

Influence of Social Networking Sites on Scholarly Communication: An Altmetrics Analysis of Selected LIS Journals

Bwsrang Basumatary¹, Bhaigyashree Boro², Manoj Kumar Verma³, and Ahmad Nazri Mansor⁴

^{1,2,3}Department of Library and Information Science, Mizoram University, Aizawl, 796004, India

⁴Faculty of Information Management, Universiti Teknologi MARA (UiTM), Puncak Perdana Campus, 40150 Shah Alam, Selangor, Malaysia

Email: bwsrangbasumatary@gmail.com

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Abstract. This study aims to examine the influence of social networking sites on scholarly papers published in Library and Information Science journals. Top 100 articles published in two renowned journals International Journal of Information Management and the Journal of Medical Library Association, that received high Altmetric Attention Score (AAS) have been taken for the study. The analysis found that LIS research is most often mentioned on Twitter, followed by news outlets and blogs. Student groups and librarians are among the most frequent readers of the publications. The Pearson correlation coefficient test revealed a very high and significant positive correlation between Scopus citation and Dimensions.ai citation, Mendeley readership and Scopus citation. However, AAS and Dimensions.ai citation is low correlation and statistically not significant. The findings indicate that journals need social media profiles to disseminate information among academia and society to increase online attention to LIS research. **Keywords:** Altmetrics, LIS research, online attention, dimensions, social media metrics.

1 Introduction

As a discipline, library and information science is undergoing rapid change, primarily driven by new areas of research and publishing. Scholarly publishing is an essential stage of the information lifecycle that generates new ideas, knowledge, and theories. With the advancement of technology in the last two decades, scholarly communication has changed significantly from traditional to electronic. In that point of view, social

networking sites are becoming one of the primary channels of dissemination of information and discussion virtually after it is published. The growth of social networking sites and their influences made significant changes in the scenario of research publications as it enhances the visibility of the research to a large audience and increases the impacts. It is evidenced by the studies of Kim et al. (2019), Bardus et al. (2020), Edakar et al. (2021), and Ozkent (2022). As online platforms, there are many ways in which social networking sites can instantly spread information and record the digital traces of how users access the different types of materials hosted on the sites.

In the contemporary era, assessing scholarly publications is one of the key concerns of information professionals. Evaluating published scholarly communication makes us understand the research trends and social and intellectual structures of a particular subject domain and predict the future research direction. The performances of scholars and scholarly communication can be evaluated through impact factors that enable the performance and value of the contribution to academia. The impact of scholarly activity can be estimated by citation counts, journal impact factors, and other citation-based impact values.

Over the years, library and information science have employed many metric fields as measurement applications. Examples include Librametrics, Bibliometrics, Scientometrics, Informetrics, and Webometrics. Significantly, Bibliometrics and Scientometrics were the primary tools most widely used for measuring author and journal impacts and evolved as computational measurement and scientific mapping. However, these methods are no longer able to meet the measurement requirement published in the new media, especially on social media. Thus, Altmetrics stands out as an alternative method to complement the traditional method for measuring the impact of scholarly articles on the social web. Jason Priem coined Altmetrics in 2010 as a generalization of article-level metrics. Altmetrics visualizes how much attention has been paid to particular scholarly papers on social networking sites. It helps the researcher, publishers, and other stakeholders identify the topic's popularity, trends, and social impacts on research publications.

With the speed of communication today, researchers, authors, and grantees are eager to receive an indicator of its value. They are concerned about immediately assessing the impact of research publications. Fast and accurate evaluation of the impact and importance of research has emerged as a fundamental component of support for decision-making in research evaluation environments. The Altmetric study will bring a new dimension to measures of scientific communication in a very short stretch.

