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Original Research

Examining the Association between Citations and Altmetric Indicators of LIS Articles indexed in Dimensions Database

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Abstract

Social media attention to scholarly articles has become a novel measure for assessing the broader impact of research, which complements the traditional citation metrics. This article examined the correlation between citations with major altmetric indicators for 1951 LIS articles published in 2020. Altmetric Explorer was used for collecting the data, and analysis was done using Excel and SPSS. The result showed that LIS articles were well engaged on social media platforms gaining more societal attention than their scientific reference in citations. Mendeley (69.40%) and Twitter (28.72%) were the top intakes of LIS articles, and Pinterest (0.001%) and F1000 (0.001%) were the least ones. The users from the USA were the major Twitterati for the LIS articles, with average Tweeters of -0.58 across the globe. The users from the UK were the top mentioner of the articles on Facebook (2.7%), while the USA was on the News and mainstream media (55.6%). Except for Peer review (r= -0.05), all other altmetric indicators were positively associated with Dimensions citations. The study's findings allow the authors to analyze the societal impact of their scholarship through altmetric indicators and use altmetric indicators as supplementary to the citation metrics for measuring the immediate impact of the LIS scientific outputs.

Keywords: Library and Information Science, Traditional Metrics, Altmetrics, Social Media Metrics.

Introduction

The advent of web 2.0 has rebooted the entire scholarly communication system (Procter et al., 2010). Social media integration into scholarly work largely influences how academics create, store, disseminate and maintain scholarly output (Banshal, Singh, Muhuri & Mayr, 2019). The wide use of social networks among academics for scholarly purposes has led to the emergence of altmetrics, which measures the movement and attention of a scientific publication on social platforms (Chen, Tang, Wang & Hsiang, 2015). It reflects processes related to social engagement, science communication and scholarly network (Ferreira, Mongeon & Costas, 2021). While traditional citation metrics lack measuring the non-academic and social impact of the scholarship, altmetrics or social media, metrics offer a quick and real-time solution for

measuring the invisible impact by analyzing the data from the social web (Nagarajan et al., 2021). Studies on altmetrics are overgrowing as a stand-alone and clubbed with other traditional metrics to prove their association at the journal, author, and article levels (Pulido, Redondo-Sama, Sorde-Marti & Flecha, 2018; Ortega, 2015; Hammarfelt, 2014). A handful of studies explored the association at the journal (Ezema & Ugwu, 2019; Tang, Tseng & Vann, 2020) and article level (Verma & Madhusudhan, 2019a, 2019b) in the Library and Information Science domain by taking either the highly cited articles or by considering the articles published years ago since the citation requires time to accrue for getting a confident result while correlating with recent altmetric indicators. Hence, the current study explores the altmetrics of the latest Library, and Information Science (LIS) articles published in the year "2020" to know how fast LIS articles attract on social media platforms.

Further, correlate each indicator with citations from the Dimensions database to prove whether the social media indicators can be supplemental to the classic metric indicators for research impact evaluation. Apart from this, many previous studies were limited to gauging the association between citations with only a few prime altmetric indicators like Twitter (Abbasi, 2018; De Winter, 2015), Mendeley (Tang et al., 2020; Thelwall, 2019) or altmetric attention score (Peters, Kraker, Lex, Gumpenberger & Gorraiz, 2016; Chang, Desai & Gosain, 2019; Ghazi Mirsaeid, Amini & Karimi Azar, 2022). Hence, a comprehensive study needs to be carried out by comparing all the available altmetric indicators with citations, and the present study is carried out. The following four prime objectives drive the entire study.

Objectives of the study

1. To gauge the presence of LIS articles on various social media platforms.
2. To determine the country-wise tweeting of LIS articles.
3. To assess the geography-wise mention of LIS articles on Facebook and Mainstream media.
4. To find the association between the Dimensions citations with altmetric indicators.

Literature Review

Even though altmetrics is an emerging area, plenty of studies have already taken place globally. Most studies investigated the association between traditional and social media metrics since both are used to observe scientific outputs' dissemination (Liu & Huang, 2022). Here, we have reviewed those altmetric studies which have taken place in different domains, with a special mention of library and information science literature.

