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ORIGINAL ARTICLE

Influence and collaboration in library and information science research: A university perspective

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ABSTRACT

Objective. The objective of this study was to examine the influence and collaboration patterns within library and information science (LIS) research, with a particular focus on the contributions of universities over time.

Design/Methodology/Approach. This study used bibliometrics and LIS network analysis to examine 14,517 articles indexed in Scopus from 1954 to 2023. The Bibliometrix R-package was used to identify publication trends, influential institutions, authors, and collaboration networks in the LIS field.

Findings. The key findings indicated that Wuhan University was the foremost institution in LIS research, with notable contributions from Chinese scholars who were identified as the most influential authors in the field. The keywords "information science" and "information retrieval" emerged as common thematic areas, reflecting core research interests. The content analysis also revealed that LIS research had robust connections with fields such as physics, computer science, and information technology, underscoring an interdisciplinary trend.

Originality/Value. This study offered original insights into the evolving landscape of LIS research, identifying both leadership in academic output and potential gaps in current research coverage. It underscored the necessity for future research to expand the scope of its database and refine keyword selection for more comprehensive representation. The findings contributed to the strategic development of LIS research and the fostering of international collaboration

Keywords: bibliometrics; library and information science; librarianship; university; social network analysis; scientific production.

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1. INTRODUCTION

The education and research of library and information science (LIS) occupy a central position in university institutions around the world. This is due to the fact that LIS was constructed in the 1960s from various knowledge disciplines, including computer science, information systems, knowledge management, digital education, and information management. It can be reasonably inferred that the sciences have played a significant role in supporting teaching, research, and social service (Abubakara, 2021). In terms of research, this field of study has integrated a number of disciplines with diverse methodologies and techniques. Furthermore, the field of LIS may be required to address the challenges posed by technological transformations and the proliferation of big data technology, as well as trends analysis, as highlighted by Järvelin and Vakkari (2022). One of the significant domains of inquiry within the field of LIS is the application of bibliometric techniques, which have the potential to enhance the efficiency of job classification and analysis research. The analysis will have an impact on personal and professional development in educational institutions (Kennan *et al.,* 2014). Moreover, bibliometric analysis can assist in identifying the specific areas of expertise or collaboration within a university, as well as providing insight into the current and historical landscape of LIS studies. This, in turn, can inform effective curriculum planning and research support (Hou *et al.,* 2022). In this regard, the LIS discipline has played a pivotal role in the operations of libraries within educational institutions, the provision of research support services, and the intellectual structuring necessary to adapt LIS education to the demands of other related fields in the era of information and communication technology (Jabeen, Yun, Rafiq, & Jabeen, 2015; Jabeen, Yun, Rafiq, Jabeen, & Tahir, 2015; Sahu & Parabhoi, 2020).

Moreover, bibliometric studies in LIS have demonstrated a paucity of studies that integrate bibliometric methods with network and content analysis. However, the methodologies, objectives, and focus areas of these studies vary significantly. In this research, the literature review is divided into the following three principal categories:

1. Productivity analysis: This comprises an analysis of publication databases, researchers, publication sources, countries, and institutions.
2. LIS network analysis: This entails examining three-field plot analysis, co-occurring keyword analysis, co-citation analysis, cooperation networks, and temporal trends to identify pivotal research topics and furnish insights for future research planning and decision-making.
3. Content analysis: This comprehensive approach analyzes research articles based on several factors, including the author, article title, journal name, publication year, altmetric attention score, research objectives, study methods, data collection instruments, sample or data sources, and results and conclusions. This approach is in accordance with the content analysis guidelines set forth by Piwowar-Sulej *et al.* (2021) and Wahyuningrum *et al.* (2023), thereby ensuring the thoroughness of our research.

Library and information science is a field of study that draws upon multiple disciplines, combining the knowledge bases of librarianship and information science. It addresses the management, organization, and dissemination of information across a range of contexts. The primary focus of librarianship is the curation, preservation, and facilitation of access to information within libraries. In contrast, the field of information science encompasses the study of information systems, technologies, and their applications in diverse contexts. The broader scope of LIS integrates these aspects to support the efficient management and retrieval of knowledge, thereby contributing to societal growth and the advancement of information technology (IT) and innovation. Research in LIS plays a critical role in identifying challenges within the profession, enhancing service standards, and advancing theoretical knowledge, as emphasized by Naseer and Mahmood (2009a). Bibliometric and network analysis methods are vital in this endeavor, helping to evaluate research productivity and collaborative networks within the field.

In this study, the term “influence” is used to describe a number of quantifiable parameters, including citation impact, which reflects the

frequency with which research from a specific institution or author is referenced in scholarly literature, and research output, which encompasses the volume and quality of publications produced. As evidenced by studies such as those conducted by Hjørland (2013) and Jabeen *et al.* (2015), citation analysis plays a pivotal role in gauging influence within the LIS field. These studies have demonstrated that highly cited works often signal pivotal contributions that shape ongoing research and professional practice. Furthermore, this study considers the phenomenon of collaborative influence, whereby institutions and researchers engage in collaborative endeavors across networks, thereby enhancing the breadth and interdisciplinary reach of LIS scholarship. The formation of collaborative networks is a pivotal aspect of advancing knowledge in this field, as scholars engage in co-authorship and co-citation relationships that can drive innovation and improve the quality of research (Hou *et al.,* 2022).