2 Literature Review

Altmetric analysis assesses the scientific publication aiming to track and validate social media metrics complement traditional metrics. Several studies have been conducted to evaluate the altmetrics of scholarly publications using different parameters and data sources. However, a few studies have been found in the library and information science field as Ezema and Ugwu (2019) analyzed the correlation of research impact of library and information science journals using citation counts and altmetrics attention

based on the citation data of WoS, Scopus, and Google Scholar and altmetric attention from 85 LIS journals indexed by WoS and found the citation data from Google Scholar correlated with altmetric attention. The other two databases maintained moderate correlations with altmetric attention. A study by Saberi and Ekhtiyari (2019) revealed that among the highly cited articles of LIS, the highest score regarding the usage captures, mentions on social media, and the most abundant citations belong to open access articles and have a significant positive correlation between Google Scholar Citations and other indicators. Likewise, Cho (2021) found most numbers of papers had a Mendeley bookmark reader, followed by views, tweets, blogs, and Wiki references, respectively, among the thousand highly cited LIS research papers on the Web of Science, and the open access papers had more attention than non-open access papers. However, the finding of Khan et al. (2022) is opposite to theirs, as they found the non-open access journals in LIS have a significant citation advantage over open access journals of 116 (58 OA and 58 non-OA) LIS journals.

Being an interdisciplinary research tool, altmetric analysis has been conducted in diverse areas at the macro and micro levels. A study on the top 10 communication journals found that the articles posted on social media received more citations than those not posted, and Twitter allows for the rapid sharing of information (Ozkent, 2022). Cho (2021) examined the altmetrics of highly cited academic papers in the social sciences and found the papers in the social sciences have greater than one altmetrics presence in greater than 30% of all altmetrics sources and a strong correlation between the numbers of citations and readers. Open access papers have a higher altmetrics presence than closed access. Similarly, Martin et al. (2020) conducted an Altmetric study of 200 articles published in six pediatric dentistry journals and found that the AAS did not correlate to the number of citations reported in WOS and Scopus. Moreover, Chang et al. (2019) studied the Correlation between Altmetric Attention Score and Citations in Pediatric surgery core journals. The finding established that the increasing age of a journal's Twitter account resulted in an increasing correlation between Altmetric Attention score and citations.

In the detailed literature search, it has been observed that many Altmetrics analyses had been conducted in the diverse subject categories using WoS, Scopus, and Google Scholar data. However, some analysis has been seen based on the Dimensions.ai database to correlate the dimension citation and Altmetric Attention Score (Kulkanjanapiban and Silwattananusarn, 2022). Mendeley readership analysis is one of the most researchers' common topics (Thelwall, 2020). However, no concrete studies have been found on the altmetric studies that are dependable for a long period. Hence, there is a need for more and time to time altmetric assessment on LIS journal articles to understand the societal impacts of research and their correlation with other impacts. Thus, the present study will contribute to filling the gap in this area of research.

3 Objectives

1. To analyze the year-wise distribution of the top 100 papers and their AAS
2. To assess the presence of social networking sites on top 100 papers

3. To identify top authors contributing papers with high AAS
4. To assess the geographical and professional variation of the Mendeley readership
5. To examine the correlation between Altmetric Attention Score, Dimensions.ai citations, and Scopus citations of the publications
6. To examine the correlation between Scopus citations and Mendeley readership counts

4 Data and Methodology

The present study intends to evaluate the presence of social networking sites and their influence on the scientific publication of two selected journals in the Library and Information Science (LIS) subject domain. The study selected the two most renowned international journals (one non-open access and one open access) that produce the most number of scholarly papers in the LIS subject category as indexed in the Scopus database (24.06.2022). The journals were selected based on research coverage in the LIS domain and are available in the Dimensions.ai database. The scope of each journal was examined and cross-checked by visiting the webpage of each journal. During examining the scope of open access journals, five journals named as- Scientific Data (CiteScore 12.6), Journal of Cheminformatics (Cite Score- 10.7), Big data and Society (CiteScore 8.1), Data Intelligence (CiteScore 5.3), and Quantitative Science Studies (Cite Score-4.6) was found in listed at top-ranked in Scopus database. However, these journals were excluded from the study because they publish most papers on the interdisciplinary subject instead of core library science papers. The selected journals for the study are given in the below table.