Ghazi Mirsaeid et al. (2022) compared altmetric indicators and citations by taking the dental research articles indexed in Scopus from two major higher institutes viz-Tehran University of Medical Sciences (TUMS) and Shahid Beheshti University of Medical Sciences (SBMU). The study reported that articles from TUMS got higher citations (73.1%) than SBMU (71.3%). Regarding the altmetric attention and coverage, the study findings reported a low coverage of articles from both the institutes' publications. Out of 409 articles, only 61 (17.6%) of articles from TUMS found altmetric attention. While it was 51 (14.8%) articles out of 401 for SBMU. The coverage of articles on other social media platforms like Twitter, Mendeley, Facebook and Google+ was found meagre for both the institutes and the authors suggested making institute's researchers get aware and using these social indicators for escalating the social visibility of their articles.

A similar kind of study from the same country investigated the social media attention to 'medical ethics' related literature by taking 455 articles indexed in the Scopus database in 2019. The study reported that the most readership in Mendeley and tweets from Twitter for the Iranian articles came from two major countries, i.e. the USA and UK. Another recent study revealed that English-speaking countries have a greater share of other social media mentions like blogs and news sources (Ortega, 2020). Master students were the primary intake of Iranian articles in Mendeley, and articles published in the Journal of Medical Ethics and History of Medicine got high social media attention. Finally, the study reported a significant association between the altmetric attention score and article citations (Seyyed Hosseini & Basirian Jahromi, 2021). These findings corresponded to the previous study conducted by Biranvand & Cheraghi (2022) among the top authors from Iran in nursing-related research. They reported a significant positive correlation between many altmetric indicators with classic metrics, especially with the Mendeley h-index with citations from Scopus and Web of Science. The same results were noted by Chi, Lopes, Rong, Charlson, Alvarez and Boerner (2021) and Grosh, Kim, Graff, Mariano & Elkassabany (2022) when they subjected citations with altmetric indicators in gynecologic oncology articles and *regional anaesthesia and pain medicine* journal articles.

Apart from medical science, the association between Mendeley readership and citations in other major fields like arts and humanities (Hammarfelt, 2014), sciences (Barnes, 2015), social sciences (Liu & Huang, 2022) and technology (Zhang, Wang, Zhao, Ordóñez de Pablos, Sun & Xiong, 2019) were not in an inverse relationship as per the findings of some previous studies.

Like Mendeley's readership, Twitter mentions are also one of the top indicators of altmetrics, which positively correlates with citations for top-tier LIS journals, i.e. Scientometrics, College & Research Libraries and Journal of the American Society for Information Science & Technology (Zhao & Wolfram, 2015). Ezema and Ugwu (2019) pointed out that among citations from top databases viz. Google Scholar (GS), Scopus, and Web of Science (WoS), Google Scholar citations have a strong positive correlation with social media citations compared to Scopus and WoS citations. This result aligns with the findings of Saberi and Ekhtiyari (2019). They discovered that the Google Scholar citations strongly correlated with the altmetric indicators like mention metrics, capture metrics, usage metrics and social media metrics for the classic LIS articles indexed in Google Scholar. Cho (2021) investigated the open-access advantages of LIS articles by taking 1000 highly cited articles from the WoS database and found that open-access LIS articles gained more mentions from blogs, wikis and Twitter compared to non-open-access LIS articles. The study could not find any citation benefits for OA publications over NOA publications. This study also reported a significant positive association between the WoS citations and Mendeley's article readership. In contrast to all these study findings, some studies reported a negative correlation between the altmetric indicators with citations (Verma & Madhusudhan, 2019a; Verma & Madhusudhan, 2019b).

After reviewing the available literature, it is clear that numerous studies investigated the association between citations and altmetric indicators in various domains, including library and information science. Nonetheless, no studies tried to correlate Dimensions citations with different altmetric indicators since Dimensions is a new and exclusive database of altmetrics. Furthermore, many studies failed to sketch the social media attention in detail for the LIS articles. So, the current study has been undertaken to bridge this gap. The result of the current study would suggest the scientometrics community use various altmetric indicators as supplementary to traditional citations for measuring the immediate and instantaneous impact of

the LIS scientific outputs and to assess the societal impact of their research by considering various social metric indicators.