The study of collaboration within LIS research is a well-established field of inquiry, with bibliometric techniques being a particularly prevalent method for mapping co-authorship patterns and institutional partnerships. Naseer and Mahmood (2009b) emphasize that collaboration facilitates the cross-pollination of ideas, thereby enabling the resolution of complex research questions. The strength and frequency of collaborations between universities, both domestically and internationally, are of great consequence in shaping the landscape of LIS research. This is evidenced by the work of Sa and Dora (2019), who examine international collaboration trends and their influence on research productivity. It is of great importance to understand and foster these collaborative structures in order to identify influential networks and ascertain how knowledge is shared across the field.

This study places a significant emphasis on the contributions of universities, given their role as primary hubs of LIS research, with the production of substantial outputs and the nurturing of influential scholars. A number of studies have examined the role of universities in advancing LIS, noting that certain institutions consistently lead in research productivity and impact (Gupta & Chakravarty, 2022). These contributions are often measured through publication counts, citation metrics, and the development of influential research programs that drive the field forward. This study emphasizes universities' contributions to LIS over time, with a particular focus on their role in fostering collaboration and generating impactful research.

This study examines the influence and collaboration that shape the LIS field by analyzing university-level research output, citation patterns, and collaborative networks. Through bibliometric analysis, it identifies key institutions, authors, and thematic trends, offering insights into academic collaborations and their contribution to the broader knowledge base of LIS. The primary objectives are to explore the dynamics of collaboration networks, analyze frequently cited studies, and assess the impact and evolution of university contributions within the academic LIS community.

2. METHODOLOGY

This study employs a bibliometric and LIS network analysis, following the methodologies established by Lazar and Chithra (2021), as illustrated in Figure 1. The data were sourced from Scopus, guided by literature reviews on LIS by Hjørland (2018). The search criteria included: TITLE-ABS-KEY ("library and information science*" OR "library science*" OR "information science*" OR "LIS") AND AFFIL (universit*). The study encompasses the period from 1954 to 2023, with an exclusive focus on research articles in the English-language. To ensure that the analysis remained focused on the core research themes relevant to the field of LIS, specific keywords and general terms (e.g., "article," "human," "male," "female," "adult," and "child") were excluded from the search. These terms were excluded on the grounds that they are too general and frequently occur in studies that are not directly relevant to LIS-specific topics. The inclusion of these terms would have introduced noise into the dataset and diluted the specificity of the bibliometric analysis. It was not the case that articles that contained both LIS-related terms and human-related keywords were automatically discarded. The exclusion criteria were employed to filter out studies where human-related terms were the primary focus and did not

contribute to LIS research. Articles that meaningfully integrated both LIS topics and human-related aspects were retained, provided that they were relevant to the objectives of the bibliometric analysis. As the analysis did not involve the participation of human subjects, ethical approval from the Institutional Review Boards (IRB) was not required. The data were then saved as a .csv file, meticulously checked, and cleaned. Ultimately, this process resulted in a dataset of 14,517 pertinent research articles, ready for further analysis using the Bibliometrix R-package (Aria & Cuccurullo, 2017). This comprehensive dataset serves as the basis for the subsequent discussion and conclusions of the study, as detailed in Figure 1.

