Who really contributes to information science research? An analysis of disciplinarity and nationality of contributors to ten top journals

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ABSTRACT

Understanding the shifts in contributions to the discipline of Information Science, and its subdisciplines/specialties of Library Science and Information Science, is important for researchers, educators, and advocates in this field. This study analyzes the disciplinary and national affiliations of authors in ten top Information Science journals from 2015-2019. Findings indicate that significant discrepancies exist among the authorship of journals examined, with journals like Journal of Documentation having a large majority of authors from Library and Information Science schools, while journals like Information Processing and Management have only a small number of computers from Library and Information Science relative to disciplines such as computer science. Nationality findings indicate that Europe, North America, and Asia have significant representation in these Information Science publications, though developing countries are severely underrepresented compared to developed countries. These findings highlight significant discrepancies in contributions to Information Science research and the need for more Library and Information Science contributors, particularly from developing countries. International and interdisciplinary collaboration may be particularly helpful in achieving this goal.

Keywords: Information science; Library science; Authorship; Journal studies; Interdisciplinary research.

INTRODUCTION

Contributions to Information Science research emerge from a variety of disciplinary and national origins. These origins have shifted over the past several decades, with the emergence of robust information systems and the Internet and a de-emphasis on traditional library management topics. The discipline of Library and Information Science (LIS) has grown more divided into the subdisciplines of Library Science and Information Science. Further, while top research in the past was dominated by the United States and European countries, contributions from other regions, such as the Asian continent, have grown. These developments may be a very promising sign for the maturation of these areas of research.

No study has yet clearly demonstrated the disciplinary and national contributions to top Information Science specific journals. This study is designed to begin to address this gap. Ten journals have been selected that represent top journals in Information Science (as opposed to general LIS). The authorship characteristics of these journals from 2015-2019 are examined, with significant discrepancies observed among journals in terms of disciplinary and national contributions.

LITERATURE REVIEW

Disciplines of Contributors to LIS

Noted in Galbraith et al. (2014) is the authorship breakdown of top Library Science journals. They found that 43 percent of articles in these journals were authored by professional librarians, 19 percent by LIS professors, and 38 percent by students, academics in other disciplines, or nonacademics (such as industry professionals). Odell and Gabbard (2008) identified references to LIS journals from journals associated with other disciplines, providing one way to view the relationship between these disciplines. Information systems, management, computer science theory and methods, artificial intelligence, and operations research were among those disciplines found to most frequently cite LIS journal articles. Schlogl and Stock (2008) found significant differences in the contributions by LIS academics and practitioners and journals focused on each population. Academic journals (which tend to have a more Information Science than library focus) were more heterogenous in terms of contributions.

A number of studies – including a group that may be referred to collectively as the Budd studies (Budd and Seavey 1996; Budd 2000; Adkins and Budd 2006; Budd 2015) – evaluate research productivity by LIS professors, thereby providing some insight into contributions to LIS research by LIS researchers (Meho and Spurgin 2005; Walters and Wilder 2015). Meho and Spurgin's (2005) article, in particular, dissects research areas with the LIS disciplines, lending insight into shifts among thought leaders that may result in greater contributions to LIS from research in other disciplines, such as the growth of human-computer interaction and social informatics research.

Prebor (2010) analyzed contributions to LIS research from LIS and non-LIS dissertations in a study of the years 2002-2006. Among LIS departments, user studies (20%), information industry management (14%), data organization and retrieval (13%), and information and the learning society (13%) were the most common topics; among non-LIS departments, information technology (23%), information industry management (20%), and social information science (13%) were most prominent. This study possibly indicates that the aspects of LIS that appeal most to LIS researchers differ from those most interesting to non-LIS researchers.

Aharony (2012) examined the nature of LIS research based on the content of ten top publications: *Journal of the Association for Information Science and Technology, Scientometrics, Information Processing and Management, Journal of Computer-Mediated Communication, Journal of Information Science, Journal of Documentation, Information Research, College and Research Libraries, Library and Information Science Research, and Journal of Global Information Management*. Attributes of articles published in 2007-2008 were analyzed, including findings about authors' geographic distribution and disciplinary affiliation. Among these articles, 37.6 percent of authors were located in North America, 36.9 percent in Europe, 20.7 percent in Asia, 2.3 percent in Australia, 1.8 percent in South

America, 0.4 percent in South Africa, and 0.2 percent in Africa (other). The top disciplinary affiliations included LIS (27.1%), general information science (9.3%), computer science (8.8%), communication (7.4%), and technology (5.0%). This study provides a compelling overview of LIS based on these journals' aggregate statistics; however, it does not provide journal-specific findings.