Materials and Methods

The data for the study were collected from Altmetric Explorer (http://altmetrics.com/) accessed on 19 April 2021. To select the articles, the keyword "Library and Information Science" (category number 0807) was used to search. The results were restricted to "articles" only. The "Data sets, Books, Clinical trial records, Book Chapters, and News Stories" were excluded since these outputs did not require social media attention for analysis. The publication date was set from 01-01-2020 to 31-12-2020. Since the articles take time to get citations, 2020 is selected by leaving 2021 and 2022, as indicated by previously published articles (Mohammadi & Thelwall, 2013). The search was executed, and the explorer tracked 2136 research outputs in which 1951 were mentioned in different sources. The results were sorted according to the Altmetric Attention Score (AAS) from highest to lowest, ranging from 337 to 1. The articles were grouped according to the months, and their corresponding citations and altmetric attention from various sources were summed for the subsequent analysis using MS Excel. Separate excel was prepared for analyzing the Twitter, Facebook and News metrics in detail. The Spearman correlation was applied in SPSS (data were skewed) for calculating the association between Dimensions citations with major altmetric indicators, including News, blogs, policy, Twitter, Peer review, Facebook, Wikipedia, Reddit, Pininterest, F1000, Video, and Mendeley readership.

Results

Articles with Citations and Social media citations/altmetric attention score

According to Figure 1, 2136 articles were published by 119 journals over the study period. Four thousand one hundred eighty-six times the articles were cited, and 16304 times the articles were socially cited. The month-wise result shows that January recorded the highest number of publications with 431 articles, which were cited 720 times with a social media attention score of 3296. Articles published in April observed the highest citations with 841 citations, though the social media attention accounted for only 1121, which was less than the altmetric score of January (3296), May (1534), July (1642), October (1298), and December (1818). It was also noted that the 155 articles published in December attracted 1818 altmetric attention, the second-highest social media attention received for a month after January depicting that altmetrics gauge the immediate and early impact of the scholarship. Social media citations were much higher for all the articles than its Dimensions citations.