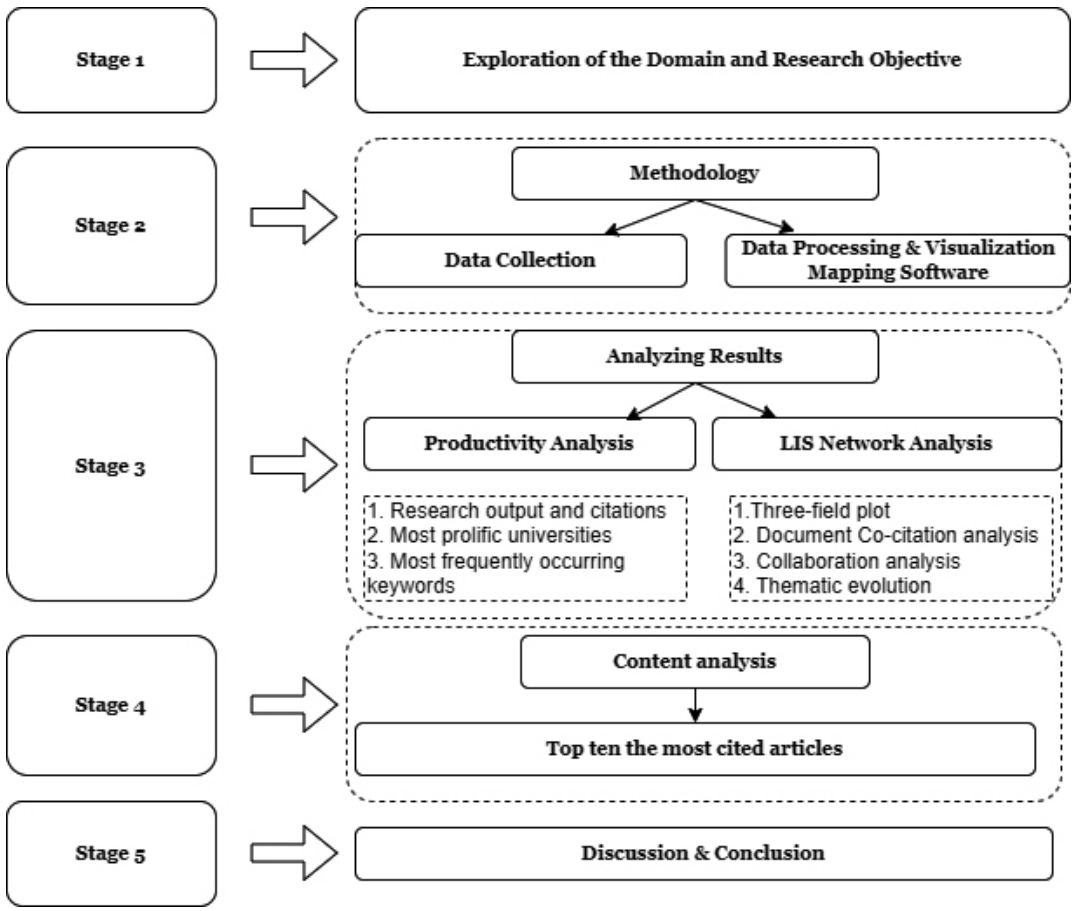

Figure 1. Stages of the LIS bibliometric study.
Source: Modified from Lazar and Chithra (2021) and Zhong and Lin (2022).

The data processing methodology employed in this study encompasses a range of key techniques for the analysis of collaboration patterns and research trends within the field of LIS. First, a bibliometric analysis was conducted using the Bibliometrix R-package to quantify research output, citations, and co-authorship trends. A network analysis was conducted for the LIS field, with a particular focus on the examination of collaborative networks between authors and institutions. To assess the relative importance of institutions, betweenness and closeness centralities were employed. The networks subjected to analysis include those of co-authorship and co-citation. In order to conduct a thematic analysis, it was necessary to identify the co-occurrences of terms. To trace thematic shifts over time and determine the evolution of research topics, the study employed Keywords Plus and Author Keywords, which were used to categorize the research topics into distinct periods of interest. Finally, we conducted the content analysis using a sample of the top 10 most-cited documents in

the LIS field. We chose this approach to ensure a robust and reliable representation of influential work, allowing for deeper insights into recurring themes, critical findings, and prominent trends within the literature. The analysis aimed to capture key contributions and foundational research that shape current understanding and guide future studies by focusing on these highly referenced documents. This sample provided a meaningful cross-section of impactful publications, ensuring the analysis was comprehensive and grounded in authoritative sources.

3. RESULTS

This study has divided the results into three main sections: (a) the LIS research articles analyzed using a productivity analysis, (b) the LIS network analysis, and (c) the content analysis of the LIS top ten most cited research articles. The study's scope was limited to the analysis of research articles published in English in LIS academic journals from universities included in the Scopus database.

3.1. Productivity analysis

3.1.1. Research output and citations

Figure 2 depicts the annual publication trends and average citations per year in the field of LIS from 1954 to 2023. The period from 1954 to 1971 was distinguished by a relatively modest scholarly output, with fewer than 10 research articles published annually. In contrast, 2020 saw a notable increase in research productivity, resulting in the publication of 914 articles—the highest number recorded to date. The study identifies notable annual fluctuations in the number of citations received by these articles. Overall, there has been a gradual increase in citations over time, with an annual growth rate of 9.56%. It is noteworthy that the average number of citations per year has been consistently increasing since 1972, with 2020 representing the peak in average annual citations, exceeding previous years by more than 4.61 times. However, in the most recent years, 2022-2023, there has been a noticeable decline in the number of citations compared to previous years.

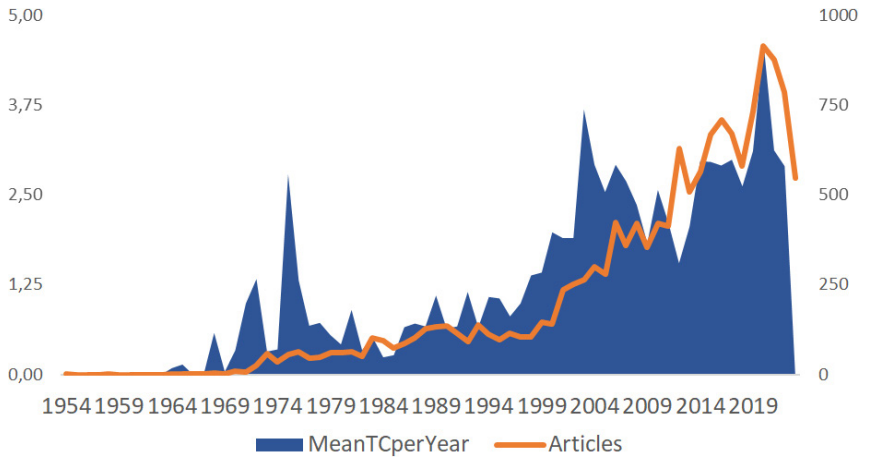

Figure 2. Research output and mean total citations of LIS articles.

