process of information production, organisation and use. With the acceleration of digital transformation through the expansion of artificial intelligence (AI) and big data, LIS research has evolved to integrate various academic disciplines (Wang, 2018; Virkus & Garoufallou, 2020). Traditionally, LIS research has focused on library services and bibliographic classification, but recent developments emphasise the optimisation of research collaboration structures and information analysis to build more sophisticated research networks and maximise research impact (Dora & Kumar, 2019; Urbano & Ardanuy, 2020). With the increasing integration of LIS with other disciplines, interdisciplinary collaboration with fields such as information science, computer science, education, and business administration has become prevalent (Urbano & Ardanuy, 2020). Co-authorship and institutional collaboration have been identified as key factors that improve both the qualitative and quantitative impact of research (Yan & Ding, 2009). Consequently, researchers are increasingly recognising international collaboration and interdisciplinary approaches as strategic methods to improve research outcomes (Sabah et al., 2019; González-Alcaide, 2021). However, Korean LIS research remains largely confined to Korean journals, especially within the LIS discipline, which limits international collaboration and interdisciplinary engagement. This limitation poses a challenge to the global competitiveness of Korean LIS research (Noh & Chang, 2019; Yang et al., 2021).

Recently, state-of-the-art information technologies such as big data analytics and AI are increasingly used in LIS research and contribute to predicting research outcomes and analysing information (Gulati & Unhelkar, 2024). Although Korean researchers are increasingly publishing in international journals (Yang & Lee, 2012), an analysis of Korean LIS research collaboration networks shows that the diversification of international collaboration and interdisciplinary research remain at a limited level. More active collaboration efforts are needed to increase research impact and global influence (Park, Kim & Park., 2021). However, few studies have empirically compared and analysed the similarities and differences in collaboration patterns among different research categories, namely: articles in Korean journals, articles submitted by Korean researchers to international journals, and articles in international LIS journals more broadly. Therefore, this study aims to conduct a comprehensive investigation of the structures of co-authorship and institutional collaboration as well as interdisciplinary integration in LIS journals to propose strategies to expand research collaboration and academic diversity in Korean LIS research.

This study aims to quantitatively compare the structure and collaboration patterns of co-authorship networks in LIS research based on articles published in seven Korean LIS journals and 20 international LIS journals from 2015 to 2024. The analysis focuses on co-authorship, institutional collaboration, interdisciplinary integration, international collaboration, and research impact. The study addresses the following research questions:

i. What are the differences between Korean and international journals in terms of co-authorship structures, the proportion of multi-author collaboration, and patterns of institutional collaboration?
ii. How does collaboration among multiple authors, disciplines, institutions, and countries affect the scientific impact of LIS research?
iii. Are the research productivity rankings of institutions publishing in Korean LIS journals similar to those in international LIS journals, or do they form different structures?
iv. How do Korean and international LIS journals differ in terms of interdisciplinary collaboration between researchers' affiliated institutions?

By answering these research questions, this study attempts to provide practical strategies to improve international collaboration and interdisciplinary cooperation among Korean LIS researchers. The findings of this study are important to serve as a strategic foundation for the Korean LIS research community to expand international research collaboration and promote interdisciplinary integration.

LITERATURE REVIEW

Co-authorship networks and trends in Korean research

Research on co-authorship in the academic field began in the 1960s in international contexts, while various studies have been conducted in South Korea since the 2000s. In the field of LIS, research on co-authorship has increased for purposes such as performance analysis, trend identification, intellectual structure analysis, and expert recommendation. In this study, the literature to date is divided into two categories: i) studies analysing LIS research trends in South Korea; and ii) studies analysing LIS research trends at the international level. Sohn (2003) and Oh (2005) conducted bibliometric analyses of Korean LIS articles published in the last 60 years and examined publication trends and changes in research topics. Kim and Nam (2009) analysed journal articles in the field of archival science to identify research trends based on author characteristics such as affiliation and academic background. Yang and Lee (2012) analysed 2,401 journal articles written by LIS professors between 2001 and 2010 and highlighted trends in publication patterns, the increasing number of internationally published papers and the rising proportion of researchers with international academic degrees.

Comparative analysis of international collaborative research

Kim et al. (2016) analysed the development and structure of the national collaborative publication network in Korea from 1948 to 2011. Lee (2016) examined the relationship between the centrality of the co-authorship network and research output and confirmed that network centrality has a statistically significant influence on research output. Kim (2017) investigated the number of co-authors in LIS journals and found that single-authored articles are more common in Korean journals, while co-authored articles (with at least two authors) are more common in international journals. Park and Heo (2017) used an index of institutional collaboration to analyse the patterns of co-authorship in Korean LIS research and found that collaboration between research institutes and faculty members was particularly active. Noh and Chang (2019) examined the trends of international research collaboration in Korean LIS journals from 1970 to 2018. Lee et al. (2019) analysed 5,383 journal articles published by 195 LIS professors between 2000 and 2017 and showed that the proportion of articles authored by co-authors was higher than that of single authors. Haq et al. (2020) confirmed that an increase in international collaboration significantly increases the scientific impact of research articles.

Structural characteristics and impact of research collaboration

Recent studies have increasingly emphasised the importance of interdisciplinary collaboration in LIS and examined the structural characteristics of co-authorship and its relationship to research impact. Siddique et al. (2023) found that LIS researchers broaden their research scope by collaborating with scholars from other disciplines such as computer science, business administration, and education, and that increased interdisciplinary collaboration is strongly associated with higher research impact. Urbano and Ardanuy (2020) conducted a detailed analysis of interdisciplinary collaboration between university

researchers and identified how different levels of collaboration influence research performance in specific areas.

Co-authorship networks have also been actively analysed in international studies. He and Spink (2002) analysed the geographical distribution of authors in JASIST and Journal of Documentation and found that researchers from the United States and Canada were the most frequent contributors. Later, Haq et al. (2020) analysed the JASIST articles and reported an increase in international collaboration, with authors from over 70 countries contributing to the research publications. Yan and Ding (2009) found significant correlations between the patterns of research collaboration, network centrality and the citation impact of Chinese LIS articles by analysing the co-authorship network. In addition, Nikzad et al. (2011) analysed the patterns of co-authorship in Iranian social sciences focusing on LIS, psychology, management and economics and calculated various indices of collaboration including Collaborative Index (CI), Degree of Collaboration (DC) and Collaboration Coefficient (CC) to compare different fields.

Gazni and Didegah (2011) analysed the patterns of collaboration in research publications at Harvard University and found that in 22 academic disciplines, the number of co-authored articles exceeded that of single-authored articles and that co-authored works had a higher citation rate than single-authored articles. Building on this, Mani (2014) analysed MJLIS journal articles and found that on average 2.06 authors were involved per article. Jabeen et al. (2015) analysed publications from 40 major LIS journals and identified trends in collaborative research and their impact on research productivity. In a national context, Mondal and Maity (2019) analysed LIS journal articles in India to compare research patterns in different countries. Sun and Yuan (2020) conducted a bibliometric analysis of articles in the WoS category “Information Science & Library Science” and visualised co-authorship networks and patterns of keyword co-occurrence. Yang et al. (2021) conducted a comparative analysis of LIS articles published in Korean and international journals between 2002 and 2021 to identify trends in the publication patterns and collaboration structures of Korean researchers. Their study found that while Korean LIS research is highly productive, its scientific impact, measured by the number of citations, is lower than that of international research. In addition, Korean research focused more on small collaborations (e.g. two-author articles), while international studies involved larger collaborations and more interdisciplinary research. The topics of international research were also more diversified over time.

However, previous studies have not fully analysed the structural characteristics of international collaborative research networks, nor have they quantitatively compared Korean and international co-authorship networks. To address these gaps, this study uses recent LIS research data from 2015 to 2024 to conduct a comprehensive analysis of Korean and international LIS journal articles and quantitatively compare the structure and patterns of co-authorship networks. This study systematically examines international collaboration by including research articles co-authored by scholars from around the world. In addition, cross-departmental collaboration between researchers, which has not been extensively addressed in previous studies, is examined, allowing a direct comparison of interdisciplinary research trends between Korean and international LIS research. By analysing co-authorship and institutional collaboration patterns, interdisciplinary integration levels, international collaborative relationships, and research impact through citation counts, this study provides a multidimensional comparison of LIS collaboration patterns over the past decade. The results provide valuable strategic insights to advance the internationalisation of Korean LIS research and promote interdisciplinary collaboration in the future.

