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Global Library and Information Science Research Patterns: A Twenty-Five-Year Reflection

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Abstract
This paper reports the findings of a desk review research on global changes in Library and Information Science (LIS) research. Specifically, the review examined articles published in a 25-year (1995-2020) span of LIS research trends using Google database. The variables in the examination were gender, citation patterns, institutional affiliation, and degree of collaboration. To collect data from 43 articles, the study applied a bibliometric method, with the resultant data subjected to content analysis. The study found that male authors published more on the theme of LIS research trends than their female counterparts. Moreover, the results indicate a positive and significant correlation between the duration of a publication and the number of citations. The number of years of publication and open access publishing had a positive but non-statistically significant relationship with citation. Furthermore, the study found authorship collaboration to be moderate at 0.581. There was also a marked shift from traditional to new LIS research areas related to digital technology and its application in libraries. Overall, the trends in LIS research appear attributable to research infrastructure, sufficient funding, access to data, and the researcher's skills. These findings support enhancing capacity building for LIS researchers to update their skills as part of concerted efforts to enable them to meet global changing needs.

Keywords: LIS research trends, LIS research, trends in LIS research, LIS publication trends, LIS publications
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Introduction

Research often serves as a fruitful way of information transmission in any field through the identification of issues and the implementation of suitable methods for solving them (Sinha, 2016). Of late, the LIS discipline has witnessed a surge in studies that assess research works of scholars (Elia & Ndenje-Sichalwe, 2022; Wusu & Lazarus, 2018). Such increase in LIS research output on research trends for the past two decades (Winkler & Kiszl, 2020) has also revealed a discernible shift in research from the traditional LIS research topics to new ones. Traditional LIS research topics began with research on library operations, which usually covered circulation, information management, indexing, classification, information behaviour, information literacy, information resources, and librarianship practices (Dora & Kumar, 2019). Despite this marked shift, there have been scanty research traces of emerging LIS research topics, particularly in developing countries such as Tanzania. As such, these observable changes in research areas within the LIS discipline merit an exploration of the

type of research conducted, collaboration and co-authorship, and citation to promote quality research and develop new knowledge.

As Pickard (2013) observed, such exploration of LIS research trends is vital in advancing LIS knowledge, research opportunities, identifying new themes, fostering growth of the profession, and putting research into practice. The ongoing changes in LIS research globally are attributable to factors such as emerging new ideas, social structures, shifts in LIS content and structure, and multidisciplinary demands (Rochester & Vakkari, 1998; Keshavartz & Shekari, 2020). Besides the extended attributes affecting global LIS research trends, Ndenje-Sichalwe and Elia (2022) identified information explosion and technology as fundamental factors inducing global changes in LIS research and education, hence necessitating a shift in LIS research and patterns.

Even though a number of studies that have explored LIS research trends (see, for example, Dora & Kumar, 2019; Tuomaala, Jarvelin, & Vakkari, 2014; Ja-Hyun & Min, 2013), little that has been researched upon in the area. Even then studies documented at a global level specifically explored studies conducted in the area of LIS research patterns and most of them reviewed research on LIS topic trends for specific countries, using doctoral theses and/or journal articles. Against this backdrop, this study sought to broadly explore the publications on LIS research trends covering a quarter of a decade. Specifically, the study set out to:

1. Explore the LIS research trends topics covered between 1995–2020.
2. Determine the gender patterns of authors researching on LIS trends between 1995–2020.
3. Trace institutional affiliation of authors who research on LIS trends between 1995–2020.
4. Assess the citation patterns among scholars who have explored research patterns between 1995–2020.
5. Establish the degree of collaboration among LIS researchers on LIS patterns between 1995–2020.

Literature Review

LIS Research Trends: Topics and Coverage

Studies on research trends in LIS have shown several distinctive issues pertaining to research trends that show the development path through knowledge shared (Islam, Islam & Mondal, 2018). Rochester's (1995) study, which applied content analysis, had focused on LIS research in Australia and covered the 1985 – 1994 period, revealed that the widely covered LIS topics were on information seeking, research and library history. Cheila (1997) in a quantitative study on library science, as reflected in the core journals of the profession, found that between 1950 and 1975, the LIS research philosophy adopted was applicable globally. On the other hand, Powell's (1999) methodological essay dealt with recent trends in research, which indicated that LIS research has been shifting towards unravelling new qualitative and quantitative research methods. Meanwhile, Mabawonku (2001), who examined trends in LIS research in Africa between 1991 and 2000, had assessed trends in LIS research while focusing on disciplines, country of publication, and place for author's professional training, publication format, journal rankings and citation counts. In the US, Adkins and Budd (2006) found that citation counts and publication trends among LIS faculty were the major scholarly deliverables of LIS research productivity.

In South Korea, Park and Song (2013) study about LIS research trends in Korea which focused on modelling, found a growing LIS research trend on topics related to the evaluation of libraries, metadata, and the internet. Winkler and Kiszl (2020), who studied academic libraries as flagships of publishing trends in LIS, analysed research topics,

citations, and rankings, found academic libraries' perspectives to be the that dominant LIS research trends followed by social media and information literacy. On their part, Arman-Keown and Patterson's (2020) content analysis of trends in library and information research established a tangible rise in the sources of data available for analysing research trends, which are essential in tracking and comparing trends. Kumar and Dora (2019) analysed research productivity and research trends on the LIS subject with reference to publications appearing in SCOPUS. The study established that digital libraries, bibliometric, academic libraries, scientometric, electronic resources as well as information retrieval were the most prevailing LIS study areas.