Table 1: List of Selected Journals

Journal title	Frequency	Category	ISSN	Cite Score	Publisher
International Journal of Information Management	Bio-monthly	Closed Access	ISSN:0268-3962 E-ISSN:1466-4437	28.8	Springer Nature, Netherlands
Journal of the Medical Library Association	Quarterly	Open Access	ISSN:1536-5050 E-ISSN:1558-9439	4.2	Medical Library Association, USA

(Source: Scopus database access on 24.06.2022)

Data has been searched in the “Source Title” section using a journal title in the Dimensions.ai database, and the result has been limited to the research category “Library and Information Studies” and sorted by “Altmetric Attention Score.” The study filtered the 50 publications from each journal with the most Altmetric Attention Score (AAS) for

further analysis. AAS and Mendeley reading data has been collected from Altmetric.com. Collected data have been analyzed using MS Excel, Google Spreadsheet, Tableau, SPSS, and Biblioshiny (Bibliometrix R package), and results are presented in the form of table, graph, and figure.

5. Data Analysis

5.1 Year-wise distribution of top 100 articles and AAS

Figure 1 illustrates the year-wise distribution of the top 100 papers and their AAS. It is seen that the most influential papers in the International Journal of Information Management are scattered between 2001 to 2022. It can be seen that the papers that have the highest AAS were published since 2015 (4 papers, 158 AAS). In contrast, the papers with the highest AAS published in the Journal of Medical Library Association are scattered between 2007 and 2022. The articles with highest AAS had been published since 2011 (2 papers, 185 AAS). It can also be seen that most papers in IJIM were published in 2020 and received the highest attention (18 papers, 1004 AAS), followed by the publications of 2018 (8 papers, 262 AAS). Similarly, the most number of publications in JMLA (8 papers) was published in 2018 and received 619 attentions, followed by 2015 (6 papers) received 198 attentions.

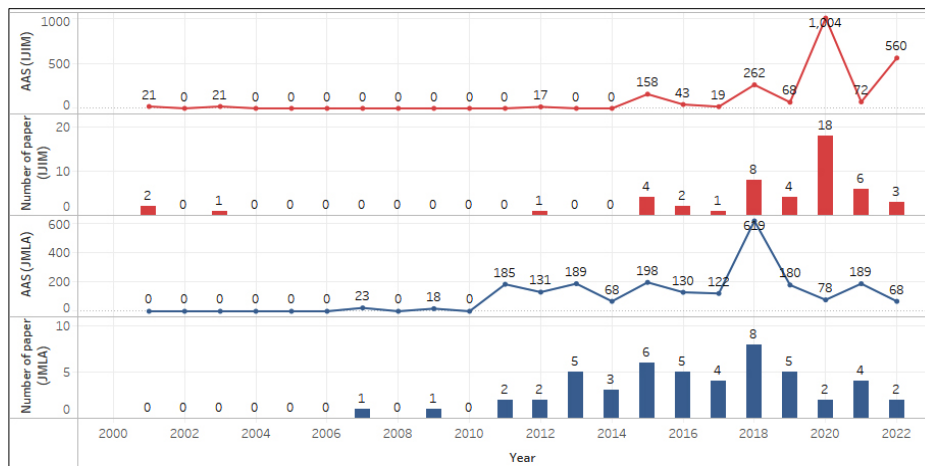


Figure 1: Year-wise distribution of publications and AAS

5.2 Presence of social networking sites on top 100 papers

Table 2 shows the presence of social networking sites on the most influential papers published in selected two journals. It is found that the fifteen different social networking and bookmarking sites play a crucial role in disseminating information regarding the