Chang (2018) analyzed articles published in journals in the "Information Science and Library Science" category of Web of Science, to identify the percentage of these articles whose contributors were affiliated with a discipline outside of LIS. The years 2005-2014 were captured in the data. Chang noted a drop in LIS articles authored by LIS authors only. This drop was most pronounced for Information Science journals, where more than 10 percent drop was experienced from 2010 to 2014, as opposed to Library Science, where the rate remained relatively steady throughout the years examined. Among the disciplines that contributed highly to Library Science and Information Science research, medicine contributed highly to Library Science (31.4% of non-LIS authors), though not nearly as much to Information Science (3.0%); business contributed fairly highly to both Library Science (13.3%) and Information Science (20.6%); computer science contributed more to Information Science (47.4%) than Library Science (12.0%). As with the Aharony (2012) study, Chang's study provides compelling aggregate findings, while not focusing on specifics by journal.

Chang's (2019) article, conversely, looked more closely at individual journals, but only over the one year period of 2015. In this study, Chang notes contributions by LIS or non-LIS authors for each article published by the journals in the 2018 data set. Using these findings, Chang developed a threshold measure for whether LIS journals should really be considered as "LIS" or fit better with another discipline. A total of 30 journals are identified in which LIS plays only a minor role as contributor (many of these journals are associated with information systems).

Urbano and Ardanuy (2020) analyzed disciplinary contributions to LIS publications from 2010-2017 from the countries of the United Kingdom, France, Germany and Spain. Among the authors, 34.1 percent of journal articles were authored by LIS researchers, 18.4 percent by math and computer science researchers, 11.7 percent by business researchers, 3.5 percent by information systems researchers, and 6.7 percent by experimental sciences and engineering researchers. About 17.1 percent of all papers studies were produced by cross-disciplinary research teams. While this study provides compelling new insight into disciplinary contributions to LIS, it is limited in that it focuses on authors from only four countries, inviting further research in this area.

Nationality of Contributors to LIS

Studies of the nationality of major contributors to Information Science research have existed from many decades. Salton (1973) provided an early overview of the discipline and nationality of authors. Salton notes that, in the *Annual Review of Information Science*, 31 of the top 35 authors were American while four were British; however, according to the *Informationsbanken System*, only 19 of the top 35 were American, 12 were German, two were British, one French and one Indian. This early study demonstrates one of the important challenges with these types of studies: it is highly dependent on the indexes/journals selected for analysis.

In 2008, Park looked at contributions to LIS journals from 1967 to 2005 from authors in the Asia Pacific Region. Among these journal articles, Australian authors were found to

contribute the most (25.4%), followed by China (23%), South Korea (10.9%), Taiwan (10.3%), and Singapore and Japan (9.6% each). These findings vary a bit by whether Library Science or Information Science journals are examined. New Zealand, for instance, is the second biggest contributor to Library Science journals, while the seventh greatest contributor to Information Science journals. Conversely, Singapore is the tenth biggest contributor to Library Science journals but the fourth greatest contributor to Information Science journals.

Davarpanah and Aslekia (2008) analyzed Social Science Citation Indexed LIS journals from 2000-2004 for the nationality of contributors. Approximately 68 percent of contributions were from authors from the United States (58%) or United Kingdom (10%). The highest ranking developing country on the list is South Africa, whose authors contributed 1.1 percent of articles among the journals. Notably, among the world's two largest countries, Indian authors contributed only 0.8 percent of articles, and China does not even appear on the list.

Sethi and Panda (2012) analyzed the nationality of authors of two journals – *International Information and Library Review* (IILR) and *Library and Information Science Research* (LISR) – from 2000-2010. The authors note significant differences in the authorship of these two journals: with IILR, India represented the most authors (36.8%), followed by the United States (18.8%) and China (4%); with LISR, the United States represented the most authors (59.6%), followed by Canada (7.4%) and Finland (5.2%). This study demonstrated the extreme amount of discrepancy in authorship from journal-to-journal.

RESEARCH QUESTIONS

Based on the gaps identified in the literature review, the following research questions were developed:
   a) What disciplines contributed the most to Information Science journals from 2015-2019?
   b) What Information Science journals classify as "Library and Information Science Journals"?
   c) What countries contributed the most to Information Science journals from 2015-2019?