MATERIALS AND METHODS

This study analyses the networks of co-authorship and institutional collaboration in LIS journal articles published in Korea and internationally between 2015 and 2024. Specifically, 3,132 articles from seven Korean LIS journals and 16,922 articles from 20 international LIS journals are collected and compared, including 699 articles authored by Korean researchers.

Data collection and creation of the dataset

For the Korean LIS journals, a total of 3,132 articles published between 2015 and 2024 in seven journals indexed in the Korea Citation Index (KCI) were collected in this study. The data were obtained from KoreaScience and the KCI web service, with the citation data reflecting the latest information as of January 2025, as shown in Table 1. KoreaScience (https://koreascience.kr) is an open-access platform for science and technology academic information in South Korea, which builds on the Korea Science Citation Database (KSCD) developed by the Korea Institute of Science and Technology Information (KISTI) since 1997 (Choi et al., 2013). The KCI, which is managed by the National Research Foundation of Korea (NRF), is a bibliographic indexing system that systematically collects and analyses citation data from Korean scientific journals. It serves as a tool to evaluate the research performance of Korean journals and supports researchers in measuring their scientific impact (Nam & Kim, 2025).

Table 1: LIS journals published in Korea

No.	Journal Title (Title Abbr.)	Language	Index	Count of articles (2015-2024)
1	Journal of the Korean Society for Library and Information Science (JKSLIS)	Korean	KCI	651
2	Journal of Korean Library and Information Science Society (JKLISS)	Korean	KCI	638
3	Journal of the Korean Society for Information Management (JKSIM)	Korean	KCI	522
4	Journal of the Korean BIBLIA Society for library and Information Science (JKBSLIS)	Korean	KCI	516
5	Journal of Korean Society of Archives and Records Management (JKSARM)	Korean	KCI	368
6	Journal of Information Science Theory and Practice (JISTAP)	English	KCI, SCOPUS	236
7	International Journal of Knowledge Content Development & Technology (IJKCDT)	English	KCI	201
			Total	**3,132**

For the international LIS journals, this study selected 20 important journals indexed in both WoS (SSCI) and SCOPUS in which at least five articles were written by Korean researchers (see Table 2). A total of 16,922 articles published in these journals between 2015 and 2024 were analysed. In addition, 699 articles written by Korean researchers in these journals were identified separately for the analysis. The data for these articles were collected through KISTI's "SCOPUS at KISTI" service, which contains important bibliographic information such as authorship, institutional affiliation and citation numbers. "SCOPUS at KISTI" is an

optimised version of Elsevier's global academic database SCOPUS, which was developed by KISTI and contains over 28,000 indexed journals and more than 60 million academic publications worldwide (Son, 2022).

Table 2: Internationally published LIS journals indexed by WoS and Scopus

No.	Journal Title	Title Abbr.	Count of articles (2015-2024)	
			Total	(Korean authors)
1	Scientometrics	Scientometris	3,345	108
2	Information Processing and Management	Inf. Process. Manag.	1,844	62
3	Journal of the Association for Information Science and Technology	JASIST	1,311	38
4	International Journal of Information Management	IJIM	1,092	60
5	Journal of Academic Librarianship	JAL	1,056	11
6	Information Technology and People	ITP	845	40
7	Journal of Informetrics	J. Informetr.	833	46
8	Journal of Information Science	J. Inf. Sci.	811	43
9	Information Development	Inf. Dev.	715	60
10	Online Information Review	Online Inf. Rev.	688	44
11	Government Information Quarterly	Gov. Inf. Q.	653	39
12	Library Hi Tech	Library Hi Tech	642	20
13	Journal of Librarianship and Information Science	J. Librariansh. Inf. Sci.	618	33
14	Electronic Library	e-library	547	20
15	Aslib Journal of Information Management	Aslib J. Inf. Manag.	530	16
16	Information Research	Inf. Res.	398	11
17	Library and Information Science Research	LISR	328	8
18	Data Technologies and Applications	DTA	246	19
19	Libri	Libri	230	13
20	Malaysian Journal of Library and Information Science	MJLIS	190	8
		Total	**16,922**	**699**

Construction of the experimental data set

In this study, an experimental dataset was constructed based on the collected articles from Korean and international LIS journals. The dataset contains bibliographic information such as author details, institutional affiliation, research topics, and citation counts, which were used to analyse research collaboration networks. To analyse the research collaboration networks, the institutions appearing in the collected articles were classified. A total of 731 institutions were identified in Korean journal articles, while 5,949 institutions were identified in international journal articles. These institutions were categorised according to the classification shown in Table 3.

Table 3: Classification of institutions for the analysis of co-authored institutions

Institution Type	Description
Universities	Universities, colleges, and their departments.
Educational and Academic Institutions	Non-university institutions focused on education and research.
Research Institutes	Independent or affiliated research centres.
Industrial and Private Organizations	Private companies, businesses, and corporations.
Medical Institutions	Hospitals and healthcare organizations.
Government Institutions	Government agencies and public organizations.
Other Institutions	Entities not classified above, such as locations and individuals.

Based on the authors' affiliation information, the Korean Council for University Education (KCUE) standard classification system was used to categorise academic disciplines. The KCUE classification system was developed to ensure the consistency of curricula and research in different academic disciplines and to facilitate comparative analyses between universities. It consists of 3 hierarchical levels according to Noh et al. (2022): Section (5 categories), Division (27 categories) and Group (151 categories). In this study, all classification levels were used to clearly define the academic field of research collaboration. Publication data from 2015 to 2021 were used for the citation analysis in this study. To ensure the reliability of the citation data, only citations that were recorded at least 3 years after publication were considered. Therefore, articles published in the last 3 years (2022–2024) were excluded from the analysis due to their relatively low number of citations.

Method of analysis

In this study, bibliometric analyses and social network analyses (SNA) were applied to the constructed dataset. The analysis was conducted as follows:

a) Research collaboration based on journal publication categories

To examine the patterns of research collaboration in LIS journal articles in detail, the data were categorised into five categories: i) Korean journals published in South Korea; ii) English journals published in South Korea; iii) all journals published in South Korea; iv) international journals; and v) international journal articles with Korean authors. A comparative analysis of patterns of co-authorship, institutional collaboration, interdisciplinary integration and citation impact within these categories was conducted. This approach enabled a quantitative assessment of the collaborative structures of Korean researchers and the characteristics of international research collaboration.

b) Analysing the degree of research collaboration

In this study, the DC was chosen as a measure of research collaboration, which is widely used in bibliometric research (Subramanyam, 1983). In academic publishing, the DC represents the extent of co-authorship among researchers and is calculated using the following formula.

$$DC = \frac{Nm}{Nm + \mathrm{Ns}}$$

Nm stands for the number of articles with multiple authors, while Ns refers to the number of articles with only one author. The same formula was used to measure the degree of institutional collaboration.

c) Analysis of the co-authorship network

A co-authorship network was constructed by creating a co-occurrence matrix based on the institutions associated with the authors. Three centrality measures were used to assess the importance of nodes within the network: Degree Centrality, Betweenness Centrality and Closeness Centrality (Freeman, 1978). The network analysis was performed with the Python package NetworkX (3.0) (Hagberg et al., 2008), while the network visualisation was performed with VOSviewer (1.6.18) (van Eck & Waltman, 2009).

d) Analysing the diversity of interdisciplinary collaboration

Based on the researchers' departmental affiliation, the diversity of interdisciplinary collaboration was measured and assessed in this study using Simpson Diversity Index (SDI). The SDI quantifies the evenness of the distribution of entities (articles) across different categories (departments) within a given group. It is widely used in various academic fields, including the social sciences (Simpson, 1949). In the following equation, p_{i}represents the proportion of articles belonging to a particular academic department.

$$D = 1 - \sum {p_{\mathrm{i}}}^2$$

e) Comparison of the institutions affiliated with the author

A Spearman correlation analysis was conducted to evaluate the similarity of collaborative networks between Korean and international researchers. For this analysis, the affiliated institutions of articles published in Korean journals were compared with those of articles authored by Korean researchers in international journals. The institutions were ranked based on the number of articles published, and the correlation between these rankings was analysed.