3.1.2. The top ten university

Table 1 presents the top ten universities with the highest level of research output in the field of library and information science. Wuhan University in China is in the first position, with 269 published articles, followed closely by the University of California, with 250 articles. Additionally, Nanjing University of Information Science and Technology and the University of Science and Technology of China are significant contributors to the Chinese academic landscape, with 131 and 121 articles, respectively. The list includes several esteemed institutions of higher learning in the USA, such as Indiana University, the University of Maryland, and Northwestern University. It is also noteworthy that the University of the Punjab in Pakistan and Nanyang Technological University in Singapore are significant

international contributors. The data serve to underscore the leading role of Chinese institutions in LIS research, while simultaneously highlighting the significant contributions made by USA and other international universities. The overall analysis yielded four Chinese universities with the greatest influence on research in LIS, followed by four well-known universities in the USA. This indicates that universities in Asia tend to be the leaders in LIS research, including those in China, Pakistan, Singapore, the American universities that had the greatest influence on research output were as follows.

Rank	University	Country	Articles
1	Wuhan University	China	269
2	University of California	USA	250
3	Nanjing University of Information Science and Technology	China	131
4	University of Science and Technology of China	China	121
5	Nanjing University	China	117
6	Indiana University	USA	115
7	University of Maryland	USA	109
8	University of the Punjab	Pakistan	109
9	Nanyang Technological University	Singapore	107
10	Northwestern University	USA	105

Table 1. Top ten most prolific universities.

3.1.3. Term co-occurrences analysis

Table 2 presents the most frequently occurring keywords in LIS research articles, with an emphasis on their significance based on the number of times they appear together. The term "information science" is the most prevalent keyword, appearing with the greatest frequency across all studies. It leads in Keywords Plus with 4,499 mentions, followed by "quantum optics," "information systems," "software engineering," "quantum information science," "information retrieval," "database systems," "mathematical models," "information retrieval systems," and "GIS," with usage frequencies ranging from 200 to 600 times or more. In terms of author keywords, "information science" once again occupies the top position, followed by "library and information science," "bibliometrics," "academic libraries," "libraries," "information literacy," "LIS education," "education," "librarians," and "citation analysis." The aforementioned keywords demonstrate a usage frequency of between 100 and 500 times or more. It is noteworthy that "information science" is a prominent feature in both the Keywords Plus and Author Keywords categories. It is imperative that the methodological section elucidate the rationale behind the utilization of indicators such as Keywords Plus and Author Keywords, thereby providing a clear justification for the presentation of results in this specific manner. Keywords Plus represents a set of search terms that extend beyond the conventional parameters of keywords, thereby facilitating the retrieval of pertinent articles. In contrast, Author Keywords are those selected by the authors to describe the content and focus of their research in particular. This distinction is of paramount importance for comprehending the patterns and trends observed in Table 2, which enumerates the 10 most frequently utilized keywords in research articles. A more detailed examination of these indicators will facilitate the contextualization of the data and provide insights into the processes of keyword selection and their implications for research visibility and impact. The study reveals a notable emphasis on science-related keywords, particularly in the domains of physics, computer science, and engineering, as well as mathematical principles. The emergence of "quantum optics," "quantum information science," and "GIS" (geographic information system) as prominent keywords is indicative of this trend. Additionally, in the Author Keywords category, "information science" and "bibliometrics" are highly emphasized, reflecting their importance in LIS research. This trend is also evident in the research themes, including information literacy, LIS education, and citation analysis.

Rank	Keywords Plus	Occurrences	Author Keywords	Occurrences
1	Information science	4,499	Information science	572
2	Quantum optics	608	Library and information science	339
3	Information systems	580	Bibliometrics	240
4	Software engineering	509	Academic libraries	203
5	Quantum information science	495	Libraries	191
6	Information retrieval	301	Information literacy	190
7	Database systems	295	LIS education	177
8	Mathematical models	289	Education	174
9	Information retrieval systems	288	Librarians	144
10	GIS	287	Citation analysis	141

Table 2. Top ten most frequently used keywords in research articles.