METHODS

This study analyzed the authorship of all articles published during the years 2015-2019 in top Information Science journals. Ten journals were selected based on their prominence in Information Science research, as indicated by inclusion in the Social Science Citation Index, Scimago Journal Rank, or peer-reviewed evaluations of top journals. These journals are as follows:
   a) *Aslib Journal of Information Management* (ASLIB)
   b) *Information Society* (INFO SOCIETY)
   c) *Information Processing and Management* (IP&M)
   d) *Information Research* (IR)
   e) *Journal of the Association for Information Science and Technology* (JASIST)
   f) *Journal of Data and Information Science* (JDIS)
   g) *Journal of Documentation* (JDOC)

    h)   *Journal of Information Science* (JIS)
    i)   *Library and Information Science Research* (LISR)
    j)   *Scientometrics* (SCIENTO)

Table 1 displays the impact indicators and faculty rankings (Manzari 2013) for each of these journals.

Table 1. Impact Indicators and Rank for the Ten Journals Selected

Journal Title	Year Established	Journal Impact Factor	Scimago JR Score	Cite Score	LIS Faculty Ranking (Manzari 2013)
Aslib	1948	1.7	0.75	3.2	1.67/5 (24th)
Info. Society	1981	1.89	1.1	4.8	1.5/5 (30th)
IP&M	1963	3.9	1.19	8.6	2.76/5 (7th)
IR	1995	0.8	0.45	1.7	2.29/5 (13th)
JASIST	1950	2.7	1.27	7.9	4.04/5 (1st)
JDIS*	2017	--	0.57	1.7	--
JDOC	1945	1.6	0.89	2.5	3.12/5 (4th)
JIS	1979	2.3	0.67	5.0	1.92/5 (16th)
LISR	1978	1.4	0.99	3.0	2.93/5 (6th)
Sciento	1978	2.8	1.21	5.6	1.13/5 (50th)

*Quickly growing new LIS journal
Impact Factor, ScimagoJR score, and Cite Score based on 2018 statistics

The disciplines of authors (indicated by their departmental affiliation or published body of work documented in their CVs/Google Scholar profiles) as well as their nationality (as indicated by university affiliation) were recorded for analysis. Findings were compiled both as an aggregate of all ten journals and individually among each one, so that the disciplinarity and nationality of authors can be compared among these publications.

RESULTS

Disciplines of Authors
Displayed in Table 2 are the top disciplines for authors of articles in the ten Information Science journals. Only about 1/3 of these authors are affiliated with departments of Library and Information Science. This is followed by several closely-related disciplines – computer science, information systems, information management, information technology, and informatics – which together comprise another one-third (35.7%) of authors. Communication is the next true social science discipline to appear on the list, representing only 2.7 percent of authors. This suggests a significant "hard science" contingent among LIS publication authors, which may (if not likely does) outnumber the social science contingent. Seventeen disciplines represented at least 1 percent of authors in the IS journals studies; together they represent 91 percent of authors among the journals.

Table 2. Disciplines of Authors Representing at Least 1% of All Articles

Discipline	Frequency	Percentage
Library and Information Science	1636	34.6%
Computer Science	764	16.1%
Information Systems	392	8.3%
Information Management	229	4.8%
Information Technology	169	3.6%
Informatics	137	2.9%
Communication	129	2.7%
Economics	128	2.7%
Engineering	122	2.6%
Management	104	2.2%
Business	91	1.9%
Data Science	87	1.8%
Sociology	82	1.7%
Health Science	73	1.5%
Education	72	1.5%
Mathematics	53	1.1%
Science and Technology Studies	47	1.0%

Table 3 provides a breakdown by journal of all disciplines that represent at least 1 percent of the journal's authors. There are several clear distinctions to be made among the journals here. There are a few journals with a high proportion of authors from LIS: IR, JDOC, LISR. There are also several with very low proportions: INFO SOCIETY, IP&M, JIS, and SCIENTO. Two of these journals – IP&M and JIS – have significantly more authors affiliated with computer science than LIS. INFO SOCIETY has a large percentage of authors affiliated with communication studies. SCIENTO, meanwhile, is divided amongst authors from a wide array of disciplines. The final three journals – ASLIB, JASIST, and JDIS – have a moderately large percentage of authors from LIS (about 1/3) and then a sizeable percentage from at least one other discipline: for ASLIB, information management (12.5%) and information systems (11.4%); for JASIST, computer science (18.8%); for JDIS, information management (13.1%).

As far as the disciplines of authors that were unique to one journal, a total of seven instances exist. INFO SOCIETY has four: media studies, law, marketing, and geography. SCIENTO has three: biology, physics, and innovation studies. These combined for 10.8 percent and 4.9 percent of these journals' authors, respectively. JASIST had the largest percentage of authors in the "other" category (from disciplines representing less than 1% of the journal's total authors), while JIS had the smallest percentage. Overall, there were 31 disciplines that represented 1 percent or more of authors for at least one journal.