RESULTS

i. Structure of co-authorship and trends in collaboration

This study compares and analyses the structure of co-authorship and patterns of collaboration at the author and institutional levels in seven Korean and 20 international LIS journals. The Degree of Collaboration (DC), shown in Table 4, indicates the proportion of articles involving multiple authors. Among the seven Korean journals, 2,016 of 3,132 articles (64.4%) were written by multiple authors. In particular, the five Korean-language journals had a DC of 63.0% with an average of 2.0 authors per article, while the two English-language journals had a higher DC of 73.0% with an average of 2.3 authors per article. In contrast, the international journals had a significantly higher level of collaboration. Of the 16,922 articles, 14,431 were written by multiple authors, which corresponds to a DC of 85.3%.

Table 4: Authorship pattern and the degree of collaboration

Journals	Num. of lead author (A)	Num. of co-author (B)	Num. of authors	Average	Num. of articles		Degree of collaboration (DC) = (D / (C+D))
			(A + B)	((A+B)/Num. of articles)	with single author (C)	with multi authors (D)	
JKSLIS	651	566	1217	1.9	315	336	51.6%
JKLISS	638	585	1223	1.9	287	351	55.0%
JKSIM	522	581	1103	2.1	142	380	72.8%
JKBSLIS	516	521	1037	2.0	153	363	70.3%
JKSARM	368	410	778	2.1	101	267	72.6%
Total	**2695**	**2663**	**5,358**	**2.0**	**998**	**1697**	**63.0%**
JISTAP	236	355	591	2.5	63	173	73.3%
IJKCDT	201	232	433	2.2	55	146	72.6%
Total	**437**	**587**	**1024**	**2.3**	**118**	**319**	**73.0%**
Grand Total	**3132**	**3250**	**6,382**	**2.0**	**1116**	**2016**	**64.4%**
Scientometrics	3,345	6,738	10,083	3.0	496	2,849	85.2%
Inf. Process. Manager.	1,844	5,614	7,458	4.0	44	1,800	97.6%
JASIST	1,311	2,688	3,999	3.1	191	1,120	85.4%
IJIM	1,092	2,564	3,656	3.3	94	998	91.4%
JAL	1,056	1,480	2,536	2.4	328	728	68.9%
ITP	845	1,807	2,652	3.1	66	779	92.2%
J. Informetr.	833	1,708	2,541	3.1	108	725	87.0%
J. Inf. Sci.	811	1,681	2,492	3.1	80	731	90.1%
Inf. Dev.	715	1,265	1,980	2.8	131	584	81.7%
Online Inf. Rev.	688	1,207	1,895	2.8	127	561	81.5%
Gov. Inf. Q.	653	1,199	1,852	2.8	99	554	84.8%
Library Hi Tech	642	1,219	1,861	2.9	107	535	83.3%
J. Librariansh. Inf. Sci.	618	934	1,552	2.5	155	463	74.9%
e-library	547	1,020	1,567	2.9	80	467	85.4%
Aslib J. Inf. Manag.	530	972	1,502	2.8	86	444	83.8%
Inf. Res.	398	615	1,013	2.5	101	297	74.6%
LISR	328	504	832	2.5	80	248	75.6%
DTA	246	514	760	3.1	24	222	90.2%
Libri	230	324	554	2.4	62	168	73.0%
MJLIS	190	326	516	2.7	32	158	83.2%
Total	**16922**	**34379**	**51301**	**3.0**	**2491**	**14431**	**85.3%**
Total of international journals with Korean authors	**699**	**1495**	**2194**	**3.1**	**103**	**596**	**85.3%**

The average number of authors per article was 3.0, which is higher than in Korean journals. In Information Processing & Management, only 44 articles were written by one author, which means that 97.6% of the articles were written by multiple authors. This emphasises the strong prevalence of collaborative research in international journals.

The Degree of Institutional Collaboration (DIC) in Table 5 indicates the proportion of articles that were co-authored by multiple institutions. In the 7 Korean journals, 917 out of 3,132 articles (29.3 %) were characterised by collaboration between several institutions, which corresponds to a DIC of 29.3 %. The five Korean-language journals had a DIC of 27.2% with an average of 1.4 institutions per article, while the two English-language journals had a higher DIC of 42.3% with an average of 1.5 institutions per article. This shows that even within the Korean journals, English-language journals have more active institutional collaboration than Korean-language journals.

Figure 1 visually compares the scales of authors and institutions in five categories: i) Korean journals published in South Korea; ii) English journals published in South Korea; iii) all journals published in South Korea; iv) international journals; and v) articles written by Korean researchers in international journals. The group of Korean journals published in Korea had a relatively high proportion of articles written by a single author and a single institution. English-language journals published in South Korea and international journals generally had a higher proportion of articles written by multiple authors and in collaboration with multiple institutions. In addition, the group of articles authored by Korean researchers in international journals had a remarkably high proportion of articles co-authored by multiple authors and institutions, indicating a trend towards active research collaboration. Figure 2 illustrates the changes in the average number of authors and institutions over the last ten years (2015–2024) for the same five categories. Overall, there is an increasing trend in both the number of authors and the number of institutions in all categories. English-language journals published in South Korea consistently had higher average scores than Korean-language journals, while international journals had a faster growth rate compared to Korean journals. This trend indicates that collaborative research in LIS is continuously increasing.

Figure 3 shows the institutional types involved in each group's articles, including universities, research institutes, industrial and private organisations, government institutions, and educational and academic institutions. In terms of distribution by institutional type in relation to the total number of articles, universities accounted for the largest share in all categories. In the group of international journal articles authored by Korean researchers, 96.7% of the affiliated institutions were universities, indicating a strongly university-centred research structure. In contrast, up to 13.7% of international journals were published by research institutes, which indicates a relatively stronger collaboration with research institutes compared to Korean research. The proportion of industrial and private organisations and government institutions was generally low, but in English-language journals published in South Korea, these figures were relatively higher at 4.3% and 1.4% respectively. Educational and academic institutions were more represented in Korean journals, while their presence in international journals was lower. These results indicate that Korean research is still predominantly university-centred, while international research shows a broader tendency to collaborate with different types of institutions.

Table 5: Authorship and the degree of institutional collaboration

Journals	Num. of institutions (Unique article) (A)	Num. of institutions (Unique articles)	Average (A/Num. of articles)	Num. of articles with single-institutions (C)	Num. of articles with multi-institutions (D)	Degree of institutional collaboration DIC= (D / (C+D))
JKSLIS	882	132	1.4	489	162	24.9%
JKLISS	906	149	1.4	445	193	30.3%
JKSIM	700	128	1.3	394	128	24.5%
JKBSLIS	726	149	1.4	343	173	33.5%
JKSARM	462	116	1.3	292	76	20.7%
Total	**3,676**	**406**	**1.4**	**1,963**	**732**	**27.2%**
JISTAP	344	217	1.5	153	83	35.2%
IJKCDT	332	183	1.7	99	102	50.7%
Total	**676**	**375**	**1.5**	**252**	**185**	**42.3%**
Grand total	**4,352**	**713**	**1.4**	**2,215**	**917**	**29.3%**
Scientometrics	6,778	2,138	2.0	1,361	1,984	59.3%
Inf. Process. Manag.	4,174	1,527	2.3	577	1,267	68.7%
JASIST	2,652	905	2.0	549	762	58.1%
IJIM	2,717	1,158	2.5	307	785	71.9%
JAL	1,718	795	1.6	644	412	39.0%
ITP	2,008	933	2.4	224	621	73.5%
J. Informetr.	1,794	673	2.2	289	544	65.3%
J. Inf. Sci.	1,531	816	1.9	362	449	55.4%
Inf. Dev.	1,346	736	1.9	358	357	49.9%
Online Inf. Rev.	1,280	728	1.9	307	381	55.4%
Gov. Inf. Q.	1,321	651	2.0	248	405	62.0%
Library HiTech	1,249	623	1.9	279	363	56.5%
J. Librariansh. Inf. Sci.	1,039	509	1.7	326	292	47.2%
e-library	1,005	519	1.8	231	316	57.8%
Aslib J. Inf. Manag.	923	475	1.7	263	267	50.4%
Inf. Res.	713	325	1.8	201	197	49.5%
LISR	556	285	1.7	176	152	46.3%
DTA	476	325	1.9	103	143	58.1%
Libri	397	233	1.7	115	115	50.0%
MJLIS	363	209	1.9	83	107	56.3%
Total	**34,040**	**6,007**	**2.0**	**7,003**	**9,919**	**58.6%**
Total of international journals with Korean authors	**1,620**	**166**	**2.3**	**247**	**452**	**64.7%**