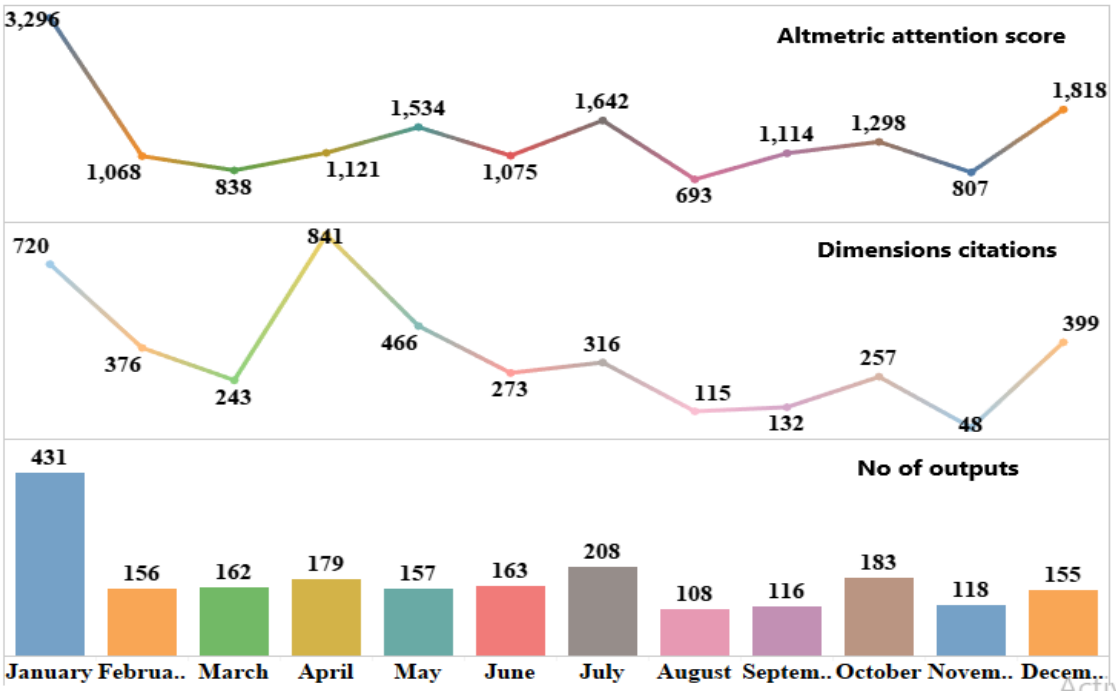

Figure 1: Articles with citations and altmetric attention score

Social media attention in detail

Table 1 presents the altmetric attention received by the articles arranged month-wise. Of the 2136 articles, 1951 were mentioned at least once on 12 social media platforms. Mendeley with 43573, and Twitter, with 18037 mentions, emerged as the powerful platforms for discussing LIS articles, followed by News (396), Blogs (309), and Facebook (299) mentions. The platforms where articles got a minor significance were Pinterest (1), F1000 (1), and Video (2). The highest number of News mentions was recorded in December, with 134. Other top mentions for each platform monthly were as follows, Blogs in January(83), Policy in January (5), Twitter in January (4015), Peer Review in October (26), Facebook in January (128), Wikipedia in January (15), Reddit in January (16), Pinterest in November (1), F1000 in May (1), Video in February (2), Mendeley in January (7893). Month-wise mentions demonstrate that January got the highest number of mentions with 12171, followed by December with 7436 mentions.

Table1
Social media attention in detail

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mendeley Readers	7893	3264	2387	5817	3028	3124	3850	1449	1868	3913	880	6100	43573
Twitter	4015	1057	949	1292	1780	1307	1978	848	1164	1462	1040	1145	18037
News	16	36	11	21	49	13	33	7	34	28	14	134	396
Blog	83	18	21	24	24	21	23	15	20	24	13	23	309
Facebook	128	9	9	19	22	14	21	11	14	33	10	9	299
Peer Review	0	1	0	1	0	7	9	0	0	26	2	19	65
Wikipedia	15	3	6	5	2	1	2	2	6	7	0	1	50
Reddit	16	2	3	2	3	1	2	1	0	5	0	2	37

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Policy	5	0	2	3	1	0	0	0	0	1	0	3	15
Video	0	2	0	0	0	0	0	0	0	0	0	0	2
Pinterest	0	0	0	0	0	0	0	0	0	0	1	0	1
F1000	0	0	0	0	1	0	0	0	0	0	0	0	1
Total Mentions	12171	4392	3388	7184	4910	4488	5918	2333	3106	5499	1960	7436	62785

Geographical distribution of Tweets and Tweeters

Figure 2 demonstrates the geographical distribution of Twitter mentions. The colour code in the map ranges from red to blue, i.e. lowest mentions from highest mentions. Tweets and retweets from 134 countries were recorded, including the category 'Unknown' (See Annexure, Table 1). As per the figure, the highest mentions were recorded from the USA, with 2425 mentions tweeted by 1409 unique tweeters (AVG Tweeters of -0.58). The second highest number of tweets accounted for the UK with 1948 mentions by 1066 tweeters (AVG Tweeters of -0.54). There were 18 countries whose mentions accounted for 2 and 24 countries with 1 mention, respectively (Annexure, Table 1).