Figure 1 shows just the five disciplines that represent the largest overall share of authors across the ten Information Science journals: LIS, information management, information systems, computer science, and informatics. For six of the ten journals, the five disciplines represent over 70 percent of authors. INFO SOCIETY had the lowest cumulative percentage among the five disciplines at only 27 percent.

Table 3. Disciplines that Represent at Least One Percent of Authors for Each Journal

Discipline	Aslib	Info Soc	IP&M	IR	JASIST	JDIS	JDOC	JIS	LISR	Sciento
Library & Information Sci.	36.9%	20.2%	7.8%	52.9%	29.0%	43.2%	69.0%	17.2%	68.8%	17.6%
Information Management	12.5%	--	3.5%	6.0%	2.5%	13.1%	4.0%	3.0%	4.4%	3.5%
Information Systems	11.4%	2.3%	16.0%	5.5%	6.0%	5.0%	3.1%	14.9%	2.6%	7.4%
Computer Science	7.5%	4.7%	40.0%	4.8%	18.8%	--	3.0%	39.9%	2.3%	10.3%
Management	4.8%	5.6%	1.9%	--	2.7%	--	--	1.3%	1.2%	5.6%
Engineering	3.1%	--	5.1%	--	2.9%	2.7%	--	2.3%	--	5.2%
Business	3.1%	2.3%	2.3%	1.0%	1.7%	1.4%	2.5%	2.0%	--	1.7%
Data Science	3.1%	--	1.0%	1.0%	3.0%	3.6%	1.5%	1.7%	--	2.0%
Informatics	2.4%	--	4.7%	5.0%	1.7%	1.4%	1.5%	5.9%	1.5%	1.6%
Economics	2.4%	3.3%	--	1.4%	3.2%	1.4%	--	1.7%	2.3%	7.9%
Sociology	1.8%	8.9%	--	1.2%	2.0%	1.8%	1.7%	--	--	2.9%
Science and Technology Studies	1.8%	1.4%	--	--	--	2.7%	--	--	--	3.80%
Communication	1.5%	21.6%	--	3.1%	4.9%	1.4%	3.3%	--	--	--
Health Science	1.3%	--	--	1.0%	2.5%	2.7%	1.0%	--	1.7%	4.3%
Information Technology	1.1%	2.8%	6.8%	5.5%	4.0%	1.4%	2.0%	5.9%	--	5.9%
Literature	--	1.4%	--	--	--	--	1.2%	--	--	--
Education	--	2.8%	1.2%	3.1%	--	1.4%	--	--	5.0%	1.7%
Psychology	--	--	1.0%	1.2%	--	--	--	--	1.7%	1.2%
Mathematics	--	--	2.9%	--	1.2%	--	--	--	--	3.0%
Biology	--	--	--	--	--	--	--	--	--	2.7%
Environmental Science	--	--	--	--	--	2.3%	--	--	--	1.4%
Physics	--	--	--	--	--	--	--	--	--	1.2%
Innovation Studies	--	--	--	--	--	--	--	--	--	1.0%
Media Studies	--	6.1%	--	--	--	--	--	--	--	--
Law	--	1.9%	--	--	--	--	--	--	--	--
Political Science	--	1.4%	--	--	--	1.4%	--	--	--	--
Marketing	--	1.4%	--	--	--	--	--	--	--	--
Geography	--	1.4%	--	--	--	--	--	--	--	--
Linguistics	--	--	1.9%	--	1.2%	--	--	--	--	--
Public Policy	--	--	--	--	1.0%	1.8%	--	--	--	--
Other	5.3%	10.5%	3.9%	7.3%	11.7%	11.3%	6.2%	4.2%	8.5%	8.1%