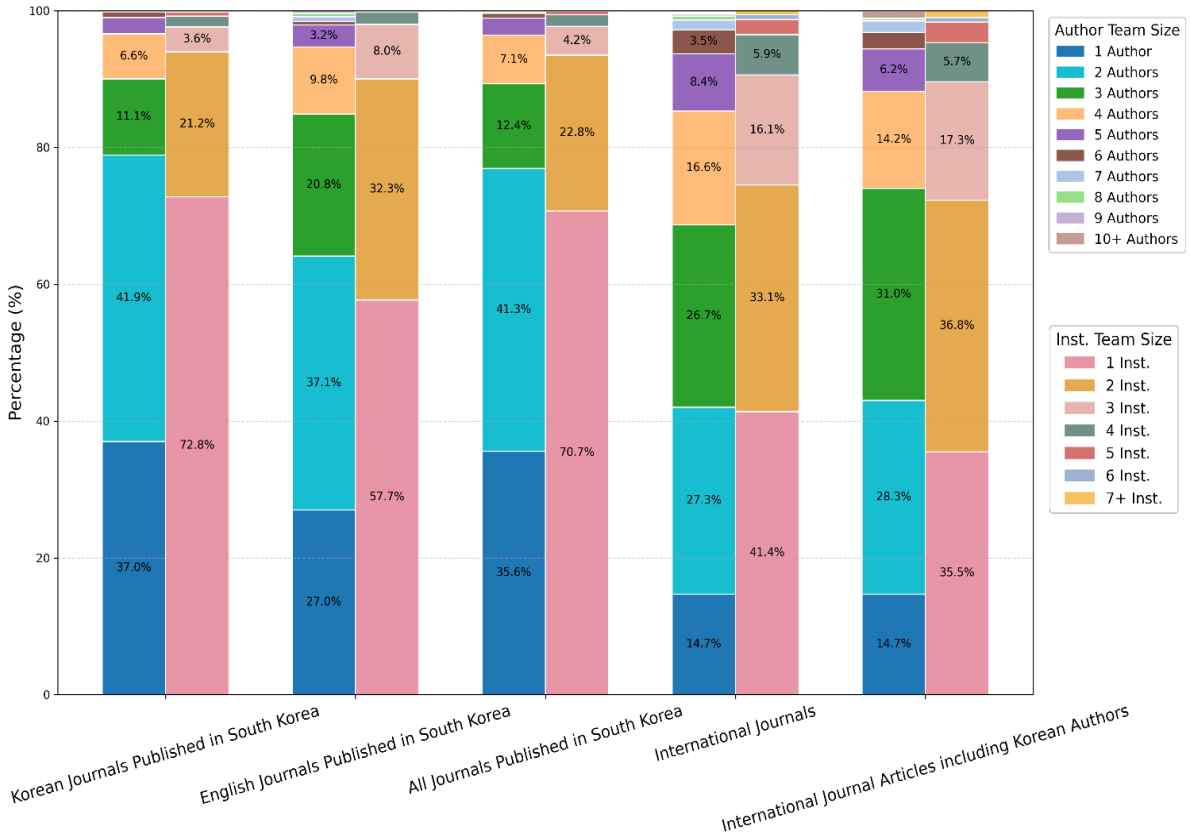

Figure 1: Comparison of author and institution team composition

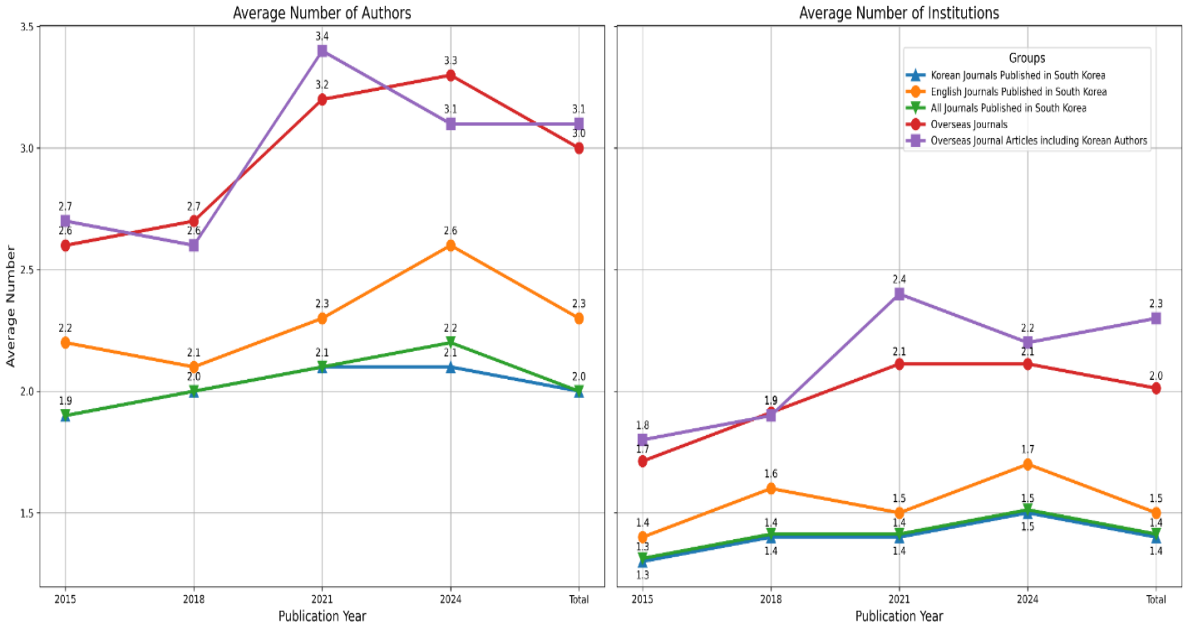

Figure 2: Trends in the average number of authors and institutions

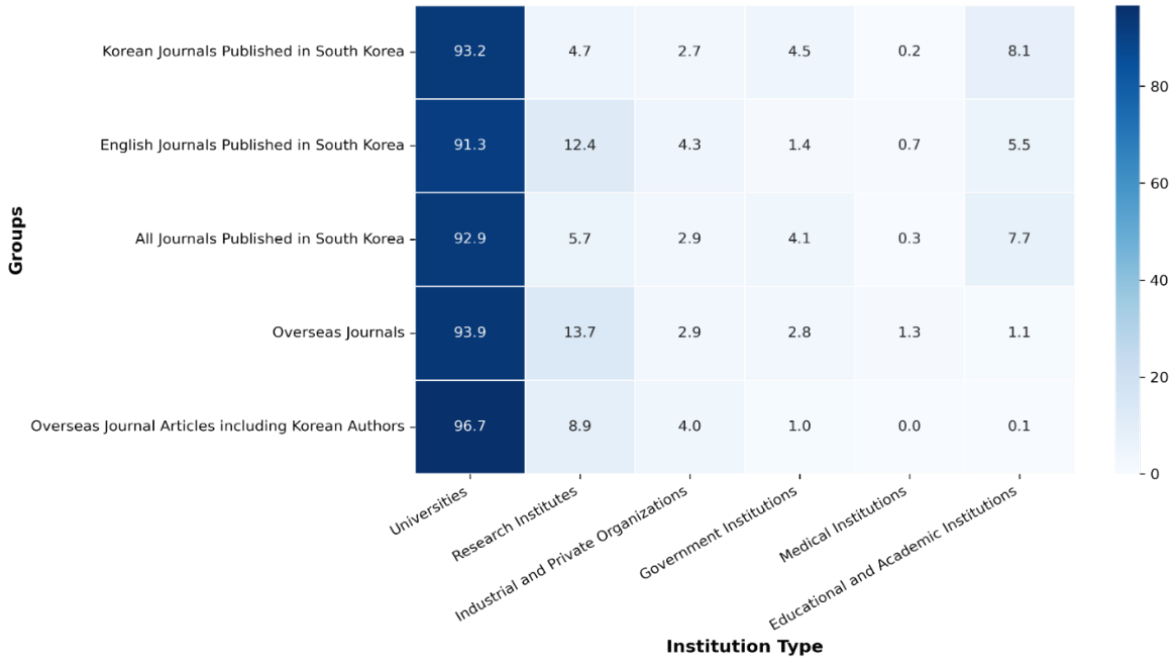

Figure 3: Distribution of facility types

Although multi-author and multi-institutional collaboration in Korean LIS research has already reached a considerable level, the extent of collaboration remains relatively limited compared to international journals. Among Korean journals, English-language journals had higher DC and DIC scores than Korean-language journals and higher levels of author-institution collaboration. International research shows broader participation from different types of institutions, including not only universities but also research institutes, companies and government agencies. A steady increase was shown in the average number of authors and institutions in all categories since 2015, indicating an increasing trend towards collaborative research across the LIS field.