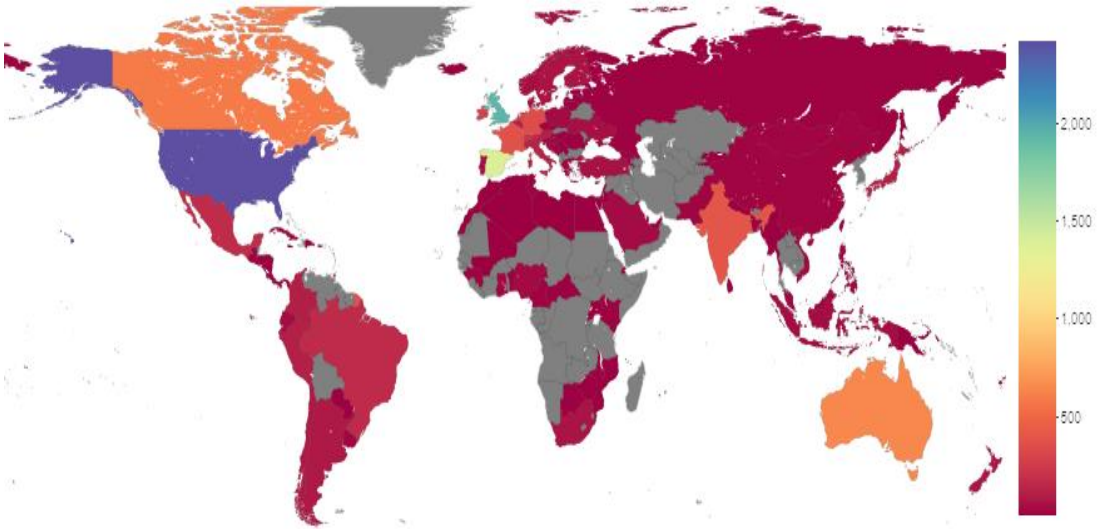

Figure 2: Geographical distribution of tweets and tweeters

Country-wise mentions of articles on Facebook

Table 2 presents the number of Facebook posts in which the articles got mentioned. The top 10 countries and their number of posts were extracted from Altmetric.com. (2021) Due to the data access restrictions, it only tracked the 'public FB' accounts (Altmetric.com, 2021). The top countries were the UK and Croatia, with 8(2.7%) posts featured from 2 UK pages and a Croatia page, respectively. Mexico held the 3rd position with 3 posts from 2 pages, followed by Brazil, Australia, Spain and the USA with 2 posts from 1 page each. Italy, Canada, and India recorded 1 mention, respectively, and India was the only country featured in the Asian region. Most of the posts (89.7%) were identified from countries with no specified origin, and all these posts emerged from 36 unique FB pages.

Table 2
Country-wise distribution of Facebook posts

Country	Facebook posts	Facebook pages
Country not specified	270 (89.7%)	36 (73.5%)
UK	8 (2.7%)	2 (4.1%)
Croatia	8 (2.7%)	1 (2%)
Mexico	3 (1%)	2 (4.1%)
Brazil	2 (0.7%)	1 (2%)
Australia	2 (0.7%)	1 (2%)
Spain	2 (0.7%)	1 (2%)
USA	2 (0.7%)	1 (2%)
Italy	1 (0.3%)	1 (2%)
Canada	1 (0.3%)	1 (2%)
India	1 (0.3%)	1 (2%)

Country-wise mentions of articles on News & Mainstream media

Table 3 depicts the country-wise mentions of the articles in central News and mainstream media. The highest of 55.6% mentions were recorded from the USA from 133 news outlets, followed by the UK with 12.1% mentions from 12 news outlets. 11.6% of mentions were recorded from Australia and 5.1% from India. From one news outlet, 8 mentions emerged from New Zealand, while Brazil logged the same number of mentions from 4 outlets. Canada, with 3 mentions from 2 unique news outlets, stood at the 10th position, just behind Germany with the same amount of mentions produced from 3 outlets.

Table 3
Country-wise mention of News

Country	Total news stories	Unique news outlets
USA	230 (55.6%)	133 (63.3%)
UK	50 (12.1%)	12 (5.7%)
Australia	48 (11.6%)	13 (6.2%)
India	21 (5.1%)	10 (4.8%)
Spain	13 (3.1%)	8 (3.8%)
New Zealand	8 (1.9%)	1 (0.5%)
Brazil	8 (1.9%)	4 (1.9%)
China	4 (1%)	2 (1%)
Germany	3 (0.7%)	3 (1.4%)
Canada	3 (0.7%)	2 (1%)

Correlation between citations with major altmetric indicators

Except for Peer review (rho=-0.05), all other altmetric indicators were positively correlated with Dimensions citations, as seen in Table 4. The highest correlation was observed for citations with Altmetric Attention Score (rho=0.21) followed by Twitter (rho=0.19), News (rho=0.16), Blog (rho=0.09), Policy (rho=0.08), Facebook (rho=0.07), Reddit (rho=0.05), Video (rho=0.01), F1000 (rho=0.01) and Wikipedia (rho=0.01). Among the altmetric indicators, the highest positive association was observed for Twitter with AAS (rho=0.81), followed by Mendeley readers with Dimensions citations (rho=0.57), Blogs with AAS (rho=0.44), News with AAS (rho=0.32).

Table 4
Correlation between citations with major altmetric indicators

	Peer review	Facebook	AAS	Twitter	Reddit	News	Blog	Video	F1000	Wikipedia	Policy	Dimensions citations	Mendeley readers
Peer review	1												
Facebook	-0.02	1											
AAS	-0.04	0.23	1										
Twitter	-0.1	0.2	0.81	1									
Reddit	-0.01	0.01	0.1	0.1	1								
News	0.03	0.01	0.32	0.06	0.05	1							
Blog	0.01	0.2	0.44	0.13	0.07	0.16	1						
Video	0	-0.01	0.03	0	0	0.1	-0.01	1					
F1000	0	-0.01	0.02	0.01	0	0	-0.01	0	1				
Wikipedia	-0.01	0	0.1	-0.01	0.04	0.01	0.01	0	0	1			
Policy	-0.01	0.02	0.09	0.07	-0.01	0.12	0.02	0	0	0.04	1		
Dimensions citations	-0.05	0.07	0.21	0.19	0.05	0.16	0.09	0.01	0.01	0.1	0.08	1	
Mendeley Readers	0.02	0.04	0.21	0.17	0.03	0.15	0.06	0.01	0.02	0.06	0.1	0.57	1