Gender Patterns of Authors Researching on LIS Trends

In a case study on gender variation in LIS research productivity, Pattel and Verma (2019) found that women researchers produced more academically when they partnered with male researchers even though there were few collaborative papers for such scrutiny. Kumar, Vijayakumara and Kumar (2018), who had explored gender disparities in LIS research productivity between 2008 and 2017, found that male scholars dominated the authorship of LIS research papered relative to their female counterparts. In contrast, Vinay and Sampath's (2021) study about LIS research productivity according to gender, found female LIS scholars outweigh male scholars, which also implies that, an increase in the number of female LIS authors influenced a decline of male LIS authors.

Institutional Affiliation of LIS Researchers

Regarding institutional affiliation, Mularski (2001) found that from 1958 to 1988, most of the published articles in LIS journals were written by researchers from other faculties including social science, business management and computer science but not necessarily from the LIS field. In the mapping of LIS literature in university news, Wadhwana (2018) found most of the LIS scholars to be affiliated with higher learning institutions, either a university or college and, thus, their direct involvement in research productivity. From 1980 to 2016, results summoned by Galyani-Moghaddam and Taheri (2018) indicate that LIS researchers attached to their parent institutions were not restricted to publishing in journals housed by their respective institutions since they could also feature in any relevant and reputable journals to raise both personal academic standing and institutional visibility.

Citation Patterns in LIS

Naseer and Mahmood (2009), who used citation patterns to analyse the utilisation of bibliometric in LIS research, found patterns of interaction with LIS scholarly work. Notably, Chikate and Patil (2008) analysed citations of LIS theses and found variance in citation of articles, which presented the different scientific undertakings whether low or high that recognised users' interest in the scientific work. Furthermore, Simisaye and Osinaike (2010) in an analytical study of journal citations in LIS from 2004-2009 reported that the citation count was still low in most of the research articles, hence refuting the notion that an article with many years since its being published could have huge citation patents.

Degree of Author Collaboration in LIS Research

Pluzhenskaia (2007), who researched on the degree of collaboration among LIS schools' faculty members and non-LIS degrees, found that faculty members in LIS schools from 1995 and 2006 had no boundaries in scholarly collaboration and worked with researchers from other disciplines. On the contrary, the assessment of authorship patterns and degree of collaboration in the LIS discipline conducted between 2000 and 2009 by Suradkar and Vaishali (2012), Elia and Sife (2018) and Siddique, Rehman and Altaf (2021) established a dominance of single-authored over multiple-authored articles. Implicitly, there was little interaction among LIS scholars and with other researchers from other disciplines. In this regard, a cross disciplinary study on collaboration against coexistence, Urbano and Ardanuy (2020) established that LIS still struggled to attain effective collaboration both within and outside the discipline, which tends to undermine interdisciplinary endeavours.

Methodology

The study applied the bibliometric method to collect data. Two research assistants facilitated the collection of data from published research articles on the trends in LIS research accessed via the Google Scholar database. The Google Scholar database enabled the gathering of specific scholarly information on the respective authors' countries and gender, which could hardly be found in journals and databases that published these articles. Data collection lasted from October to December 2021with content analysis occurring from April to June 2022. The study used the Google database to search for, retrieve and review relevant literature based on five key search terms: (LIS trends), OR (LIS research trends), OR (LIS research patterns) OR (Trends in LIS research) OR (LIS publication trends). These key terms were essential in retrieving relevant studies in relation to the broader theme of the research. The researchers carefully entered these search terms, identified and retrieved papers for further analysis. The focus on the topic of LIS research trends was the main criterion for selecting these LIS studies. In all, the study zeroed in on forty-three articles after close scrutiny for establishing patterns amongst LIS scholars in research trends. LIS studies that adopted a similar method in studying trends in LIS research include, Wusu and Lazarus (2018), Dora and Kumar, (2019), and Panahi et al. (2022). In addition to the bibliometric methods, the study also used Subramanyam's (1983) formula to calculate the degree of authorship pattern for LIS research trend studies:

$$C = \frac{Nm}{Nm + Ns}$$

Where;

C = Degree of collaboration in a discipline
Nm = Number of multi-authored papers in the discipline
Ns = Number of single authored papers in the discipline

Research Findings

LIS Research Topics and Trends

This study analysed global LIS research trends from 1995 to 2020, where the research conducted between 1995-2005 focused on information infrastructure and management of information whose themes included information services, status of libraries, information seeking, library planning, information technology, information access, storage and retrieval. Between 2006 and 2015 LIS research was more on productivity, particularly publication and citation. The 2016-2020 period the research was much more inclined towards information science and digital tools for libraries, as Table 1 and Figure 1 further illustrates:

Table 1: LIS Research Topics and Trends, 1995 – 2020 (n=43)