ii. Structure of co-authorship by discipline and country

Analyses were conducted to compare the distribution of academic disciplines among university-affiliated authors and the national distribution of all authors in Korean journals (Korean-language and English-language journals) and international journals (articles written by Korean researchers). The analysis examines whether research collaboration in Korea and internationally is concentrated in specific academic fields and countries or whether it has interdisciplinary and multinational characteristics.

Table 6 shows the classification of academic disciplines at a broad level for authors belonging to a university in each group. The Korean-language journal published in Korea showed a strong concentration on social sciences, with 95.5% of authors belonging to LIS, while other fields such as engineering and natural sciences were minimally represented. In contrast, the English-language journal published in Korean still had a high proportion of social sciences, including 78.5% from LIS, but also included articles from business and economics, and electrical and computer engineering. This indicates a relatively broader range of disciplines than the Korean-language journal. The articles written by Korean researchers in international journals had a lower proportion of social sciences (45.4%), with LIS accounting for 28.3%. Instead, business and economics (31.5%) and engineering (23.3%) were more

strongly represented, indicating a much more interdisciplinary research landscape compared to the Korean journals.

To compare the diversity of interdisciplinary collaboration between these three categories, the Simpson Diversity Index (SDI) was calculated and analysed in this study based on the group-level classification of authors belonging to the academic disciplines in the constructed dataset. The SDI increases when research is more evenly distributed across multiple disciplines, indicating less concentration in a single field.

Table 6: Comparison of the distribution of articles by discipline across categories

Disciplines		**Korean journals published in Korea**		**English journals published in Korea**		**International journal (Articles including Korean authors)**	
Section level	**Division level**	**Dept. article num.**	**Dept. article ratio (%)**	**Dept. article num.**	**Dept. article ratio (%)**	**Dept. article num.**	**dept. article ratio (%)**
Humanities And Social Science	Social science	2312	96.5%	194	83.3%	245	45.4%
	Humanities	101	4.2%	7	3.0%	6	1.1%
	Management and economy	39	1.6%	17	7.3%	170	31.5%
	Education	25	1.0%	2	0.9%	3	0.6%
	Language and literature	8	0.3%	0	0.0%	1	0.2%
	Law	5	0.2%	0	0.0%	1	0.2%
Engineering	Electric/electronics/computers	25	1.0%	24	10.3%	126	23.3%
	Industry/safety	10	0.4%	3	1.3%	63	11.7%
	Construction	9	0.4%	0	0.0%	0	0.0%
	Education	4	0.2%	0	0.0%	0	0.0%
	Machinery	1	0.0%	0	0.0%	3	0.6%
Natural Science	Health	7	0.3%	1	0.4%	2	0.4%
	Nurse	4	0.2%	1	0.4%	1	0.2%
	Mathematics, physics, astronomy, earth	2	0.1%	2	0.9%	3	0.6%
	chemistry / life science /environment	3	0.1%	0	0.0%	2	0.4%
	Education	2	0.1%	0	0.0%	0	0.0%
	Agriculture, forestry and fisheries	0	0.0%	1	0.4%	0	0.0%
	Life science	1	0.0%	0	0.0%	0	0.0%
Art and Physical	Art	4	0.2%	0	0.0%	7	1.3%
	Applied Art	2	0.1%	0	0.0%	3	0.6%
	Dancing/Physical Education	1	0.0%	0	0.0%	2	0.4%
	Medical Treatment	0	0.0%	1	0.4%	5	0.9%
	Num. of unique articles	**2395**	**100%**	**233**	**100%**	**540**	**100%**

The results show that the Korean-language journal published in Korea has the lowest SDI value of 0.132, while the group of English-language journals has a slightly higher value of 0.345. In contrast, the group of articles written by Korean researchers in international journals had the highest SDI value of 0.719, indicating that the group of international journals with Korean authors had a more balanced participation of researchers from different academic disciplines and formed a more diverse collaborative structure than the other categories.

Figure 4 illustrates the top 10 contributing countries in each group based on the total number of articles. Since authors from multiple countries may contribute to a single article, the sum of country-specific shares may exceed 100%. For Korean journals published in South Korea, South Korea accounted for 99.4% of total contributions, indicating a minimal contribution from international researchers. In contrast, English-language journals published in South Korea (English Journals Published in South Korea) included researchers from several countries, including Nigeria (NGA, 18.1%), India (IND, 13.5%) and the United States (USA, 5.7%), indicating that English-language journals allow for some degree of international collaboration.

Figure 4: Countries by proportion of total articles in each group

Among the international journals, China (CHN, 24.0%), the United States (USA, 20.3%) and the United Kingdom (GBR, 7.8%) made the largest contribution, which emphasises their

central role in the global research network. South Korea (KOR, 4.1%) was also among the top 10 contributing countries, indicating that Korean researchers have some presence in international journals. Since the group of articles written by Korean researchers in international journals (International Journal articles including Korean authors) consists exclusively of articles with Korean authors, South Korea naturally accounted for 100% of the contributions. In this group, the United States (USA, 22.6%) and China (CHN, 9.3%) followed as the top collaborating countries, which shows that Korean researchers frequently engage in international collaborations, especially with the United States and China.

Korean journals, especially Korean-language journals, focused heavily on the social sciences, with an emphasis on LIS, and a tendency for research collaboration to be centred on Korean institutions. In contrast, the English-language journals published in South Korea contained a relatively broader range of academic disciplines and international researchers; however, they did not exhibit an interdisciplinary and multinational collaborative structure to the same extent as the group of articles in international journals authored by Korean researchers. The group of international journals with Korean authors showed a higher degree of collaboration between researchers from different disciplines, including business and engineering, and actively engaged in global research networks, which resulted in the highest SDI score.

Considering these differences, utilising both English-language Korean journals and international journals could be an effective strategy to expand international collaboration and interdisciplinary research in the Korean LIS field. In addition, academic societies that publish Korean-language journals should look for ways to promote interdisciplinary and international articles that are co-authored and support global collaboration.

iii. Citation analysis of articles published in Korean and international journals

Analyses were conducted for research articles published in Korean journals indexed in the Korea Citation Index (KCI) and international journals indexed in SCOPUS using on citation counts. In the analysis, the dataset is divided into 4 main categories: i) Korean journals in Korean language; ii) Korean journals in English language; iii) all international journals; and iv) a subset of international journals containing articles written by Korean researchers. To examine the impact of the various factors of collaboration, the study analyses the average number of citations based on authorship type (single author vs. multiple authors), institutional collaboration (one institution vs. multiple institutions), national collaboration (one country vs. multiple countries), and disciplinary collaboration (one field vs. multiple fields). Figure 5 illustrates these trends and provides a comparative perspective on citation patterns in different research environments. However, due to data limitations, disciplinary classification was not available for all international journal articles. Therefore, the disciplinary collaboration analysis was conducted only for Korean journals and the subset of international journal articles authored by Korean researchers.

a) Korean journals in KCI: Korean-language vs. English-language journals

The average number of citations for Korean journals was generally in the single-digit range and thus significantly lower than that of international journals. For Korean-language journals, the average number of citations overall was about 4.5 citations per article. There were no significant differences in the number of citations depending on the number of authors, institutional collaboration or international collaboration, as most citations were in the range of 4–5. However, in terms of disciplinary collaboration (single discipline vs. multidiscipline), articles with multidisciplinary collaboration had slightly higher citation counts, but the difference was not as pronounced as for the other collaboration factors.For English-language

journals published in Korea, the average citation rate was only 0.5, which is significantly lower than for Korean-language journals. The reason for this lower citation impact in Korean citation databases remains unclear. Possible explanations include differences in linguistic and academic communities, the thematic distance between research topics or the limited readership of these journals within Korean academic networks. Further in-depth research is needed to clarify the factors that contribute to the low citation performance of English-language journals in Korean citation indices.