AAS= Altmetric Attention Score

Discussion

In this study, we carried out an altmetric analysis of the LIS articles published in 2020 to correlate the Dimensions citations with the available thirteen altmetric indicators. The study also investigated how quickly recent LIS articles penetrated social media platforms. Our study result delineated that 2136 articles were published in 2020 across 119 LIS journals, in which 1951 or 91.33% of articles showed their presence on various social media platforms. Furthermore, articles were cited 4186 times and were socially cited 16304 times. Patently, the socialdiscussion was more for the LIS articles than its scientific references. The possible reason could be that the citations take time to accrue compared to their social visibility, as evident from previously published studies (McGillivray & Astell, 2019). Later, our study reported that January and December logged the highest amount of altmetric attention while citations plummeted monthly,indicating that the articles mentioned and usage were higher than their citations. This finding corroborates the findings of a previous study which revealed that articles at the initial time of their publication attract more social attention (Starbuck & Sharon, 2016).

Further,we discovered that LIS articles mainly penetrated the thirteen major platforms, with higher activities reported on Mendeley and Twitter. These findings correspond to many previous studies that Mendeley and Twitter are the major intakes of scientific literature, including library and information science (Vishakha & Sarangapani, 2020; Sedighi, 2020; Hammarfelt, 2014; Htoo & Na, 2017).

Geographically, we discovered that users from 131 countries had mentioned LIS articles on Twitter, with high mentions fromthe USA and UK. The possible reason for this is the number of Twitter users was high in thesecountries, and a previous study confirmed the same (Vysakh & Babu, 2021). Concerning Facebook mentions the UK and Croatia topped with 8 mentions,

respectively. Concerning the mention of articles in the News and mainstream media, both USA and the UKtopped with 230 and 50 mentions, respectively. Finally, our study findings showed a positive correlation between Dimensions citations and all major altmetric indicators except Peer review. The positive correlation between Dimension citations with altmetric indicators, specifically altmetric attention score with citations, was noted in another similar kind of study by Vysakh and Babu (2021). However, the correlation value was also somewhat near, i.e. 0.21 from this study and 0.19 per their study and regarded as a weak positive association (Dancey & Reidy, 2011). Similar to the Dimensions database, some of the previous studies discovered a positive association between altmetric indicators and citations from other major databases like Scopus (Maflah & Thelwall, 2014), Google ScholarWoS (Mohammadi & Thelwall, 2014; Zhao & Wolfram, 2015; Htoo & Na, 2017) and ResearchGate (Ali & Richardson, 2017) for the LIS literature.

Conclusion

As per this study's findings, it can sum up that positively correlated indicators can be supplemental to the citation for evaluating the immediate impact of the LIS outputs since both indicators exhibit standard features. Therefore, it can be concluded that some altmetric indicators with positive associations can represent citations from the Dimensions database. However, since the correlation is weak for someindicators, it is not suggested that the altmetric approach could fully replace the traditional metrics for the measurement. Still, it can be used side by side with citations for measuring the socialimpact

of the LIS scientific output. A similar exploration in other domains would decide the novelty of new metrics to measure their research outputs' immediate social invisible impact along with the traditional citation indicators.