3.2. Library and information science network analysis

3.2.1. Three-field plot

Figure 3 presents a three-axis graph that illustrates the relationships among authors, universities, and the most frequently used keywords in LIS research. A Sankey diagram is employed to visualize the flow of information through coordinated paths, offering an insightful overview of the distribution and interconnectivity of data. The three-dimensional format of the graphic facilitates comprehension of the complex relationships between data points. The dimensions of the square nodes in the diagram are proportional to the frequency of occurrence of the respective authors, institutions, and keywords within the collaborative network. It is essential to provide a clear and accurate description of the measurement methodology for each indicator in this section in order to ensure the clarity and facilitate the interpretation of the presented results. The Sankey diagram provides a clear visual representation of the complex relationships between key authors, their institutional affiliations, and the various LIS research domains. Notable figures such as Y. Li, J. Zhang, and Y. Wang are distinguished by their significant contributions, particularly from prominent Chinese institutions such as Wuhan University and Nanjing University of Information Science and Technology. These institutions demonstrate substantial connections to multiple research areas, thereby underscoring their role as hubs of interdisciplinary collaboration. Research themes such as bibliometrics, information science, and LIS emerge as dominant fields interconnected by robust scholarly networks. The diagram offers a comprehensive academic landscape, emphasizing collaborative patterns and institutional strengths in shaping influential research domains.

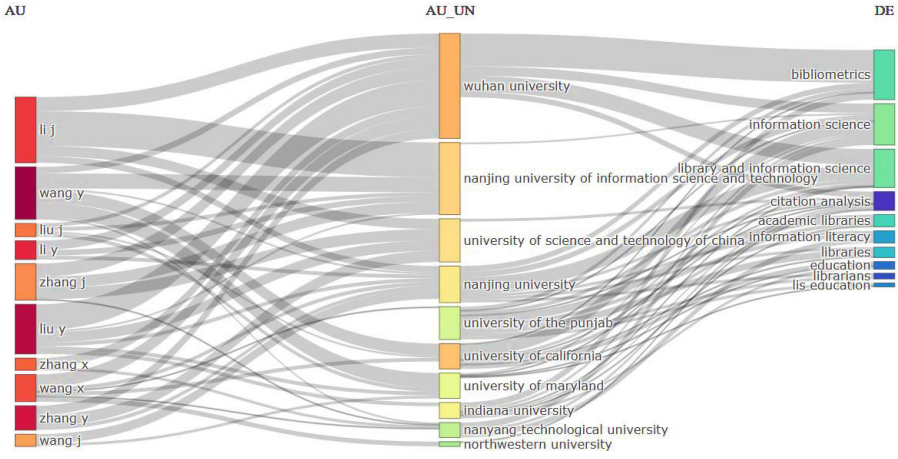

Figure 3. Three-field plot showing the network between authors (left), institutions (middle), and keywords (right).

3.2.2. Document co-citation analysis

Figure 4 presents a co-citation analysis of LIS research articles, which have been categorized into five distinct cluster groups. The clusters are represented by nodes of varying colors, each denoting a distinct research area, while the connecting lines indicate the relationships between the studies. The thickness of the lines is indicative of the degree of similarity or commonality among the studies within each cluster. This analysis comprises 50 nodes, indicating that the articles within each cluster frequently cite one another and share common thematic interests (Hjørland, 2013). This co-citation network provides a visual representation of the relationships among influential journals in information science and library studies, where each node represents a journal, and connections between them indicate instances of being cited together in scholarly work. Larger nodes, such as those for the *Journal of the American Society for Information Science, Journal of Documentation,* and *Scientometrics,* signify journals with high co-citation frequency, underscoring their central role and influence within the field. The dense web of connections, particularly around these key journals, suggests they are frequently referenced together, reflecting thematic overlaps and a shared foundation of ideas within this academic discipline. The network is color-coded into red and blue clusters, likely representing distinct subfields or research themes, such as information science and library science differences. This clustering reveals knowledge organization within the field, with journals grouped based on similar research focuses or methodologies. Overall, the network captures the interconnectedness and central sources that define the core literature in information science and library studies, highlighting foundational journals and the themes that shape scholarly discourse.

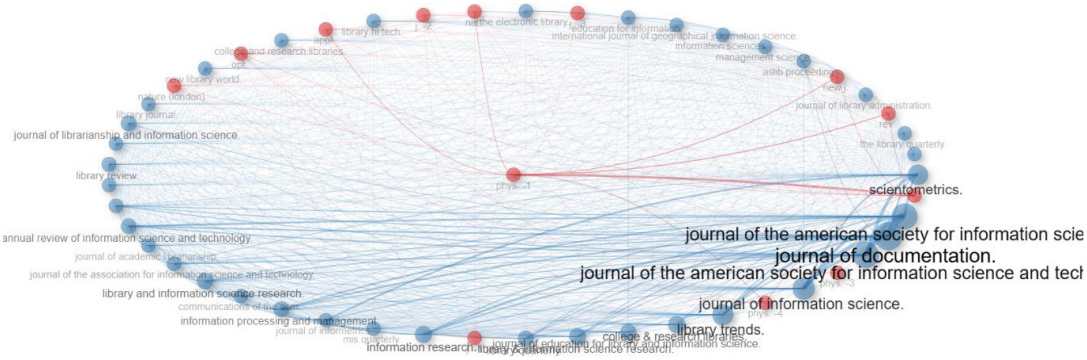

Figure 4. Document co-citation analysis.