Sn	Topic	Year	Theme
1	Library and information science Research in Australia: A content Analysis of Research Articles in the Australian library journal and Australian academic & research libraries	1995	Library and information services
2	Trends in Publication Productivity of Library and Information Science Faculty, 1978-1988	1995	Library science and information science
3	The periodical literature of library and information in Africa: 1990 - 1995	1996	Information technology & status of librarians
4	Research in library science as reflected in the core journals of the profession: A quantitative analysis (1950-1975)	1997	Function and roles of libraries & research philosophy
5	International LIS Research: A Comparison of National Trends	1998	Library & Information Science
6	Subject trends in library and information science research, 1975-1984	1988	Information Technology
7	Recent trends in research: A methodological essay	1999	Research methods
8	Fifty Years of LIS Research in India: Trends and Development	2000	Library planning and management & information seeking behaviour
9	Trends in library and information science research in Africa, 1991 - 2000	2001	Archives & information science
10	Research Trends in library and information science at the International Islamic University, Malaysia	2002	Information technology
11	International Library and Information Science Research: A Comparison of National Trends	2003	Information storage and retrieval & library and information services
12	A content analysis of librarianship research	2004	Information access and retrieval
13	Study on the research trends of library and information science in Korea by analysing journal articles and the cited literatures	2005	Library and information science
14	Scholarly productivity of U.S. LIS faculty	2006	LIS publications and citation
15	LIS research in Africa: how much is it worth? A citation analysis of the literature, 1986-2006	2007	LIS publications and citation
16	A scientometric analysis of international LIS journals: Productivity and characteristics	2008	LIS publications and citation
17	Library and Information Science Research in Botswana: An Analysis of Trends and Patterns	2008	LIS education
18	LIS Research in Pakistan: An Analysis of Pakistan Library and Information Science Journal 1998-2007	2009	LIS education
19	Trends in library and information science research in research in Korea: Focused on master's theses and doctoral dissertations from 2001 to 2010	2010	Information services
20	Library and information science research trends in India	2011	Library and information science
21	Research trends in library and information science in India with a focus on Punjab university, Chandīgarh	2011	Technology & LIS education
22	Research visibility, publication patterns and output of academic librarians in sub- Saharan Africa: The case of Eastern Africa	2012	LIS publications
	A study on the research trends in LIS in Korea using topic	2013	

23	modelling		Library services & Information science
24	Research trends in LIS based on Spanish scientific publication 2000-2010	2013	Information services, LIS education &information use
25	Evolution of Library and Information Science, 1965–2005: Content Analysis of Journal Articles	2014	Scientific communication and information seeking
26	Doctorial research in library and information science in India: trends and issues	2014	LIS publication
27	Subject dispersion of LIS research in Pakistan	2014	Information services
28	Current trends in library and information science research in India	2015	Information Technology
29	Research trends of library management in LIS in India since 1950-2012	2015	Information services & LIS education
30	Reflection on Library and Information Science Research	2016	LIS publications
31	An empirical analysis of the research trends in the field of library and information science in India	2017	Information Technology
32	Major trends in LIS research: A bibliometric analysis	2018	Bibliometric & citations
33	Forty-Five Years of LIS Research Evaluation: An Informetric study of the Author-Supplied keywords	2018	Information system design to scientific communication
34	Library and information (LIS) research topics in Indonesia from 2006 to 2017	2018	Information resources, information systems & information society
35	Research Trends in Library and Information Science in Bangladesh: An Analytical Study	2018	Digital libraries
36	National and international trends in library and information science research: a comparative review of the literature	2019	Library and information services
37	Research Productivity and Research Trends in the LIS Subject: A study with reference to SCOPUS	2019	Digital library & bibliometric
38	Visual topical analysis of library and information science	2019	Information retrieval & social media
39	The evolution of LIS research topics and methods from 2006-2018: A content analysis	2020	Informetric & information seeking behaviour
40	Academic Libraries as The Flagships of Publishing Trends in Library and Information Science	2020	Social media & information literacy
41	Content analysis in library and information research: an analysis of trends	2020	Information research & scientometric
42	Evaluation of research topics in LIS between 1996 and 2019: an analysis based on latent Dirichlet allocation topic model	2020	Social media & mobile application
43	Twenty-six years of LIS research focus and hot spots, 1990–2016: A co-word analysis	2020	Information seeking and retrieval

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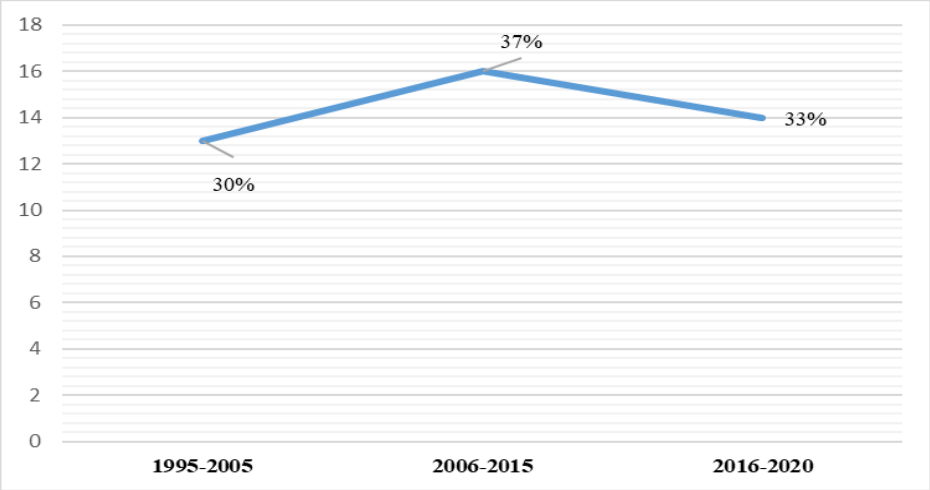