Figure 1: Percentage of Authors from Each of the Five Top Disciplines
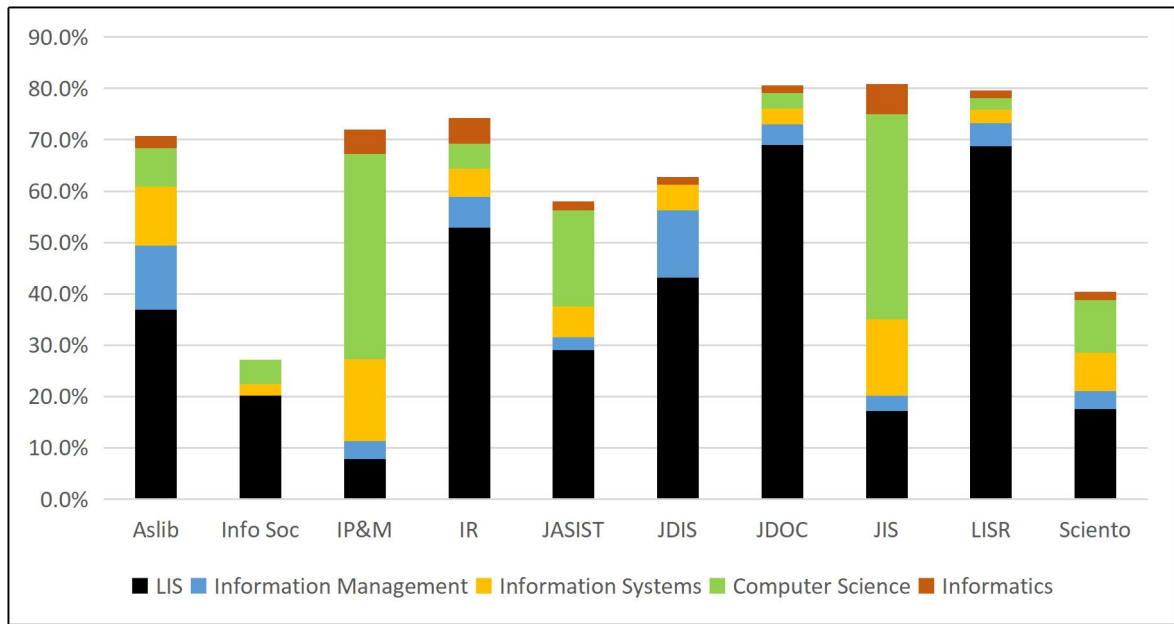
Nationality of Authors

Table 4 presents the nationality of the authors published in the ten Information Science journals over 2015-2019. The United States and China are the top contributors by a large margin but are also two of the largest countries in the world by population. Relative to population size, Finland, with a population of around five million, may be the most impressive in terms of percentage of authors. A total of 89 countries had at least one author published in one of the ten Information Science journals. Among continents, Asia represents the largest share with 37.5 percent, followed by Europe with 33.3 percent, North America with 22.2 percent, Australia with 3.7 percent, South America with 2.4 percent, and Africa with 0.9 percent.

Table 5 shows the nations whose authors represent at least 1 percent of total authors, by journal. There are a total of 46 nations that appear at least once on this list. Twelve nations appear in only a single journal: Austria (IP&M), Lithuania (IR), Switzerland (JASIST), Nigeria (LISR), Russia (SCIENTO), Cuba (JDIS), Mexico (SCIENTO), Jordan (LIS), Argentina (LISR), Serbia (ASLIB), Poland (SCIENTO), and Romania (SCIENTO).

Figure 2 displays the percentage of authorship for each of the ten Information Science journals represented by the top five overall countries: United States, China, United Kingdom, Spain, and Australia. For most journals, this ranges from 40-50 percent. Nearly 80 percent of authors in JDIS, however, are affiliated with one of these five countries. Six of the ten journals are published and have an editor-in-chief from one of these five countries – if Germany was added to the list, this would be eight of ten. Surprisingly, the top two countries – the United States and China, representing 34 percent of all authors – are represented among editors-in-chief in only three of the ten journals. The United Kingdom is overrepresented, having the publisher or editor-in-chief of five of the ten journals.

Table 4: Nationality of Authors Representing at Least One Percent of All Articles

Nation	Frequency	Percentage
United States	861	18.1%
China	753	15.8%
United Kingdom	400	8.4%
Spain	246	5.2%
Australia	175	3.7%
Canada	161	3.4%
South Korea	146	3.1%
Italy	123	2.6%
Finland	122	2.6%
Iran	119	2.5%
Netherlands	113	2.4%
Sweden	110	2.3%
Germany	100	2.1%
Israel	90	1.9%
India	89	1.9%
Malaysia	83	1.7%
Taiwan	81	1.7%
Brazil	73	1.5%
Belgium	66	1.4%
Turkey	65	1.4%
Pakistan	54	1.1%
Denmark	48	1.0%