3.2.3. Collaboration analysis

Table 3 illustrates the most significant university institutions, as determined by betweenness centrality (BC) and closeness centrality (CC) network values, for facilitating collaborative work and supporting research and research collaboration in exchanging opinions in global LIS research. The analysis revealed that Wuhan University in China exhibited the highest BC value. The BC value was followed by that of Nanjing University, the University of California, and Indiana University, and it was also observed that universities with CC values, such as Islamic Azad University in Iran and the University of Malaya in Malaysia, have research collaborations and do not have clear collaborations with other institutions. In general, the study indicates that renowned universities may originate from developed countries such as China, the USA, Canada, and Singapore.

3.2.4. Thematic Evolution

Figure 5 presents an analysis of the evolution of research topics in LIS over the past 70 years, employing Keywords Plus and Author Keywords from university research across the globe. This analysis reveals shifts in focus areas across three distinct periods. In the initial period (1954-2007), Keywords Plus indicates a predominant focus on subjects such as

Rank	University	Country	BC	University	Country	CC
1	Wuhan University	China	242.0317	Islamic Azad University	Iran	1.0000
2	Nanjing University	China	168.2515	University of Malaya	Malaysia	1.0000
3	University of California	USA	129.3414	Wuhan University	China	0.0128
4	Indiana University	USA	94.3745	Drexel University	USA	0.0118
5	Drexel University	USA	91.8738	Nanjing University	China	0.0116
6	Nanyang Technological University	Singapore	85.0739	University of California	USA	0.0116
7	Harvard University	USA	79.2937	National University of Singapore	Singapore	0.0111
8	National University of Singapore	Singapore	59.4669	Indiana University	USA	0.0109
9	University of Alberta	Canada	57.7962	Nanyang Technological University	Singapore	0.0104
10	Tsinghua University	China	51.0288	Peking University	China	0.0104

Notes: BC: betweenness centrality; CC: closeness centrality.

Table 3. Top ten most central of affiliation collaboration based on betweenness and closeness centralities.

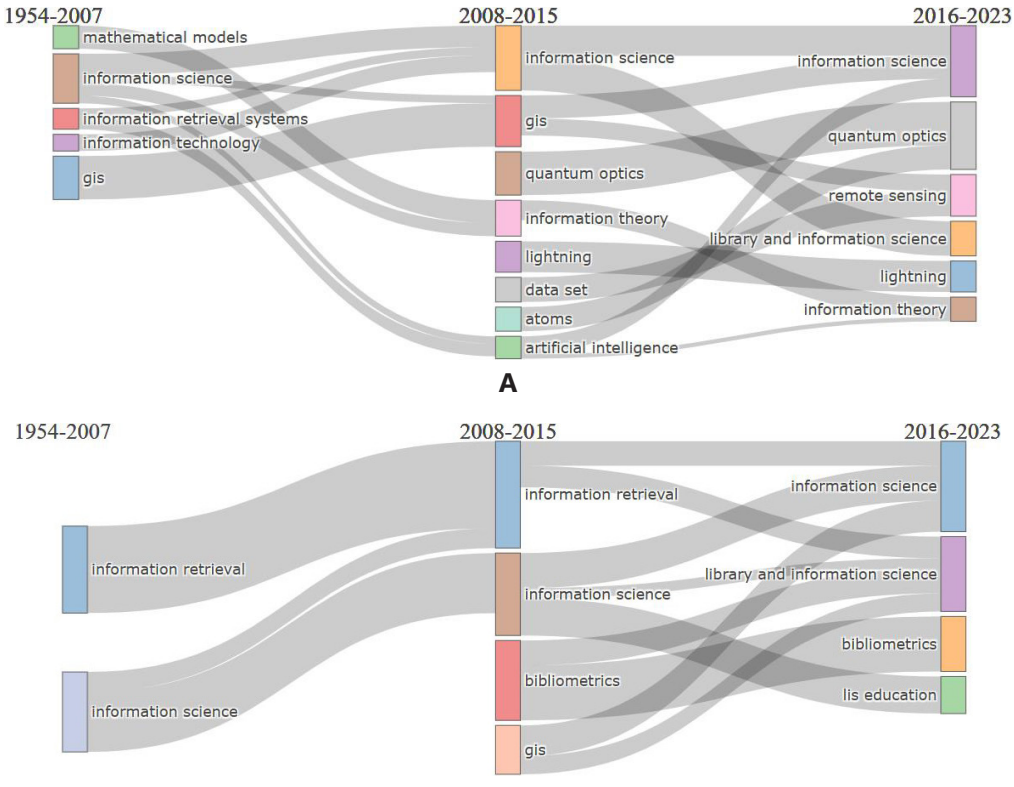

Figure 5. Thematic evolution analysis of (A) Keywords Plus and (B) Author Keywords.

mathematical models, information science, information retrieval systems, IT, and GIS (Prabpala & Nitiwatthana, 2024). The subsequent period (2008-2015) exhibits a notable shift towards information science, GIS, quantum optics, information theory, lightning, datasets, atoms, and artificial intelligence. The most recent period (2016-2023) demonstrates the preeminence of information science, quantum optics, remote sensing, LIS, lightning, and information theory. The size of the square box indicates the frequency of the keyword. From 1954 to 2007, the dominant themes were information retrieval and information science. The period from 2008 to 2015 saw a continuation of these trends, with the addition of bibliometrics and GIS. The most recent period (2016-2023) demonstrates a sustained interest in information science and

LIS, with bibliometrics and LIS education also emerging as significant areas of focus. This indicates that "information science" has consistently been a key focus across all periods. The evolution of bibliometric research is particularly notable in the second and third periods. In the latest years (2016-2023), while "information science" remains central, the emergence of "library and information science" and "bibliometrics" indicates a significant shift towards education-related topics. The appearance of "LIS education" underscores its growing importance in recent LIS research.