References

Abbasi, S. (2018). *Tracing the Visibility of Swedish LIS Research Articles by Using Altmetrics.* University of Boras. Retrieved from http://hb.diva-portal.org/smash/record.jsf?pid=diva2%3A1305290&dswid=-1835

Ali, M. Y. & Richardson, J. (2017). Pakistani LIS scholars' altmetrics in ResearchGate. *Program*, 51(2), 152-169. https://doi.org/10.1108/PROG-07-2016-0052

Altmetric.com. (2021). *Facebook Tracking*. Retrieved from https://help.altmetric.com/support/solutions/articles/6000235936-facebook

Banshal, S. K., Singh, V. K., Muhuri, P. K. & Mayr, P. (2019). How much research output from India gets social media attention ? *Current Science*, 117(5), 753-760. https://doi.org/10.18520/cs/v117/i5/753-760 760

Barnes, C. (2015). The Use of Altmetrics as a Tool for Measuring Research Impact. *Australian Academic & Research Libraries*, 46(2), 121-134. https://doi.org/10.1080/00048623.2014.1003174

Biranvand, A. & Cheraghi, Z. (2022). Investigating the relationship between altmetrics indicators and scientometric indicators of Iranian researchers in the field of nursing in the period 2000-2019. *International Journal of Information Science and Management*, 20(3), 215-225. https://dorl.net/dor/20.1001.1.20088302.2022.20.3.12.9

Chang, J., Desai, N. & Gosain, A. (2019). Correlation Between Altmetric Score and Citations in Pediatric Surgery Core Journals. *Journal of Surgical Research*, 243, 52-58. https://doi.org/10.1016/j.jss.2019.05.010

Chen, K., Tang, M., Wang, C. & Hsiang, J. (2015). Exploring alternative metrics of scholarly performance in the social sciences and humanities in Taiwan. *Scientometrics*, 1, 97-112. https://doi.org/10.1007/s11192-014-1420-6

Chi, A. J., Lopes, A. J., Rong, L. Q., Charlson, M. E., Alvarez, R. D. & Boerner, T. (2021). Examining the correlation between Altmetric Attention Score and citation count in the gynecologic oncology literature: Does it have an impact? *Gynecologic Oncology Reports*, 37, 100778. https://doi.org/10.1016/j.gore.2021.100778

Cho, J. (2021). Altmetrics analysis of highly cited academic papers in the field of library and information science. *Scientometrics*, 126(9), 7623-7635. https://doi.org/10.1007/s11192-021-04084-w

Dancey, C. & Reidy, J. (2011). *Statistics without maths for psychology*. Pearson education.

De Winter, J. C. F. (2015). The relationship between tweets, citations, and article views for PLOS ONE articles. *Scientometrics*, 102(2), 1773-1779. https://doi.org/10.1007/s11192-014-1445-x

Ezema, I. J. & Ugwu, C. I. (2019). Correlating research impact of library and information science journals using citation counts and altmetrics attention. *Information Discovery and Delivery*, 47(3), 143–153. https://doi.org/10.1108/IDD-08-2018-0029

Ferreira, M. R., Mongeon, P. & Costas, R. (2021). Large-Scale Comparison of Authorship, Citations, and Tweets of Web of Science Authors. *Journal of Altmetrics*, 4(1). https://doi.org/10.29024/joa.38

Ghazi Mirsaeid, S. J., Amini, S. & Karimi Azar, Z. (2022). Altmetrics and Citation-Based Indicators in Dentistry Articles of Tehran and Shahid Beheshti Universities of Medical Sciences during 2014-2019. *International Journal of Information Science and Management (IJISM)*, 20(2), 167-180. https://dorl.net/dor/20.1001.1.20088302.2022.20.2.10.5

Grosh, T., Kim, J., Graff, V., Mariano, E. R., & Elkassabany, N. M. (2022). Is there a correlation between Altmetric Attention Scores and citation count in Regional Anesthesia and Pain Medicine journal articles? *Regional Anesthesia & Pain Medicine*, 47(10), 649-650. https://doi.org/10.1136/rapm-2022-103554

Hammarfelt, B. (2014). Using altmetrics for assessing research impact in the humanities. *Scientometrics*, 101(2), 1419-1430. https://doi.org/10.1007/s11192-014-1261-3

Htoo, T. H. H. & Na, J. C. (2017). Disciplinary differences in altmetrics for social sciences. *Online Information Review*, 41(2), 235-251. https://doi.org/10.1108/OIR-12-2015-0386

Liu, C. & Huang, M. H. (2022). Exploring the relationships between altmetric counts and citations of papers in different academic fields based on co-occurrence analysis. *Scientometrics*, 127(8), 4939-4958. https://doi.org/10.1007/s11192-022-04456-w

Maflah, N. & Thelwall, M. (2014). When are readership counts as useful as citation counts? Scopus versus Mendeley for LIS journals. *Journal of the Association for Information Science and Technology*. https://doi.org/10.1002/asi