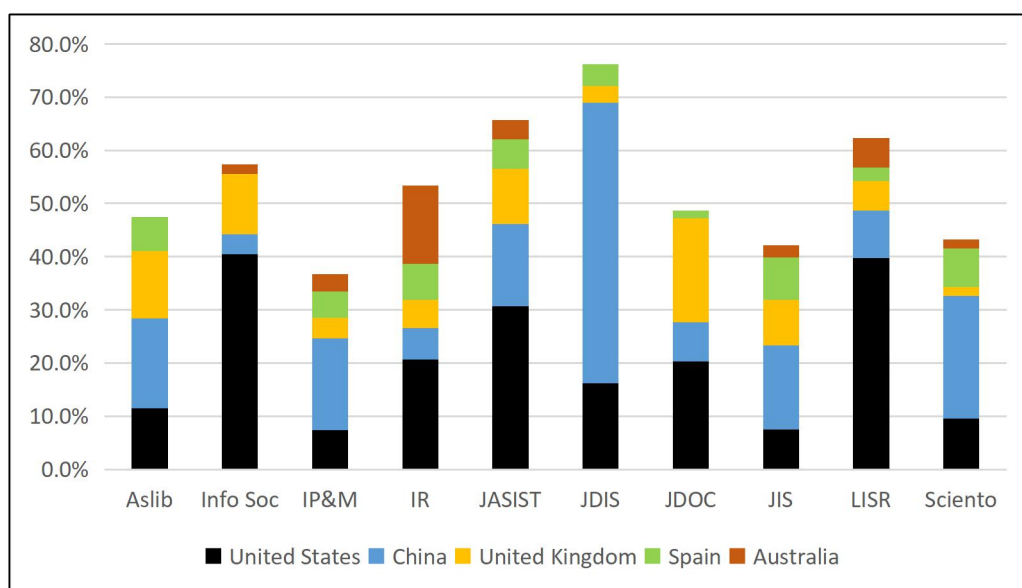Figure 2: Percentage of Authors from Each of the Five Top Nations

Table 5. Nations that Represent at Least One Percent of Authors for Each Journal

Nation	Aslib	InfoSoc	IP&M	IR	JASIST	JDIS	JDOC	JIS	LISR	Sciento
United States	11.4%	40.4%	7.4%	20.6%	30.7%	16.2%	20.3%	7.5%	39.7%	9.5%
China	16.9%	3.8%	17.2%	6.0%	15.4%	52.7%	7.4%	15.8%	9.0%	23.1%
United Kingdom	12.7%	11.3%	3.9%	5.3%	10.4%	3.2%	19.5%	8.6%	5.5%	1.7%
Spain	6.4%	--	4.9%	6.7%	5.5%	4.1%	1.5%	8.0%	2.6%	7.2%
Australia	--	1.9%	3.3%	14.8%	3.7%	--	--	2.3%	5.5%	1.7%
South Korea	--	--	2.1%	2.9%	2.5%	--	--	10.0%	--	3.6%
Iran	4.8%	--	2.3%	--	--	--	--	8.8%	2.0%	2.5%
Netherlands	1.8%	10.3%	6.4%		2.0%	3.6%	2.0%	--	--	1.6%
Brazil	--	--	4.5%	2.2%	--	--	--	--	--	4.0%
Finland	1.5%	3.3%	--	4.3%	1.3%	--	7.1%	2.9%	3.5%	--
Malaysia	5.3%	--	--	3.3%	--	--	--	4.0%	--	1.0%
India	1.5%	--	5.1%	--	--	--	--	3.9%	--	2.9%
Canada	2.4%	4.2%	2.1%	1.7%	6.0%	1.4%	5.8%	1.3%	4.4%	3.5%
Sweden	1.1%	1.4%	--	6.9%	--	1.4%	8.6%	--	1.2%	1.2%
Israel	4.8%	3.3%	--	4.1%	1.8%	--	--	--	2.6%	1.4%
Italy	--	4.7%	7.0%	1.2%	2.0%	--	1.8%	2.6%	1.2%	2.6%
Germany	5.3%	--	1.4%	1.0%	3.0%	--	1.8%	--	--	4.0%
France	--	--	2.9%	--	--	--	--	--	--	2.2%
Austria	--	--	2.5%	--	--	--	--	--	--	--
Saudi Arabia	--	--	--	--	--	--	3.0%	2.0%	--	--
Turkey	2.4%	--	1.8%	--	--	--	--	4.3%	--	1.4%
Denmark	--	1.9%	--	--	1.5%	--	4.0%	--	--	--
Taiwan	2.9%	--	2.5%	2.2%	--	--	--	1.1%	2.3%	3.8%
Lithuania	--	--	--	2.4%	--	--	--	--	--	--
Belgium	1.1%	1.9%	--	1.2%	1.2%	5.9%	1.2%	--	--	2.6%
Singapore	4.0%	--	--	1.0%	--	--	1.3%	--	--	--
Pakistan	1.8%	--	1.2%		--	--	--	2.9%	1.2%	2.2%
New Zealand	--	--	--	1.7%	--	--	--	--	2.0%	--
South Africa	2.2%	--		--	--	--	--	--	1.5%	--
Norway	--	--		--	--	1.4%	2.8%	--	1.2%	--
Switzerland	--	--	--	--	1.8%	--	--	--	--	--
Czech Republic	1.5%	--	1.6%	--	--	--	--	--	2.0%	--
Japan	--	--	1.8%	--	--	--	--	--	--	1.6%
Nigeria	--	--	--	--	--	--	--	--	1.7%	--
Russia	--	--	--	--	--	--	--	--	--	1.6%
Portugal	--	--	2.5%	1.0%	--	--	--	--	--	1.2%
Greece	--	--	1.6%		--	--	1.7%	1.4%	1.5%	--
Croatia	--	--	--	1.4%	--	--	--	--	1.5%	--
Cuba	--	--	--	--	--	1.4%	--	--	--	--
Mexico	--	--	--	--	--	--	--	--	--	1.4%
Jordan	--	--	--	--	--	--	--	1.3%	--	--
Argentina	--	--	--	--	--	--	--	--	1%	--
Slovenia	--	--	1.0%	1.4%	--	--	1.0%		--	1.3%
Serbia	1.1%	--	--	--	--	--	--	--	--	--
Poland	--	--	--	--	--	--	--	--	--	1.0%
Romania	--	--	--	--	--	--	--	--	--	1.0%