Figure 1: LIS Research Trends, 1995 – 2020

Authors Gender Patterns and Origin

Gender analysis helped to establish participation of the two broad gender categories in relation to LIS research trends. Gender distribution among LIS scholars, who have studied research trends reveal that male respondents were in the majority (n=33, 67%) compared to their female counterparts (n=16, 33%). Moreover, the results in table 4 show that the number of authors did not necessarily translate into increased citations. For instance, a title "Library and information (LIS) research topics in Indonesia from 2006 to 2017" has four authors and "Research visibility, publication patterns and output of academic librarians in sub-Saharan Africa: The case of Eastern Africa" has three authors. In addition, the degree of collaboration among authors featuring in selected topics has been calculated.

Table 2: LIS Scholars' Gender Patterns and Country of Origin (n=43)

Sn	Title	No. of Authors	Author (s) Name	Gender	Country
1	Library and information science Research in Australia: A content Analysis of Research Articles in the Australian library journal and Australian academic & research libraries	1	Maxine Rochester	Female	Australia
2	Trends in Publication Productivity of Library and Information Science Faculty, 1978-1988	2	Prudence Dalrymple Jana Varlejs	Female Female	U.S.A U.S.A
3	The periodical literature of library and information in Africa: 1990 - 1995	1	Anaba A. Alemna	Male	Ghana
4	Research in library science as reflected in the core journals of the profession: A quantitative analysis (1950-1975)	1	Peritz Cheila	Female	Israel
5	International LIS Research: A Comparison of National Trends	2	Maxine Rochester Pertti Vakkari	Female Male	Australia Finland
6	Subject trends in library and information science research, 1975-1984	1	Stephen E. Atkins	Male	U.S.A
7	Recent trends in research: A methodological essay	1	Ronald Powell	Male	U.S.A

	Fifty Years of LIS Research in India: Trends and Development	2	Kannappanavar, B.U	Male	India
8			Vijayakumar, M	Male	India
9	Trends in library and information science research in Africa, 1991 - 2000	1	Iyabo, Mabawonku	Female	Nigeria
10	Research Trends in library and information science at the International Islamic University, Malaysia	1	KabaAbdoulaye	Male	Dubai
	International Library and Information Science Research: A Comparison of	2	Maxine K. Rochester	Female	`U.S.A
11	National Trends		Pertti Vakkari	Male	Finland
		3	Denise Koufogiannakis	Female	Canada
	A content analysis of librarianship		Linda Slater	Female	Canada
12	research		Ellen Crumley	Female	Canada
13	Study on the research trends of library and information science in Korea by analysing journal articles and the cited literatures	1	Oh, Se-Hoon	Male	Korea
			Denice Adkins	Female	U.S.A
	Scholarly productivity of U.S. LIS	2	John Budd	Male	U.S.A
14	faculty				
15	LIS research in Africa: how much is it worth? A citation analysis of the literature, 1986-2006	1	Omwoyo, Bosire Onyancha	Male	South Africa
	A scientometric analysis of	2	Mohammad, Davarpanah	Male	Iran
16	international LIS journals: Productivity and characteristics		Aslekia, S	Male	Iran
17	Library and Information Science Research in Botswana: An Analysis of Trends and Patterns	1	Kgomotso H. Moahi	Female	Botswana
			Khalid Mahmood	Male	Pakistan
	LIS Research in Pakistan: An Analysis of Pakistan Library and Information	2	Mirza Muhammad Naseer	Male	Pakistan
18	Science Journal 1998-2007				
19	Trends in library and information science research in research in Korea: Focused on master's theses and doctoral dissertations from 2001 to 2010	1	Jung-Sook Song	Female	Korea
20	Library and information science research trends in India	1	Mittal Rekha	Female	India
21	Research trends in library and information science in India with a focus on Punjab university, Chandīgarh	1	Reshma Rana	Female	India
			Dennis Ocholla	Male	South Africa
	Research visibility, publication patterns and output of academic librarians in	3	Lyudmila Ocholla	Female	South Africa
22	sub- Saharan Africa: The case of Eastern Africa		Omwoyo, BosireOnyancha	Male	South Africa
			Park Ja-Hyun	Female	Korea
	A study on the research trends in LIS in	2	Song Min	Male	Korea
23	Korea using topic modelling				
24	Research trends in LIS based on Spanish scientific publication 2000-	1	Anna Kawalec	Female	Poland