3.3. Content analysis

Table 4 presents the ten most frequently cited articles in the field of LIS. These articles encompass a diverse range of topics, including information retrieval models, technology acceptance, big data, and quantum entanglement. They address pivotal issues such as information sorting, user behavior modeling, data visualization, and evaluation metrics in semantic networks. These comprehensive studies underscore the rich and multifaceted nature of research within the LIS domain.

No.	TC/AAS	Objectives	Results or conclusion
1	5,319/29 (Salton et al., 1975)	The paper proposes a vector space model for automatic indexing in document retrieval based on space density computations.	The choice of indexing vocabulary relates to space density computations. Retrieval performance might inversely correlate with density. The results validate the model's utility, indicating improved recall–precision performance with reduced density.
2	4,999/NA (Bhattacherjee, 2001)	The paper applies expectation-confirmation theory to understand the factors influencing users' intention to continue using information systems.	The study collected data through an online survey of 1,000 online banking customers. The results showed that perceived usefulness, satisfaction, and confirmation were significant determinants of IS continuance intention.
3	4,332/3 (Chin et al., 2003)	The paper demonstrates the effectiveness of the PLS approach in recovering true effects through a Monte Carlo simulation study with known true effects.	The paper introduces a novel approach to analyze interaction effects using latent variable modeling. This technique is validated through simulated and real IT adoption datasets, showcasing its effectiveness via partial least squares modeling in accurately estimating interaction effects in a Monte Carlo simulation and an empirical study on electronic-mail adoption.
4	3,872/NA (Shenton, 2004)	• Ensure trustworthiness in qualitative research projects. • Address credibility, transferability, dependability, and confirmability.	• Strategies for ensuring trustworthiness in qualitative research. • Importance of addressing credibility, transferability, dependability, and confirmability.
5	3,129/22 (Chen, 2006)	This article describes the latest development of a generic approach to detecting and visualizing emerging trends and transient patterns in scientific literature and makes substantial theoretical and methodological contributions to progressive knowledge domain visualization.	• Visualizations of mass extinction and terrorism datasets. • Prominent article in mass extinction visualization: Alvarez (1980).
6	2,170/12 (Philip Chen & Zhang, 2014)	This paper is aimed to demonstrate a close-up view of Big Data, including Big Data applications, Big Data opportunities and challenges, as well as the state-of-the-art techniques and technologies currently adopt to deal with the Big Data problems.	This article discusses the challenges and opportunities in dealing with Big Data, including data capture, storage, analysis, and visualization. It is found that managing large-scale data remains a problem, but there are still significant potentials and opportunities in data management.
7	1,850/0 (Vidal et al., 2003)	To investigate the scaling properties of quantum entanglement in spin chain systems, both in the vicinity of the quantum critical point and at the quantum critical point.	The paper establishes a precise connection between concepts of quantum information, condensed matter physics, and quantum field theory by showing that the behavior of critical entanglement in spin systems is analogous to that of entropy in conformal field theories.
8	1,813/NA (Eisert et al., 2010)	The paper reviews the current status of area laws for entanglement entropy in various fields, including black hole physics, quantum information science, and quantum many-body physics.	In this paper, the current status of area laws in quantum many-body systems is reviewed, and a significant proportion is devoted to the clear and quantitative connection between the entanglement content of states and the possibility of their efficient numerical simulation.

No.	TC/AAS	Objectives	Results or conclusion
9	1,791/NA (Featherman & Pavlou, 2003)	To predict e-services adoption by incorporating perceived risk facets into the technology acceptance model (TAM).	Incorporating a second-order perceived risk into TAM, the study showed performance risks impacting various factors. It highlighted the crucial role of perceived risk, especially in e-service adoption. Emphasizing performance-related risk's influence, ease of use mitigates these concerns, signifying its critical role in e-service acceptance.
10	1,444/NA (Rada et al., 1989)	The objective of the paper is to develop and apply a metric called "distance" on semantic nets to assess the conceptual distance between sets of concepts. The authors aim to evaluate the value of a knowledge base in the retrieval of biomedical literature and the ranking of documents in response to a query.	The authors propose a metric called "distance," which is based on spreading activation and conceptual distance, to assess the conceptual distance between sets of concepts in a semantic net of hierarchical relations. Distance is calculated as the average minimum path length over all pairwise combinations of nodes between two subsets of nodes.