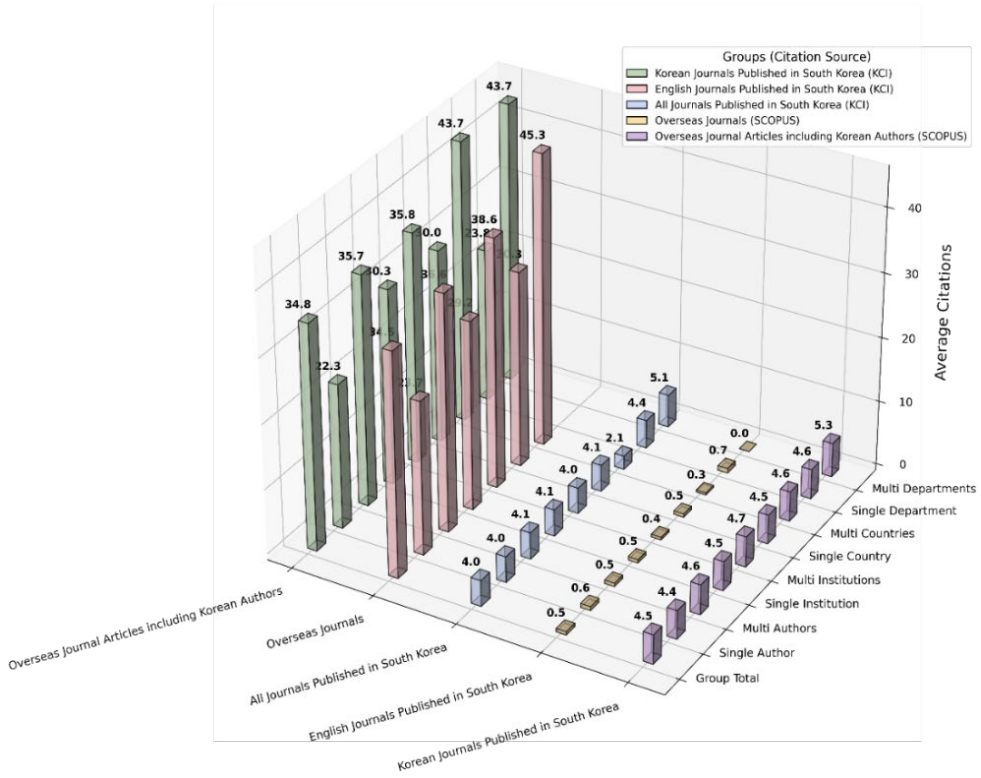

Figure 5: Average citations of journal categories and various collaborations

b) International journals in SCOPUS: international journals vs. international journals with Korean authors

The group of international journals recorded an average citation count of 34.5, which was significantly higher than that of the Korean journals. A clear trend was observed: Multi-author articles were cited more frequently than single-author articles, multi-institution collaborations outperformed single-institution collaborations, and multi-country collaborations resulted in more citations than single-country collaborations. This confirms previous findings (Jabeen et al., 2015; Noh & Chang, 2019) that research collaboration in international journals is more active and leads to higher citation impact. The subgroup of international journals with Korean authors showed a similar pattern to the overall group of international journals. The average number of citations was 34.8, which is a significant difference from the Korean journals. In addition, articles with multiple authors, institutions and countries consistently had higher citation counts, emphasising the importance of collaborative research. Further disciplinary analysis (within the available dataset) also revealed that multidisciplinary collaboration resulted in higher citation counts than collaboration between individual disciplines, suggesting that interdisciplinary collaboration is an important factor in citation impact.

c) Authorship, institutional, national and disciplinary collaboration and citation impact

Articles involving multiple authors, institutions, countries and disciplines have a higher average citation frequency in each category than articles involving only one author. This trend was observed in both Korean (KCI) and international (SCOPUS) journals, although it was much more pronounced in international journals. Articles in international journals that were the result of multinational and multi-institutional collaboration had significantly higher citation counts, emphasising the crucial role of global and interdisciplinary collaboration in increasing scientific impact. Conversely, average citation counts in Korean journals remained in the single digits and showed no significant differences in terms of authorship or institutional collaboration. In contrast, international journal articles generally have high citation counts, with a clear trend that citation counts increase significantly with increasing authorship and institutional, national and disciplinary collaboration. These findings suggest that increased research collaboration both internationally and across disciplines can significantly improve the academic impact of research in the Korean LIS field. In the future, active promotion of international co-authorship and interdisciplinary collaboration should be a key strategy to increase the influence and visibility of research.

iv. Analysing the co-authorship network based on the institutions and countries associated with the authors

This section analyses the co-authorship networks between author-affiliated institutions in both Korean and international journals. For this purpose, co-authorship networks were constructed for each group and network centrality measures were calculated. Table 7 shows the results of the network centrality analysis for the 10 institutions with the highest number of publications in 3 categories: i) journals published in South Korea; ii) international journals; and iii) a subset of international journals containing articles authored by Korean researchers. In addition, a visual representation of the international co-author network was created to identify which countries act as central nodes of research collaboration in international LIS journals.

a) Analysis of the institutional network

Table 7 lists the top 10 institutions in terms of publication volume for each group and their respective network centrality values (degree centrality, betweenness centrality and closeness centrality). In the group of Korean journals ("All Journals Published in South Korea"), institutions such as Konkuk University, Jeonbuk National University and Pusan National University are among the top performers. The results show that universities specialising in library and information science (LIS) play a central role in Korean research collaboration. In the group of international journals, on the other hand, Wuhan University, Nanjing University and the University of Malaya were among the frontrunners.

The analysis revealed a strong presence of universities from China, Malaysia, Pakistan, the United States and various European countries, suggesting a more geographically diverse research network compared to Korean journals. In the subset of international journals with Korean authors (International Journal Articles including Korean Authors), the leading institutions were Yonsei University, Sungkyunkwan University and Kyung Hee University. These results show that leading Korean universities play an important role in international LIS research collaboration. In addition, a correlation analysis was conducted to compare the publication rankings of 54 universities published in both the group of Korean journals and the subgroup of international journals with Korean authors. The results showed that the Spearman correlation coefficient was 0.17 ($p = 0.218$), which means that the correlation was not statistically significant. This indicates that institutions with a high number of publications in Korean journals do not necessarily rank high in international journals and vice versa.