	2010				
25	Evolution of Library and Information Science, 1965–2005: Content Analysis of Journal Articles	3	Otto Tuomaala Kalervo Järvelin Pertti Vakkari	Male Male Male	Finland Finland Finland
26	Doctorial research in library and information science in India: trends and issues	2	Shashi Prabha Singh Parveen, Babbar	Female Male	India India
27	Subject dispersion of LIS research in Pakistan	2	Mirza Muhammad Naseer Khalid Mahmood	Male Male	Pakistan Pakistan
28	Current trends in library and information science research in India	1	Bhanu Partap	Male	India
29	Research trends of library management in LIS in India since 1950-2012	2	Bapan Kumar Maity Sudip Ranjan Hatua	Male Male	India India
30	Reflection on Library and Information Science Research	1	Maxine K. Rochester	Female	U.S.A
31	An empirical analysis of the research trends in the field of library and information science in India	2	Mallkarjun Dora H. Anil Kumar	Male Male	India India
32	Major trends in LIS research: A bibliometric analysis	2	Oluwaseyi Wusu Nneka Lazarus	Male Female	Malaysia Nigeria
33	Forty-Five Years of LIS Research Evaluation: An Informetric study of the Author-Supplied keywords	1	Omwoyo, Bosire Onyancha	Male	South Africa
34	Library and information (LIS) research topics in Indonesia from 2006 to 2017	4	Nove Eka Variant Anna Endang Fitriyah Mannan Dyah Puspitasari Srirahayu Fitri Mutia	Female Female Female Female	Indonesia Indonesia Indonesia Indonesia
35	Research Trends in Library and Information Science in Bangladesh: An Analytical Study	3	Shariful Islam Nazmul Islam Madhob Mondal	Male Male Male	India India India
36	National and international trends in library and information science research: a comparative review of the literature	2	Mallkarjun Dora H. Anil Kumar	Male Male	India India
37	Research Productivity and Research Trends in the LIS Subject: A study with reference to SCOPUS	2	Manoj Kumar Sa Mallkarjun Dora	Male Male	India India
38	Visual topical analysis of library and information science	3	Pin Li Guoli Yang Chuanqi Wang	Male Male Male	China China China
39	The evolution of LIS research topics and methods from 2006-2018: A content analysis	2	Jinxuan Ma Brady D. Lund	Female Male	U.S.A U.S.A

40	Academic Libraries as The Flagships of Publishing Trends in Library and Information Science	2	Bea Winkler Peter Kiszl	Female Male	Hungary Hungary
41	Content analysis in library and information research: an analysis of trends	2	Vera Armann-Keown Liane Patterson	Female Female	Canada Canada
42	Evaluation of research topics in LIS between 1996 and 2019: an analysis based on latent Dirichlet allocation topic model	1	Xiaoyao Han	Female	Berlin
43	Twenty-six years of LIS research focus and hot spots, 1990–2016: A co-word analysis	2	Reza Mokhtarpour Ali Akbar Khasseh	Male Male	Iran Iran

Institutional Affiliation of Authors of LIS Trends Research Articles

The study further determined the authors' institutional affiliation and their occurrence as important factors that can influence trends in LIS research. The results show that the Institute of Management of India and the University of Zululand in South Africa had four occurrences each, which marked the highest number of occurrences across the studies involved:

Table 3: LIS Trends Research Article Authors' Institutional Affiliation (n=43**)**

Sn	Affiliated Institution	Number of occurrence
1	Beit Berl Academic college	1
2	Charles Sturt University. Waggawagga Australia	2
3	Delhi University	1
4	Department of Library and Information Science, Payame Noor University, Iran	1
5	Department of Library and Information Science, Shahid Chamran University of Ahvaz, Iran	1
6	Department of Library and Information Science, University of the Punjab, New Campus, Lahore, Pakistan	1
7	Department of LIS in International Islamic University, Malaysia (IIUM)	1
8	Emporia State University, School of Library and Information Management, Emporia, Kansas	1
9	Faisal University, Dammam, Saudi Arabia	1
10	Haryana Agricultural University	1
11	Humboldt University, Berlin	1
12	Indian institute of management, Ahmedabad	4
13	Indian Maritime University, Kolkata.	1
14	Institute of Library and information science, Eotuos Lorand University	1
15	Institute of Space Technology, Islamabad Highway, Islamabad, Pakistan	1
16	Jawaharla Nehru University	1
17	Kresge, Wayne State University, U.S.A	1
18	Kuvempu University	1
19	Lagos State University of Education, Oto	1
20	National Institute of Science and Communication and Information Resources	2
21	National Research Council of Canada	1
22	Pakistan library	1
23	Punjab University, Chandigarh	1
24	Rabindra Bharati University Meghnad Saha Institute of Technology	2
25	School of Information Sciences, University of Tampere	3
26	School of Library and Information Management, Emporia State University	1
27	School of Information Management, Nanjing University, Nanjing, China	3
28	Tampere University, Finland	1

29	University of Alberta, Canada	3
30	University of Botswana	1
31	University of California, U.S.A	1
32	University of Ghana	1
33	University of Ibadan, Nigeria	1
34	University of Illinois	1
35	University of Indonesia	1
36	University of London	1
37	University of Malaya	2
38	University of Missouri-Columbia	2
39	University of Manitoba, Canada	1
40	University of Rajshahi, Bangladesh	1
41	University of Sheffield	1
42	University of South Africa (UNISA)	1
43	University of the Punjab institute of Space Technology	1
44	University of Zululand, Empangeni, South Africa	4
45	Yancheng Teachers University, Yancheng, China	1
46	Yonsei University	1

Citation Patterns of LIS Articles

Analysis of citation patterns in this study focused on the title of LIS research, year of publication, covered publication period, number of years covered, and number of citations of a respective publication. The results show that publication period of publications ranged from 5-63 years. The most cited publications (294, 163, 143, 139) were published in 1993 (294), 2014 (163), 2007 (143), and 2013 (139), as Table 3 further illustrates:

Table 4: Duration and citation patterns of LIS research (n=43)