publications of both journals. The articles of IJIM are mostly mentioned on Twitter (1183), followed by news outlets (133) and blogs (25). The most influential paper entitled “Editorial: How to develop a quality research article and avoid a journal desk rejection” authored by Dwivedi et al. (2022) has the most number of Twitter mentions (654), followed by an article entitled “Beyond the hype: Big data concepts, methods, and analytics” authored by Gandomi and Haider (2015) that has 79 Twitter mentioned. In contrast, the most number of papers published in JMLA have also been mentioned mainly through Twitter (1831), followed by blog posts (70) and news outlets (45). The paper entitled “Blacklists” and “whitelists”: a salutary warning concerning the prevalence of racist language in discussions of predatory publishing authored by Houghton and Houghton (2018) is being mentioned the most number of times (201), followed by “Critical librarianship in health sciences libraries: an introduction” authored by Barr-Walker and Sharifi (2019), mentioned 112 times.

Regarding the readership statistics of both journals’ publications, users actively prefer Mendeley to read papers that can be confirmed with the most number of Mendeley reading statistics with 22439 and 6467, respectively. Apart from that, a few users prefer to read in CiteULike as the papers published in IJIM have 12 readership counts, whereas papers of JMLA have 31 readers. It is found that in these selected journals the open-access does not affect of readership in Mendeley as the closed-access journal IJIM has the most readership counts than an open-access journal JMLA.

Table 2: Presence of social networking sites on top 100 publications

Title of Journal	Number of article	Mentioned by													Readers on		AAS
		Blogs	Wikipedia pages	Tweeters	Facebook pages	Patents	Video uploaders	Google+ users	Reddit	Policy source	Q&A thread	Connotea	Peer review sites	News outlets	CiteULike	Mendeley	
IJIM	50	25	8	1183	12	3	3	3	1	11	0	1	0	133	12	22439	2245
JMLA	50	70	20	1831	37	0	1	4	0	2	2	7	1	45	31	6467	2198

5.3 Top 10 publications ranked by AAS

The top 10 articles of both journals ranked by AAS have been listed in Tables 3 & 4. It is found that the most mentioned articles on Twitter have the most AAS. The study filtered the top 100 data without limiting particular years, even though the papers published in the most recent years in IJIM have received the most AAS. Social networking

sites provide an indication of the quality and popularity of research that is being discussed and read. In contrast, the articles published in 2018 and 2011 in JMLA have received the most AAS (Table 4).

Table 3: Top 10 publications of IJIM ranked by AAS

International Journal of Information Management (IJIM)				
Rank	Title	Year	Authors	AAS
1	Editorial: How to develop a quality research article and avoid a journal desk rejection	2022	Dwivedi et al.	530
2	Wearable device adoption among older adults: A mixed-methods study	2020	Farivar et al.	357
3	Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice	2020	De et al.	225
4	Beyond the hype: Big data concepts, methods, and analytics	2015	Gandomi, Amir; Haider, Murtaza	117
5	A framework for analysing blockchain technology adoption: Integrating institutional, market and technical factors	2020	Janssen et al.	115
6	Online social media fatigue and psychological well-being- A study of compulsive use, fear of missing out, fatigue, anxiety and depression	2018	Dhir et al.	110
7	Normalising the new normal: Changing tech-driven work practices under pandemic time pressure	2020	Carroll, Noel; Conboy, Kieran	60
8	A case analysis of securing organisations against information leakage through online social networking	2018	Molok et al.	50
9	A bidirectional perspective of trust and risk in determining factors that influence mobile app installation	2018	Chin et al.	36
10	Spillover of workplace IT satisfaction onto job satisfaction: The roles of job fit and professional fit	2020	Wang et al.	34