Notes: TC: total citation; AAS: altmetric attention score from www.altmetric.com through Google Scholar on September 30, 2023; NA: not available.

Table 4. Content analysis of top ten articles in LIS.

4. DISCUSSION

This study highlights the necessity for LIS researchers to prioritize the development, exploration, and assessment of research output in bibliometrics, LIS network analysis, and content analysis. The principles of bibliometrics are particularly useful for enhancing and stabilizing the quality of LIS research, as evidenced by Khan's (2016) findings. The utility of bibliometric tools in curriculum analysis (Juznic & Urbanija, 2003) and the evaluation of research quality (Middleton, 2005) have been acknowledged. A noteworthy finding of this study is the considerable influence exerted by Wuhan University in the field of LIS research. This observation lends support to the hypothesis that the university possesses a robust research capacity within the Asian academic landscape. This places Wuhan University in a competitive academic position alongside leading institutions in the USA and Europe, such as those in the UK. This comparison highlights the contribution of Asian universities to the advancement of LIS research and development. The analysis of Keywords Plus (Table 2) reveals a diverse range of research topics spanning multiple knowledge fields, indicating the interdisciplinary nature of LIS research. This diversity is further evidenced by the frequent appearance of Keywords Plus in titles, which are automatically generated by computer algorithms (Garfield & Sher Irving, 1993; Garg & Singh, 2022; Tan *et al.,* 2014). These findings assist researchers in identifying evolving trends and keywords in LIS research. However, bibliometric and LIS network analysis at the university level have been limited, with variations in methodologies, including differing search terms and regional foci. The necessity for more comprehensive bibliometric studies combining network analysis and content analysis is evidenced by studies from India (Sa & Dora, 2019), Bangladesh (Islam & Roy, 2021; Islam *et al.,* 2018), Arab cities (Siddique *et al.,* 2023), and BRICS countries (Gupta & Chakravarty, 2022; Tripathi *et al.,* 2018). Furthermore, the study underscores the significance of author collaboration, employing centrality measures to ascertain pivotal contributors within LIS research networks. This approach facilitates the identification of influential authors who facilitate collaboration and knowledge development. The evolution of research topics in LIS is revealed by an analysis of Keywords Plus and Author Keywords, which indicates significant shifts in focus over time. The most frequently occurring themes are "information science" and "information retrieval." The content analysis of the 10 most frequently cited LIS research articles reveals a diverse range of topics, particularly in the fields of computer science, physics, and information science. This analysis facilitates the identification of the most impactful articles, thereby providing insights into the theoretical frameworks and tools that are shaping LIS research. Furthermore, the altmetric analysis, although not a prominent feature of this study, has the

potential to serve as a valuable tool for gauging the social impact and popularity of research. In the context of the Internet and social media, the social influence of scientific research is becoming an increasingly relevant topic of study. This comprehensive analysis of bibliometric data in LIS research provides insights into the dynamic evolution of research topics, influential institutions, and key contributors. It highlights the value of interdisciplinary approaches and the role of bibliometrics and LIS network analysis in shaping the future of LIS research at the university level.

5. CONCLUSION

The education of professionals in the field of library and information science is of paramount importance for the growth of organizations, institutions, society, and professionals across the globe. This is corroborated by research publications at university-level institutions around the globe. The study demonstrated that from 1954 to 2023, a total of 14,517 LIS research articles were published, indicating a consistent expansion in research focus and citations. This highlights the potential for the establishment of collaborative LIS research initiatives at academic institutions across the globe. It may be necessary for LIS research activities to adapt in order to meet future demands for collaboration and networking. The establishment of official societies for the dissemination and publication of high-quality LIS articles has the potential to enhance the professional development of researchers and to enhance the reputations of universities. Wuhan University in China is distinguished by its substantial contributions to research, with institutions in the USA and the UK also making notable contributions. The majority of published LIS research articles concentrate on the fields of physics, computer science, and IT. Further studies may wish to consider utilizing larger databases from alternative sources or refining keyword searches in order to analyze disparate content scopes and interests. The application of bibliometric techniques, LIS network analysis, and content analysis enables a comprehensive examination of citation patterns, thereby facilitating a more profound comprehension of the popularity and impact of LIS research. This study makes a contribution to the field of LIS by employing bibliometric techniques to gain insight into the analysis of large datasets, which are presented through a variety of data diagrams. It encourages the sustainable development of research and knowledge exchange among professionals in the LIS field, including researchers, academics, and professors. In light of the significance of adapting to technological and educational changes, this research aims to advance LIS research in a sustainable manner at universities across the globe.

Conflict of interests

The authors should declare potential conflicts of interest or not.

Contribution statement

Conceptualization, formal analysis, investigation, methodology: Pornnisa Wattanasiri, Paiboon Manorom, Wirapong Chansanam.

Data curation, software, validation, visualization: Pornnisa Wattanasiri, Paiboon Manorom, Wirapong Chansanam.

Writing-original draft, writing-review & editing: Pornnisa Wattanasiri, Paiboon Manorom, Wirapong Chansanam.

Statement of data consent

All relevant data have been included in the manuscript. ●

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