Sn	Title	Year of Publication	Publication Period	Years Publication Covered	Citation Count
1	Library and information science Research in Australia: A content Analysis of Research Articles in the Australian library journal and Australian academic & research libraries	1995	1985-1994	10 years	45
2	Trends in Publication Productivity of Library and Information Science Faculty, 1978-1988	1995	1978 - 1988	10 years	10
3	The periodical literature of library and information in Africa: 1990 - 1995	1996	1990 - 1995	6 years	42
4	Reseach in library science as reflected in the core journals of the profession: A quantitative analysis (1950-1975)	1997	1950 - 1975	25 years	28
5	International LIS Research: A Comparison of National Trends	1998	1965, 1975, 1985	3 years	55
6	Subject trends in library and information science research, 1975-1984	1988	1975-1984	10 years	110
7	Recent trends in research: A methodological essay	1999	1925–1972; 1973 -1981	47 years; 8 years	190
8	Fifty Years of LIS Research in India: Trends and Development	2000	1950-2000	50 years	8
9	Trends in library and information science research in Africa, 1991 0 2000	2001	1991 - 2000	10 years	30
10	Research Trends in library and	2002	1994-2000	7 years	36

	information science at the International Islamic University, Malaysia				
11	International Library and Information Science Research: A Comparison of National Trends	2003	1952–1964; 1965-1989 & 1985- 1994	12 years; 24 years & 14 years	66
12	A content analysis of librarianship research	2004	2001	1 year	222
13	Study on the research trends of library and information science in Korea by analysing journal articles and the cited literatures	2005	1946- 1951; 1956-1961; 1966-1971; 1976-1981; 1986-1991& 1996 -2001	5 years; 5 years; 5 years; 5 years & 5 years;	47
14	Scholarly productivity of U.S. LIS faculty	2006	1999 - 2004	6 years	129
15	LIS research in Africa: how much is it worth? A citation analysis of the literature, 1986-2006	2007	1986-2006	21 years	32
16	A scientometric analysis of international LIS journals: Productivity and characteristics	2008	2000 -2004	5 years	172
17	Library and Information Science Research in Botswana: An Analysis of Trends and Patterns	2008	1980-2006	27 years	40
18	LIS Research in Pakistan: An Analysis of Pakistan Library and Information Science Journal 1998-2007	2009	1998-2007	19 years	49
19	Trends in library and information science research in research in Korea: Focused on master's theses and doctoral dissertations from 2001 to 2010	2010	2001 - 2010	9 years	26
20	Library and information science research trends in India	2011	1990-2010	21 years	52
21	Research trends in library and information science in India with a focus on Punjab university, Chandīgarh	2011	1957-2009	52 years	39
22	Research visibility, publication patterns and output of academic librarians in sub- Saharan Africa: The case of Eastern Africa	2012	2000-2009	10 years	48
23	A study on the research trends in LIS in Korea using topic modelling	2013	1970-2012	43 years	139
24	Research trends in LIS based on Spanish scientific publication 2000-2010	2013	2000-2010	11 years	31
25	Evolution of Library and Information Science, 1965–2005: Content Analysis of Journal Articles	2014	1965-2005	40 years	163
26	Doctorial research in library and information science in India: Trends and issues	2014	1950-2012	62 years	46
27	Subject dispersion of LIS research in Pakistan	2014	1947-2008	62 years	18
28	Current trends in library and information science research in India	2015	2008-2013	6 years	4
29	Research trends of library management in LIS in India since 1950-2012	2015	1950-2012	63 years	12

30	Reflection on Library and Information Science Research	2016	2005 - 2013	8 years	3
31	An empirical analysis of the research trends in the field of library and information science in India	2017	2004-2015	12 years	12
32	Major trends in LIS research: A bibliometric analysis	2018	1980 - 2017	37 years	31
33	Forty-Five Years of LIS Research Evaluation: An Informetric study of the Author-Supplied keywords	2018	1971-2015	45 years	25
34	Library and information (LIS) research topics in Indonesia from 2006 to 2017	2018	2006-2017	12 years	4
35	Research Trends in Library and Information Science in Bangladesh: An Analytical Study	2018	1980-2016	37 years	2
36	National and international trends in library and information science research: a comparative review of the literature	2019	1952-1964; 1965-1974; 1975-1984 & 1985-1994	12 years; 9 years; 9 years & 9 years	8
37	Research Productivity and Research Trends in the LIS Subject: A study with reference to SCOPUS	2019	1944-2017	73 years	4
38	Visual topical analysis of library and information science	2019	1989-2018	30 years	11
39	The evolution of LIS research topics and methods from 2006-2018: A content analysis	2020	2006-2018	13 years	5
40	Academic Libraries as The Flagships of Publishing Trends in Library and Information Science	2020	2013-2017	5 years	4
41	Content analysis in library and information research: an analysis of trends	2020	1990-2015	26 years	4
42	Evaluation of research topics in LIS between 1996 and 2019: an analysis based on latent Dirichlet allocation topic model	2020	1996-2019	23 years	4
43	Twenty-six years of LIS research focus and hot spots, 1990–2016: A co-word analysis	2020	1990 - 2016	26 years	16

Furthermore, the researchers conducted a regression test to establish the relationship between citations, accessibility, publication span (coverage), and years since publication. The results from the three models revealed that the duration of a publication is statistically significant (0.872, 0.908 and 0.908, respectively) relative to citations at a 0.01 level of probability. A positive relationship emerged between years' coverage and open access with a number of citations. However, the study findings found the duration coverage of a publication and open access not to be statistically significant to the number of citations. Generally, the results show these three variables have a positive correlation with citation, as tables 5 and 6 further demonstrate:

Table 5: Descriptive statistics summary

Variable	Obs	Mean	Std. Dev.	Min	Max
Citation	43	44.061	61.884	2	294
Coverage	43	26.563	20.069	3	73

Years	43	9.061	8.444	1	43
Access	43	0.576	0.502	0	1

Table 6: Linear regression results of variables

Dependent variable: log (number of citations)			
Variables	(1) Model 1	(2) Model 2	(3) Model 3
Log (years since publication)	0.872***	0.908***	0.908***
	(0.133)	(0.140)	(0.143)
Log (coverage years)		0.181	0.181
		(0.182)	(0.196)
Open access			0.00418
			(0.334)
Constant	1.540***	0.924	0.919
	(0.269)	(0.631)	(0.755)
Observations	43	43	43
R-squared	0.580	0.593	0.593

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Degree *of Author Collaboration*

The study also gathered information on the degree of authors' collaboration in the studies under review. In this regard, the study identified the number of single-authored articles versus multiple- (co-) authored papers. The researchers used Subramanyam's formula to determine the degree of collaboration among the authors. Table 7 and Figure 2 present the results:

$$C = \frac{25}{25 + 18}$$

Therefore, C = 0.581

Table 7: Degree of author collaboration

Sn	Year	Ns	Nm	(Nm + Ns)	Degree of Collaboration
1	1995	1	1	2	0.5
2	1996	1	0	1	0
3	1997	1	0	1	0
4	1998	1	1	2	0.5
5	1999	1	0	1	0
6	2000	0	1	1	1
7	2001	1	0	1	0
8	2002	1	0	1	0
9	2003	0	1	1	1
10	2004	0	1	1	1
11	2005	1	0	1	0
12	2006	0	1	1	1
13	2007	1	0	1	0
14	2008	1	1	2	0.5
15	2009	0	1	1	1
16	2010	1	0	1	0
17	2011	2	0	2	0
18	2012	0	1	1	1
19	2013	1	1	2	0.5
20	2014	0	3	3	1

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21	2015	1	1	2	0.5
22	2016	1	0	1	0
23	2017	0	1	1	1
24	2018	1	4	5	0.8
25	2019	0	3	3	1
26	2020	1	3	4	0.75
	Total	**18**	**25**	**43**	**0.581**

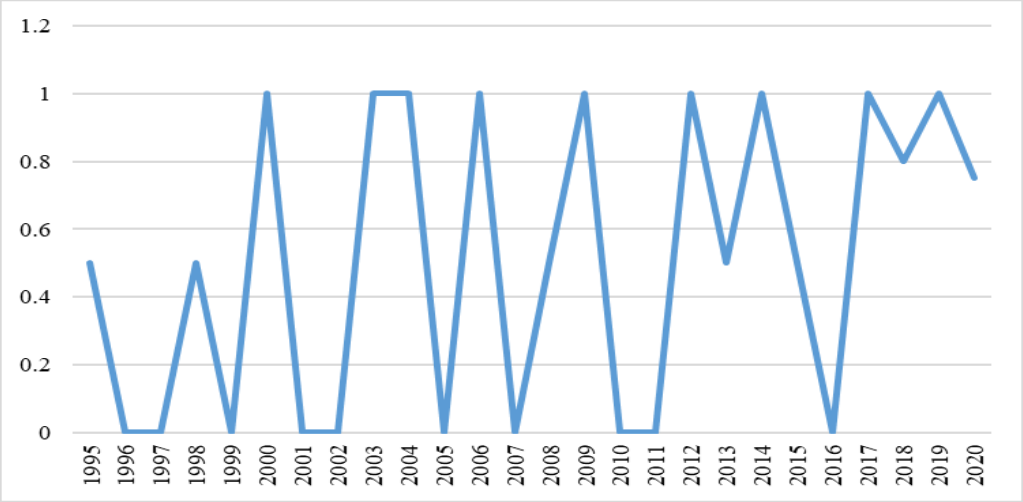

Figure 2: Authors' collaboration, 1995-2020

Discussion of Findings

The studies analysed reveal diverse topical issues pertaining to global LIS research trends. From 1995 – 2005, most of the LIS trends research undertaken focused on information infrastructure and management of information in libraries. Subcategories under this broad theme include information services, status of libraries, information seeking, library planning, information technology, information access, storage and retrieval. Moreover, from 2006 – 2015 the concentration of LIS trends research shifted from management of information and information infrastructure in libraries to LIS research productivity (LIS publication and citation count). Other topical areas that were least covered during the same period include LIS education, information services and information seeking. Subsequently, from 2016 – 2020, most of the studies on LIS research trends consulted focused on information science and digital tools for libraries. Other least covered topics during the same period include information search and scientific communication. Ndenje-Sichalwe and Elia (2022) attribute the differences observable in the LIS research trend to evolving changes in technology and the global LIS education landscape that influences LIS research, hence extending coverage of LIS research topic trends.

The study findings on gender patterns of authors researching on LIS, as portrayed in Table 2, show male dominance in LIS trends research. This dominance could be attributable to male preference for the research on trends. Impliedly, even though the LIS profession usually accounts for more female professionals who engage in research (Vinay & Sampath, 2021), fewer engage in research related to LIS trends at the global level. The other reason could be linked to most of studies analysed reflect the two previous decades during which women's involvement in research was the least.