Table 4: Top 10 publications of JMLA ranked by AAS

Journal of Medical Library Association (JMLA)				
Rank	Title	Year	Authors	AAS
1	"Blacklists" and "whitelists": a salutary warning concerning the prevalence of racist language in discussions of predatory publishing	2018	Houghton, Frank; Houghton, Sharon	370
2	Accuracy and completeness of drug information in Wikipedia: an assessment.	2011	Kupferberg, Natalie; Protus, Bridget McCrate	164
3	Breaking the barriers of time and space: the dawning of the great age of librarians.	2012	Plutchak, T Scott	112
4	The value of library and information services in patient care: results of a multisite study.	2013	Marshall et al.	88
5	Critical librarianship in health sciences libraries: an introduction	2019	Barr-Walker, Jill; Sharifi, Claire	82
6	PRISMA 2020 and PRISMA-S: common questions on tracking records and the flow diagram	2021	Rethlefsen, Melissa L.; Page, Matthew J.	76
7	Retraction policies of top scientific journals ranked by impact factor.	2015	Resnik et al.	72
8	A competency framework for librarians involved in systematic reviews	2017	Townsend et al.	67
9	It takes longer than you think: librarian time spent on systematic review tasks	2018	Bullers et al.	62
10	Claire Fraser, RN, MD, OMG: history of medicine in the Outlander novels and series	2020	Greenberg, S.J.	60

5.4 Top 10 authors contributing papers with high AAS

Table 5 illustrates the list of authors who have contributed the most number of papers with high AAS. The article fractionalized number was also calculated using Biblioshiny (Bibliometrix R package) to calculate the uniform contribution of all co-authors of each paper. Janssen M from (Delft University of Technology, Netherlands) tops the list with the most number of contributions, followed by Rowe F (SKEMA Business School, France) in the IJIM. As per articles fractionalized, Aladwani AM tops the list (2.0), followed by Rowe F. In contrast, seven authors have contributed two papers each that received high AAS, and the rest have one paper each. In terms of article fractionalized,

three authors (Cooper ID from JMLA, United States; Greenberg SJ from National Library of Medicine, Rare Books & Early Manuscripts, United States; Houghton F from Limerick Institute of Technology, Ireland) have the most numbers contribution that has equal contribution in their research.

Table 5: Top 10 contributed authors

Rank	Author	IJIM		JMLA		
		NP	Article Fractionalized	Author	NP	Article Fractionalized
1	Janssen M	5	1.38	Barr-Walker J	2	0.75
2	Rowe F	3	1.53	Bekhuis T	2	1.2
3	Aladwani	2	2.0	Charbonneau	2	1.00
4	AM Brookshire	2	0.67	DH Cooper ID	2	1.5
5	R Chin AG	2	0.67	Greenberg SJ	2	1.5
6	Conboy K	2	0.6	Houghton F	2	1.5
7	De R	2	0.36	Swanberg SM	2	0.44
8	Dubey R	2	0.13	Abbott R	1	0.33
9	Dwivedi	2	0.13	Adams Ne	1	1.00
10	YK Harris MA	2	0.67	Akers KG	1	1.00

5.5 Correlation between AAS, Dimensions.ai Citation and Scopus Citation

A Pearson correlation coefficient (Pearson's R) was computed to assess the linear relationship between Altmetric Attention Score (AAS), Dimensions.ai Citation (DC), and Scopus Citation (SC). The Pearson correlation method is the most common method for numerical variables. The correlation coefficient is reported as the decimal number between -1.00 and 1.00, where 0 means no correlation, -1.00 is a total negative correlation, and 1.00 is a total positive correlation between variables. It is found that the correlation between the AAS and Dimensions.ai citation is low correlation and statistically not significant ($r=.084$, $p = .404$), and AAS and Scopus citation was also low correlation and not significant ($r=.080$, $p = .430$). On the other hand, there is a very high positive and significant correlation between Scopus citation and Dimensions.ai citation ($r=.998$, $p = <.001$), as shown in Table 6.