DISCUSSION

What Disciplines Contribute Most to Information Science Journals?

Library and Information Science clearly has the most authors that contribute to Information Science journals. However, the percentage of contributors from this discipline (34.6%) may be lower than some would anticipate. Walters and Wilder (2015) indicate that

about 54 percent of all publications in LIS journals (much broader than the just the ten journals selected for this study) were authored by LIS researchers. The rate for these ten journals is considerably lower than that mark.

Notably, disciplines like management, communication, sociology, and psychology represent a small fraction of overall authors in Information Science journals. This is significant given the contribution of these disciplines to the origin of Information Science in subfields like information behavior and management of information organizations. Computer and systems-oriented disciplines appear to have subsumed that role. With the emergence of organizations like the ischools consortium, the distinction between these disciplines may be shrinking or unifying as a single discipline of "information."

What Information Science Journals Classify as "Library and Information Science Journals"?

Three journals – *Information Processing and Management* (in particular), *Journal of Information Science*, and *Scientometrics* – have a very low percentage of authors from LIS schools. Two of these journals (IP&M and JIS) have significantly higher (over double) as many authors affiliated with computer science, as well as a sizeable percentage affiliated with information systems. Given this fact, is it actually appropriate to consider these "Library and Information Science journals"? They may classify as "Information Science journals" while not (or no longer) fitting alongside the LIS research journals in terms of contributors. This is not necessarily a bad thing – certainly by any citation-based metric these journals are all quite successful. Conversely, there are a few journals that are so overwhelmingly authored by LIS researchers that they stand out from the other journals. Compared to the general findings for all of LIS research from 2007-2012 (Walters and Wilder 2015), these journals have considerably more LIS authors (69% and 68.8% versus 54% for general LIS). The remaining journals have a similar proportion to LIS research in general.

Perhaps it would be appropriate to distinguish LIS journals from Information Science journals in databases like the Web of Science (where the subject category for these journals is called "Information Science and Library Science"). Journals like JIS have made a clear decision to avoid including the word "library" or its derivatives in the journal name. These journals are focused purely on the pursuit of Information Science topics – information behavior, information retrieval, informetrics – rather than the operation of libraries and duties of librarians. While Information Science topics are relevant to library operations, there appears to be a distinction to be made. Researchers from other disciplines are more interested in those journals that focus on general Information Science (IP&M, JIS, SCIENTO) and less so on those that explicitly focus on LIS (LISR, JDOC). Journals like *Library Quarterly* and *College and Research Libraries*, though not included in this study, may be expected to have an even lower percentage of contributors from other disciplines, given their firm standing in LIS. These observations are supported by the study of Abrizah, Noorhidawati, and Zainab (2015), whose survey of LIS researchers found that they classified journals like JDOC and LISR as LIS while JIS and SCIENTO were more commonly classifed as Information Science journals. Huang, Shaw, and Lin (2019) also found significantly different citation patterns with journals classified as "Library Science" versus those classified as "Information Science," which made a need to distinguish these journals clear.

Notably, Huang and Chang (2012) include JDOC alongside IP&M, JASIST, JIS, and SCIENTO as "Information Science journals," while LISR is placed alongside *Library Quarterly, College*

*and Research Librarie*s, *Journal of Academic Librarianship*, and *Library Resources and Technical Services* as "Library Science journals." This study, however, finds that JDOC has much more in common, in terms of authorship, with LIS than the other four journals in the Information Science list. This is not to say, though, that authorship among journals should be the only factor in determining which are LIS journals. Content of the articles and co-citation among journals may establish that, though some journals have more contributors from LIS schools than others, all journals publish research that is relevant and utilized by LIS researchers.