When evaluating an institution's influence by looking at the association of its researchers with other academic institutions, the study discovered that writers from Asia and Africa were most common with highest occurrences based on the institutions they were

affiliated to. Investment in research infrastructure and university attributes are related to the productivity of research at each institution. As to the 2020 - 2021 Centre for World University Rankings (CWUR), report, Ahmedabad's Indian Institute of Management was placed first nationally and 415th globally. The current findings indicate that while an established infrastructure may be essential for LIS research, author attributes in particular, enthusiasm and expertise may matter more when it comes to studying LIS trends. Thus, the productivity of research may benefit from the presence of qualified researchers (social capital) so that LIS schools could offer distinctive contribution towards LIS research trends productivity (Son, 2016).

Also, citation/publication count has widely been used by scholars globally to evaluate research visibility, trends and impact (Ahmad *et al*., 2020). Additionally, Aksness, Langfeldt and Wouters (2019) explained that the most significant output produced from research work is established through direct citations that a specific piece of work has attained. The statistical analysis results of the current study showed a positive correlation between citation and access, year of publication and duration covered by the material. Even though there may be a number of factors influencing readership and citation patterns in scholarly materials, such as quality, reputation of a journal, prolificacy, and subject field (Olmeda-Gomez & Moya-Anegon, 2016), these findings also suggested that quality and prolificacy are important factors. Only the years following publication, however, have shown a statistically significant link with the quantity of citations. The quantity of citations has only statistically significantly correlated with the years since publication, nevertheless. Since p-values are larger than 0.1, coverage years and open access has no statistically significant impact on the amount of citations. The gender dimension also had no bearing on the citation of articles. Moreover, the results suggest that while the year of publication and the length of time the published work is covered may tend to influence citation counts, they do not always amount to a decisive factor that corresponds to the citation count gained by an article. Despite some variations that are evident in the findings. The fact that other factors, like the calibre of a journal and an index to reliable databases, which scholars worldwide, arguably, use did not appear to be significant determinants of scholars applying it to expand their LIS knowledge was insightful even though these findings are not new in LIS knowledge and studies.

The present findings, therefore, show that, although citations of articles may be intrinsic and individualistic, LIS scholars' choice of LIS literature may not necessarily be influenced by publication duration, quality, co-authorships, type of publication outlet or even the methodology used but more by its accessibility and perceived research relevance and prevailing knowledge gaps. Implicitly, there are challenges researchers globally and, particularly, in developing countries experience in accessing literature such as closed versus open access, which influence the researcher's citation pattern. Although the present findings indicate a number of LIS articles cited, the citation counts are low. In other words, despite a number of cited articles being freely accessible, they were still the least cited. Three reasons could explain this trend. To begin with, LIS scholars could have little interest in such research themes while keeping an eye on the high impact themes such as social media and technology-related fields that have a greater impact on international research collaboration and citation (Velez-Estevez, *et al*., 2022). Second, LIS scholars tend to cite each other and have the least citation practices and publication trends relative to other scholars, especially those in natural sciences (Winkler & Kiszl, 2020). For instance, Elia and Sife (2018) found top ten highly cited scholars to come from developed countries and mainly on technology research. Supporting this, Olmeda-Gomez and de Moya-Anegon (2015) found Spain, Poland, Portugal, Italy, Greece and Austria to be European countries prolific in LIS research output. Similarly, the present findings also found the most highly cited articles to have been written by LIS scholars from developed countries in Europe.

The study further explored the degree of collaboration/co-authorship among LIS scholars researching on LIS trends. Applying Subramanyam's (1983) formula to calculate degree of authorship pattern yielded results of 0.581, which signals a fairly strong collaboration and co-authorship amongst LIS across 25 years. The study findings, therefore, imply that scholars researching on the LIS research pattern preferred multiple authorship. The preference on co-authorship may also explain the need for multiple skills among scholars for conducting such research. Finding and synthesising relevant factors of potential LIS trends may need complicated and multifaceted abilities, making research on trends that generate complex data time-consuming. The study results show that the collaboration was more local than international, despite the fact that the results demonstrated great coordination. Researchers from other institutions or countries were engaged in just three out of 25 publications having co-authorship, which is comparable to 12 percent. As a result of their study, researchers who have researched on LIS research less likely to work with overseas scholars to do comparative research. Similarly, Velez-Estevez *et al*. (2022) found domestic collaborations to be widely conducted research in bibliometrics. Overall, the domestic nature of collaborative research on library patterns may explain the challenges LIS scholars face in accessing data from international databases and account for low citation.

Conclusion

The results of the current study identify worldwide dynamic trends and problems in the field of library and information science research. Understanding of LIS academic demands has grown, as evidenced by a movement in research orientations from 1995-2005 research perspectives (information infrastructure and management of information in libraries) to research productivity between 2006 and 2015, and finally to information science and digital technologies for libraries. The study refreshes LIS academics' abilities to reflect shifting demands throughout the world and advocates for greater research capacity-building programmes among them. In addition, a second study should evaluate individual LIS journals and compare factors like ranking, indexing, cooperation, sample size, and methodology that academics use to identify trends in LIS research in particular areas.

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