Table 6: Correlation between AAS, Dimentions.ai Citations and Scopus Citations

	Altmetric Attention Score	Dimen-sions Citation	Scopus Ci-tation
Altmetric Attention Score	1	.084	.080
Pearson Correlation		.404	.430
Sig.			
N	100	100	100
Dimensions Citation	.084	1	.998**
Pearson Correlation			.000
Sig.	.404		
N	100	100	100
Scopus Citation	.080	.998**	1
Pearson Correlation			
Sig.	.430	.000	
N	100	100	100

** . Correlation is significant at the 0.01 level (2-tailed).

5.6 Geographical variation of the Mendeley readership

The 100 articles with high AAS have active readers from 63 countries, IJIM has readers from 34 countries, and JMLA has readers from 29 countries. The countries with the most number of appearances in the papers and highest readership counts are listed in Table 7. United Kingdom has the most active readers on Mendeley as it appears most frequently in the 8 different papers of IJIM with 19 readership counts. The United States follows with the appearance of 6 times in different papers with 18 readership counts. The papers with high AAS published in JMLA have the most readers from the United States that appear in the 24 papers with 108 readership counts, followed by the United Kingdom, which appeared in the 14 papers with a total number of 28 readership counts. It is also found that the geographical locations of 22364 readers of IJIM's papers and 6217 readers of JMLA's with high AAS are unknown in the Altmetric.com database. The relationship between readers' countries and readership counts may vary due to this anonymous data.

Table 7: Geographical variation of Mendeley readership

Rank	IJIM			JMLA		
	Country	Appearance	Readers	Country	Appearance	Readers
1	United Kingdom	8	19	United States	24	108
2	Germany	6	17	United Kingdom	14	28
3	United States	6	18	Australia	10	15
4	Brazil	5	16	Canada	8	18
5	Netherlands	5	7	Spain	7	12
6	Spain	4	9	Mexico	4	7
7	Portugal	3	7	Italy	5	5
8	Canada	3	5	France	4	5
9	Colombia	3	3	India	4	5
10	Finland	3	3	Brazil	3	5

5.7 Professional variation of the Mendeley readership

Mendeley offers the readership statistics by different user groups, i.e. Masters's Students, Bachelor students, Ph.D., Librarian, Professor, etc. Figure 2 illustrates the professional variation of the Mendeley readership counts of both journals. A similar category of the readership profession has been merged (Master/PG and PhD/Doctoral Students). The papers published in the IJIM have the most significant readership from the students' community as Master/PG students (4228), followed by PhD/Doctoral students (3939) actively reading the papers. In contrast, the papers published in JMLA have the most significant readers from the category of Librarian (1228), followed by Master/PG students (886).