Table 7: Top 10 author-affiliated institutions and network centrality

Categories	Top 10 author (Affiliated institutions)	Country	Num. of articles	Degree centrality	Betweenness centrality	Closeness centrality
All journals published in South Korea	Konkuk University	South Korea	239	0.0685	0.0369	0.1725
	Chonbuk National University	South Korea	223	0.0731	0.0494	0.1725
	Pusan National University	South Korea	177	0.0487	0.0172	0.1559
	Yonsei University	South Korea	175	0.0441	0.0277	0.1651
	Myongji University	South Korea	148	0.0578	0.0326	0.1615
	Ewha Womans University	South Korea	138	0.0381	0.0175	0.1533
	Chonnam National University	South Korea	135	0.0487	0.0269	0.1562
	Hansung University	South Korea	130	0.0487	0.0207	0.1689
	Chung Ang University	South Korea	125	0.0274	0.0111	0.1474
	Kongju National University	South Korea	119	0.0426	0.0251	0.1477
International journals	Wuhan university	China	584	0.0504	0.0605	0.3437
	Nanjing University	China	273	0.0261	0.0197	0.3216
	University Of Malaya	Malaysia	153	0.0165	0.0158	0.2946
	Peking University	China	147	0.0227	0.0146	0.3197
	University of the Punjab	Pakistan	141	0.0160	0.0168	0.2920
	Nanyang Technological University	Singapore	137	0.0143	0.0077	0.3060
	University of Wolverhampton	United Kingdom	135	0.0056	0.0027	0.2818
	University of Leuven	Belgium	134	0.0192	0.0164	0.3068
	Indiana University	United States	133	0.0236	0.0194	0.3236
	Nanjing University of Science and Technology	China	133	0.0150	0.0060	0.3061
International journal articles including Korean authors	Yonsei University	South Korea	113	0.0162	0.0113	0.3034
	Sungkyunkwan University	South Korea	82	0.0136	0.0103	0.2992
	Kyung Hee University	South Korea	51	0.0091	0.0050	0.2781
	Korea Advanced Institute of Science and Technology	South Korea	50	0.0057	0.0036	0.2560
	Seoul National University	South Korea	39	0.0059	0.0036	0.2683
	Konkuk University	South Korea	39	0.0042	0.0027	0.2421
	Chung Ang University	South Korea	28	0.0037	0.0010	0.2609
	Korea University	South Korea	25	0.0125	0.0047	0.2939
	Yeungnam University	South Korea	24	0.0047	0.0026	0.2711
	Hanyang University	South Korea	22	0.0035	0.0010	0.2488

b) Visualisation of Korean vs. international institutional networks

Figure 6 shows a dense visualisation of the co-occurrence network between author-affiliated institutions in international journals, while Figure 7 visualises the same network for Korean journals using the same methodology. In international journals, institutions with multidisciplinary and multinational character are densely clustered at the core of the network (Figure 6). In contrast, Korean journals have a network structure that is primarily led by institutions specialising in LIS (Figure 7). Particularly in the case of Korean journals in Korean, the network is concentrated in large universities with LIS departments, which emphasises the disciplinary focus of the subject area. On the other hand, international journals have a broader co-operation network involving institutions from the fields of business, engineering and natural sciences, which again confirms that international research networks have a different structure than Korean ones.

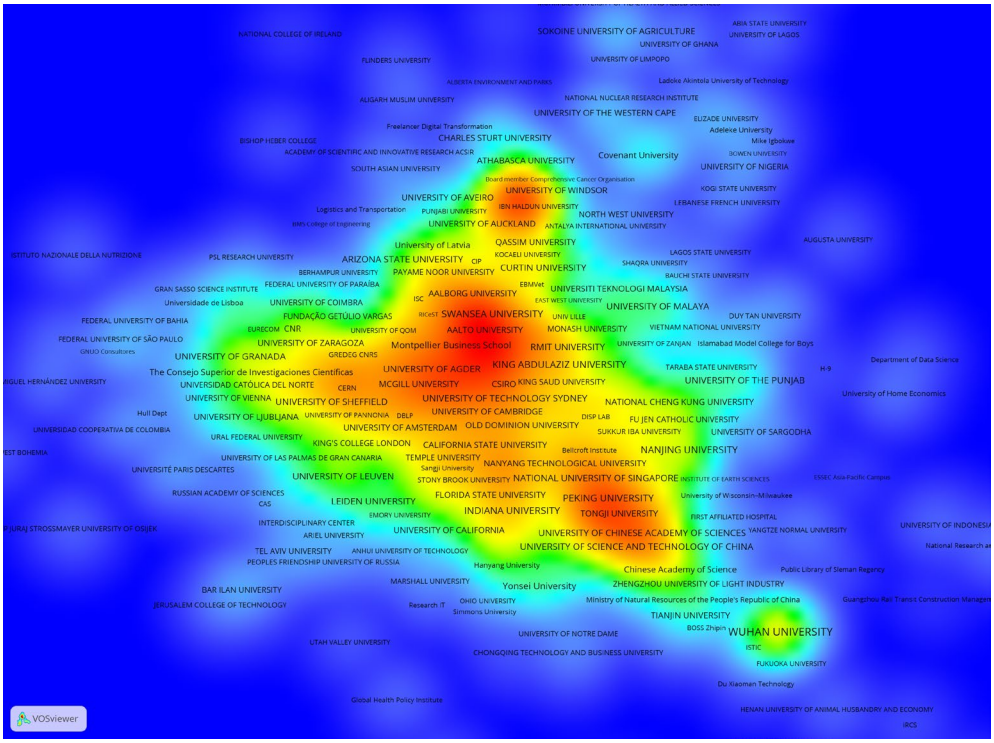

Figure 6: Density map of the network of co-authorship in international journals

c) Analysis of the international co-authorship network

The international network of co-authorship in international journals is shown in Figure 8. The analysis shows that the United States (US) and China (CHN) serve as central hubs and actively collaborate with various countries. South Korea (KOR) recorded 308 co-authored publications with the United States and 124 with China, indicating that these two countries are Korea's most frequent collaborative partners in research. It was found that European countries are closely connected and form strong regional networks. The analysis of network centrality also confirmed that the United States, China and the United Kingdom had high degree centrality, betweenness centrality and closeness centrality and thus played a central role in global research collaboration. South Korea also had a relatively high degree centrality, but the betweenness centrality and closeness centrality were lower. This indicates that Korean research collaborations are concentrated in certain large countries rather than playing a key role in the global research network.

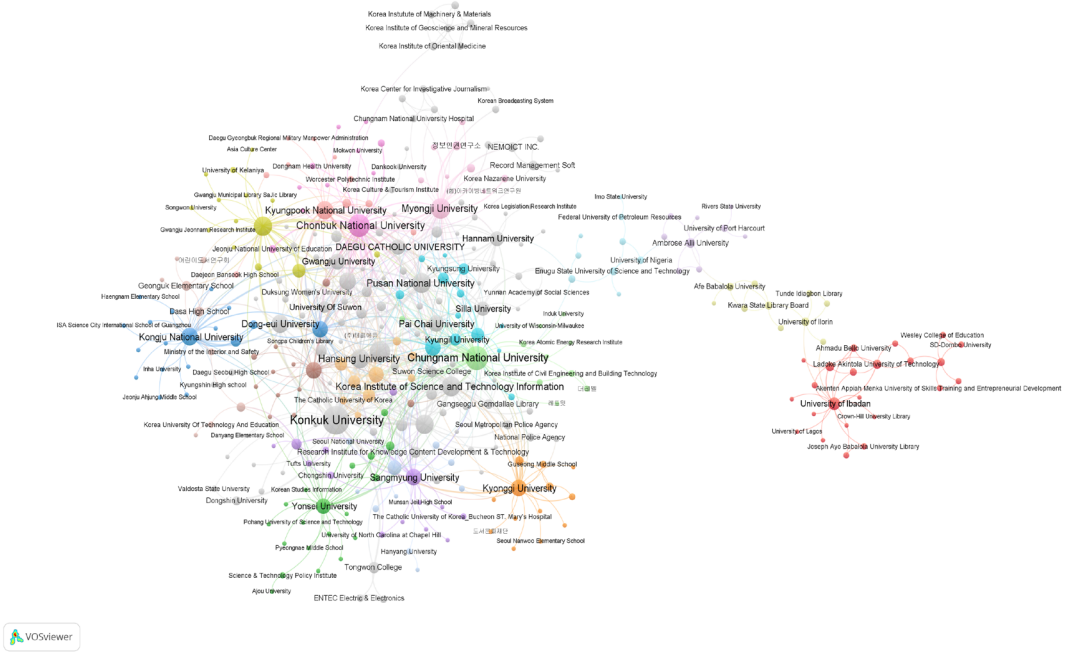

Figure 7: Co-author network map of affiliated institutions in journals published in South Korea