What Countries Contribute the Most to Information Science Journals?
Six countries are responsible for 53.4 percent of authors in Information Science journals and 80 percent of publishers and editors-in-chief of these journals: The United States, China, United Kingdom, Spain, Australia, and Germany. Each of these countries has a top-15 economy by GDP, with a combined GDP among them ($45 trillion across six countries) that is greater than all other countries combined ($42 trillion across 189 countries). Finland, Israel, Pakistan, Denmark, and Greece are the only five countries in the top-25 by percentage of authors that do not have a top-25 economy by GDP, with Greece have the smallest economy at 50th worldwide. This indicates a strong skew towards countries with large economies.

The findings of this study indicate a significant skew away from developing countries. Though developing countries comprise over half of all countries worldwide and about 80 percent of the world's population, they represent only 32.8 percent of authors in these ten Information Science journals. While China has made significant strides in terms of contributions compared to studies like Davarpanah and Aslekia (2008) of 2000-2004, other developing countries have not had the same fortune. If China is removed, developing countries still represent over half the world's population but only 17 percent of authors in the Information Science journals. The 47 least developed countries (United Nations 2014), representing about ¼ of nations worldwide and nearly 1/5 of the world's population, represent less than 0.1 percent of the authors of articles in the ten Information Science journals.

While not unique to Information Science, this disparity is a major shortcoming that deprives the majority of the world from equitable participation in the creation and dissemination of cutting-edge knowledge in the discipline. Outreach to researchers in these countries is sorely needed. This discrepancy is not due to differences in numbers of LIS programs worldwide. About 54 percent of LIS programs are located in developing countries, with India itself having more LIS programs than all of North America. This is more likely a discrepancy in access to resources related to conducting and disseminating research findings in these journals.

Information Science journals published in developing countries are lacking. Based on journals in the Information Science and Library Science category within the Social Science Citation Index, only five of 86 (6%) are published in developing countries: *Informacao and Sociedade-Estudos* (Brazil), *Transinformacao* (Brazil), *African Journal of Library, Archives, and Information Science* (Nigeria), *Malaysian Journal of Library and Information Science* (Malaysia), and *Investigacion Bibliotecologica* (Mexico). All but one of the four countries in which these five journals are published has a population greater than 100 million, and all have a top-35 economy by GDP worldwide.

CONCLUSION

This study examined only ten top journals in the field of Information Science. In this sense, it, by no means, provided expansive coverage of the field. While Walters and Wilder (2015) did provide a more extensive examination of Information Science as a whole, they did not examine individual publications as in this study. As such, there is an opportunity to expand the number of journals examined to provide a more extensive examination (à la Walters and Wilder), while providing detailed journal-level findings (à la the present study). While this study would demand a lot of work, it may be managed by a team of researchers and could provide valuable novel insight into the field of Information Science and its major research publications.

The methods employed in this study may be used in further studies to examine the nature of other disciplines. Particularly for LIS researchers, this method of journal-level examination may be valuable for providing insight about the disciplines in which university librarians serve as liaison. Additionally, analyses for disciplines like education and information systems may provide compelling insight about the role of LIS in other disciplines (i.e., the inverse of this study).

While all Information Science journals are quite unique in terms of the disciplinarity and nationalities of their authors, a couple unifying themes emerge from looking at the aggregate data. First, that disciplinary contributions to these journals represent a minority-majority; that is, while LIS clearly contributes most to Information Science journals of any discipline, no discipline contributes over 50 percent. In a few journals – LISR and JDOC – LIS researchers are clearly predominant, but in many others – IP&M, JIS, SCIENTO – they are a minority. Outside of LIS, these Information Science journals are favored by researchers in computer-centric disciplines.

Authorship among these top Information Science journals skews heavily towards countries with large economies. Developing economies are underrepresented in terms of number of countries worldwide and total population. Countries outside of Europe, China, and the United States are underrepresented. There are numerous opportunities for expanding promotion of these journals to a more diverse group of authors, however this lack of diversity also likely demonstrates a more fundamental problem within the discipline of lack of support for developing nations and collaboration and outreach by researchers in more privileged positions.

As Information Science research continues to expand and evolve globally, the findings of this study provide orientation to the current status of top research in the field. It invites further inquiry and efforts to improve equity in considering a variety of diverse disciplinary and national perspectives on the most pressing issues.

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