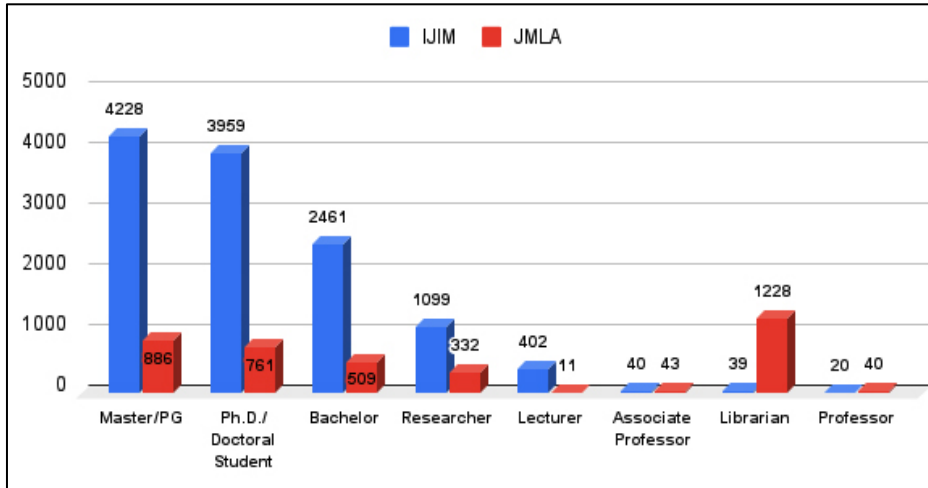


Figure 2: Professional variation of the Mendeley readership

5.8 Correlation between Mendeley readership counts and Scopus citation

Pearson correlation between Scopus citation and Mendeley readership count of the papers published in both journals has been computed as shown in Table 8A & B. It is found that the correlation between Scopus citation and Mendeley readership of papers published in IJIM is positively very high and statistically significant ($r=.964, p<.001$). Similarly, the correlation between Scopus citation and Mendeley readership of papers published in JMLA is moderately positive and significant ($r=.632, p<.001$). It indicates that the increase of readership in Mendeley would lead to increased citation of papers in Scopus.

Table 8A: Correlation between Mendeley readership and Scopus citations (IJIM)

		Mendeley Readership	Scopus Citation
Mendeley Readership	Pearson Correlation	1	.964**
	Sig.		.000
	N	50	50
Scopus Citation	Pearson Correlation	.964**	1
	Sig.	.000	
	N	50	50

** . Correlation is significant at the 0.01 level (2-tailed).

Table 8B: Correlation between Mendeley readership and Scopus citations (JMLA)

		Mendeley Readership	Scopus Citation
Mendeley Readership	Pearson Correlation	1	.632**
	Sig.		.000
	N	50	50
Scopus Citation	Pearson Correlation	.632**	1
	Sig.	.000	
	N	50	50

** . Correlation is significant at the 0.01 level (2-tailed).

6 Discussion and Conclusion

This study explored the influence of social networking sites based on the top 100 papers with high Altmetric Attention Score (AAS) published in the International Journal of Information Management and Journal of Medical Library Association using altmetric tools. Further, this study assesses the correlation between Altmetric Attention Score, Dimensions.ai citation, and Scopus Citation; and between Scopus citation and Mendeley readership counts. It is found that the fifteen different social webs have been used in disseminating information regarding the papers published in both journals. Most previous research found that open access journals have more attention and citation impacts than non-open access journals (Erfanmanesh, 2017; Saberi and Ekhtiyari, 2019; Cho, 2021). However, this study found that non-open access journal has more Mendeley readership count, AAS, Dimensions.ai citations, and Scopus citations than open access journal, as earlier found by Khan et al. (2022).

This study also found that Twitter is the most used social networking site for discussion regarding scholarly publications and the top LIS articles have active readers on

Mendeley (Tang et al., 2020; Cho, 2021; Rangaswamy & Babu, 2021). Apart from that, the articles are frequently mentioned in the news stories and blogs that may significantly influence LIS research publications in the contemporary era. Further, for more attention to LIS research, there is a need for the online profile of journals on social media platforms to facilitate the spread of research information among academia and society.

The Pearson correlation coefficient test shows a very high positive and statistically significant correlation between Scopus citations and Dimensions.ai citations ($r=.998$, $p<.001$). Previous researchers Thelwall (2018) and Singh et al. (2021) also found a strong correlation between Scopus citations and Dimensions.ai citations counts. Similarly, the articles of both journals have a positive and significant correlation between Mendeley readership and Scopus citations. Vysakh and Babu (2021), and Thelwall (2020) found that the students' category, i.e., Masters Students, Ph.D., and bachelors, are the most active reader of LIS articles on Mendeley. Similarly, the present study found a similar trend. However, it is fascinating that the readers' category of Librarians is the most frequent reader of the article published in JMLA. The articles of IJIM have the most readers from the United Kingdom, whereas articles of JMLA have the most active readers from the United States.

However, the study is limited to the 100 LIS articles with the highest AAS and published in the top journals of the LIS subject category. Altmetric analysis is an emerging method to evaluate the research's popularity and impact on academia and society. Hence, it is strongly interdisciplinary that can be applied in different fields of knowledge. Future studies can focus on broader perspectives by taking more articles, journals, and other databases. Analysis can also be conducted in another discipline for instant measurement of the popularity of the publications that can be useful for the policymakers, funding agencies, practitioners, and other stockholders.

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