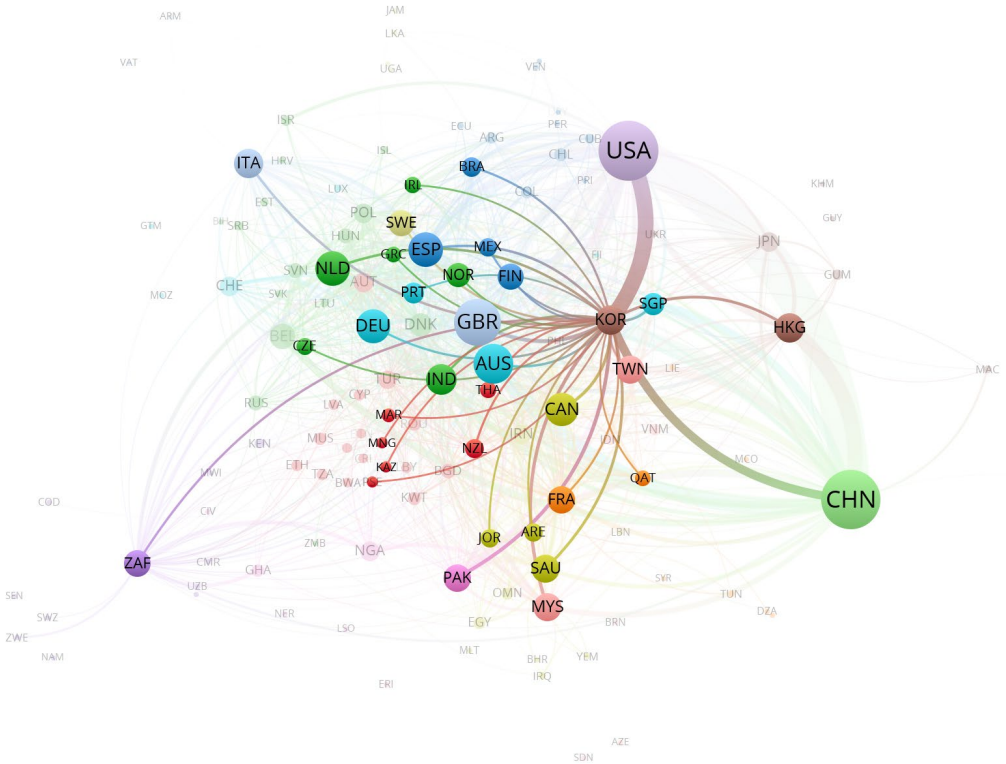

Figure 8: Network map of co-authorship in LIS research in international journals

This analysis confirms that the networks of research collaboration between Korean journals and international journals (especially those involving Korean authors) form different structures. While Korean journals are primarily led by universities specialising in LIS, international journals have a broader structure of collaboration involving business, engineering and natural sciences, as well as a more diverse and globally integrated network between institutions.

In the international network of co-authorship, the United States and China act as important nodes in the global academic landscape, and South Korea was found to focus heavily on collaboration with these two countries. These differences suggest that a transition to more interdisciplinary and multinational collaborations is essential for expanding research collaborations in the Korean LIS field. As the number of international journal publications involving Korean institutions continues to increase, Korean institutions may increasingly play a bridging role within the global research network in the future, enabling broader international research collaboration.

DISCUSSIONS

This study quantitatively analysed the structure and collaboration patterns of co-authorship networks in major Korean and international LIS journals. Korean journals were categorised into Korean-language and English-language journals, while international journals were categorised into all published articles and a subset of articles authored by Korean researchers. Using this categorisation, the study compared the characteristics of research collaboration and examined the differences in research collaboration structures and their impact on research performance.

Structures of co-authorship, proportion of multi-author collaboration and patterns of institutional collaboration between Korean and international journals

Articles published in international journals had on average, a higher number of authors than articles in Korean journals and a higher proportion of cross-institutional and international collaboration. Even within the subset of international journals with Korean authors, a high level of collaboration was observed, indicating a growing trend towards international collaboration in research. In contrast, Korean journals had a higher proportion of single-authored articles, with collaboration mainly within the same institution, and a relatively lower proportion of international co-authorship. These results emphasise the structural differences in co-authorship and institutional collaboration between Korean and international LIS journals.

Impact of co-authorship on the performance of LIS research in Korea and internationally

An analysis of the impact of co-authorship on research performance revealed that international journal articles were cited more frequently on average than Korean journal articles. Articles involving multiple institutions and countries were cited more frequently, suggesting that broader collaboration increases the impact of research. In the subset of international journals with Korean authors, multidisciplinary collaboration resulted in higher citation frequency compared to research in a single discipline, supporting the idea that collaboration between different academic fields contributes to greater research impact. In contrast, Korean journals maintained a discipline-centred structure of collaboration, limiting their citation performance and highlighting the need to promote interdisciplinary research in the Korean LIS field.

Institutional research productivity in Korean and international LIS journals

A comparison of institutional research productivity between Korean journals and international journals authored by Korean researchers revealed no statistically significant correlation, suggesting that the two groups have different institutional network structures. The Korean journals were relatively concentrated in universities engaged in LIS research, while the group of international journals included Korean researchers from a broader range of disciplines, including LIS (28.3%), social sciences (45.4%), economics (31.5%), and engineering (23.3%), indicating a more interdisciplinary and distributed institutional composition. These results indicate that differences in institutional composition and co-operation patterns contribute to the different structures of research productivity of the two groups.

Interdisciplinary collaboration between the researchers' affiliated institutions

The Simpson Diversity Index (SDI) analysis revealed that English-language Korean journals (SDI=0.345) and the subset of international journals with Korean authors (SDI=0.719) have a higher degree of interdisciplinary collaboration than Korean-language Korean journals (SDI=0.132). This indicates that international research encourages more active interdisciplinary collaboration. In contrast, Korean journals continue to be discipline-orientated, especially in the field of LIS. These findings emphasise the importance of fostering interdisciplinary collaboration among Korean LIS researchers to broaden research diversity and global engagement.

CONCLUSIONS

This study analysed research articles published in Korean and international LIS journals between 2015 and 2024 to identify patterns of research collaboration and differences in co-authorship structures. The main findings show that international journals have a higher rate of multi-institutional and multi-national collaboration and a larger proportion of articles with co-authorship compared to Korean journals. The subset of articles authored by Korean researchers in international journals also showed a strong trend towards international collaboration. In contrast, Korean journals had a higher proportion of single-authored articles, with research collaboration mainly within the same institution. Articles written by multiple authors were cited more frequently on average than articles written by a single author, and articles from multiple institutions and multiple countries were cited even more frequently, although this trend was more pronounced for international journals than for Korean journals.

This finding suggests that research collaboration can help increase the impact of academic publications. Korean journals showed a structure of collaboration centred on LIS, while the group of articles written by Korean researchers in international journals showed more active interdisciplinary collaboration in various academic fields. These findings emphasise the need for Korean LIS researchers to expand opportunities for international collaboration while promoting interdisciplinary research to broaden the scope of LIS studies. Furthermore, fostering an open research environment in Korean journals is crucial to facilitate collaboration with international researchers and expand opportunities for interdisciplinary cooperation. This study contributes to a deeper understanding of research collaboration structures in Korean LIS research and serves as a basis for exploring future opportunities for research collaboration. Future studies should focus on tracking changes in collaborative networks over time and conducting an in-depth analysis of motivations and barriers to research collaboration.

Limitations and future research directions

Although this study provides a comparative analysis of the structures of research collaboration in Korean and international LIS journals, several limitations must be acknowledged.

a) Lack of disciplinary classification for all international journals: The analysis of disciplinary collaboration was only conducted for the subset of international journals with Korean authors, as a comprehensive classification for all international journal articles was not available. Future studies should perform a more comprehensive disciplinary classification for all international journals to enable a broader interdisciplinary analysis.
b) Limited sample of international journals: This study analysed 20 international journals, which may not fully represent the diversity of LIS research collaborations worldwide. Future research should expand the sample to include a wider range of journals for a more comprehensive analysis.
c) Time frame and limitations of the citation data: The study focused on research articles published between 2015 and 2024, but long-term trends in the number of citations were not analysed. Future studies should track citation patterns over a longer period to better understand the long-term impact of research collaborations.
d) Quantitative approach with limited consideration of qualitative factors: The study primarily used a quantitative approach without considering qualitative aspects such as the motivations and challenges of research collaboration. Future research should incorporate qualitative methods, such as interviews with researchers, to further explore the factors that influence the dynamics of research collaboration.

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CONFLICT OF INTEREST

The authors have no relevant competing interests to declare pertaining to the content of this article.

AUTHOR CONTRIBUTION

Conceptualization: [all authors], Methodology: [all authors], Formal analysis and investigation: [all authors], Writing - original draft preparation: [all authors]; Writing - review and editing: [all authors].

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