McGillivray, B. & Astell, M. (2019). The relationship between usage and citations in an open access mega-journal. *Scientometrics*, 121(2), 817–838. https://doi.org/10.1007/s11192-019-03228-3

Mohammadi, E. & Thelwall, M. (2013). Assessing non-standard article impact using F1000 labels. *Scientometrics*, 97(2), 383-395. https://doi.org/10.1007/s11192-013-0993-9

Mohammadi, E. & Thelwall, M. (2014). Mendeley readership altmetrics for the social sciences and humanities: Research evaluation and knowledge flows. *Journal of the Association for Information Science and Technology*, 65(8), 1627-1638. https://doi.org/10.1002/asi.23071

Nagarajan, A., Raamkumar, A. S., Erdt, M., Vijayakumar, H., Luo, F., Zheng, H. & Theng, Y. L. (2021). Altmetrics for research impact actuation (ARIA): An impact tracking tool for multidisciplinary and role-based cross-metric analysis. *Journal of Altmetrics*, 4(1). https://doi.org/10.29024/joa.36

Ortega, J. L. (2015). Relationship between altmetric and bibliometric indicators across academic social sites: The case of CSIC's members. *Journal of Informetrics*, 9(1), 39-49. https://doi.org/10.1016/j.joi.2014.11.004

Ortega, J. L. (2020). Blogs and news sources coverage in altmetrics data providers: A comparative analysis by country, language, and subject. *Scientometrics*, 122(1), 555-572. https://doi.org/10.1007/s11192-019-03299-2

Peters, I., Kraker, P., Lex, E., Gumpenberger, C. & Gorraiz, J. (2016). Research data explored: An extended analysis of citations and altmetrics. *Scientometrics*, 107(2), 723-744. https://doi.org/10.1007/s11192-016-1887-4

Procter, R., Williams, R., Stewart, J., Poschen, M., Snee, H., Voss, A. & Asgari-Targhi, M. (2010). Adoption and use of Web 2.0 in scholarly communications. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 368(1926), 4039-4056. https://doi.org/10.1098/rsta.2010.0155

Pulido, C. M., Redondo-Sama, G., Sorde-Marti, T. & Flecha, R. (2018). Social impact in social media: A new method to evaluate the social impact of research. *PLoS ONE*, 13(8), 1-20. https://doi.org/10.1371/journal.pone.0203117

Saberi, M. K. & Ekhtiyari, F. (2019). Usage , captures , mentions , social media and citations of LIS highly cited papers : An altmetrics study. *Performance Measurement and Metrics*, 20(1), 37-47. https://doi.org/10.1108/PMM-10-2018-0025

Sedighi, M. (2020). Evaluating the impact of research using the altmetrics approach (case study: the field of scientometrics). *Global Knowledge, Memory and Communication*. https://doi.org/10.1108/GKMC-02-2019-0013

Seyyed Hosseini, S. & Basirian Jahromi, R. (2021). Iranian articles in medical ethics: An altmetrics approach on social media vs. a bibliometric study in scopus database. *International Journal of Information Science and Management*, 19(1), 15-26. Retrieved from https://ijism.ricest.ac.ir/article_698330_008924afc97e4933fccb7b246885e578.pdf

Starbuck, E. & Sharon, P. (2016). Altmetric scores: Short-term popularity or long-term scientific importance. *Digital Library Perspectives*, 33(4), 314-323. https://doi.org/10.1108/DLP-10-2015-0020

Tang, Y., Tseng, H. & Vann, C. (2020). Unwrap citation count, Altmetric Attention Score and Mendeley readership status of highly cited articles in the top-tier LIS journals. *Global Knowledge, Memory and Communication*, 69(8-9), 653-664. https://doi.org/10.1108/GKMC-01-2020-0005

Thelwall, M. (2019). Do Mendeley reader counts indicate the value of arts and humanities research?. *Journal of Librarianship and Information Science*, 51(3), 781-788. https://doi.org/10.1177/0961000617732381

Verma, S. & Madhusudhan, M. (2019a). Altmetric analysis of highly cited publications on digital library in Brazil and India: A comparative study. *Library Philosophy and Practice, (e-journal)*. 2273. Retrieved from https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=5685&context=libphilprac

Verma, S. & Madhusudhan, M. (2019b). An altmetric comparison of highly cited digital library publications of India and China. *Annals of Library and Information Studies*, 66(2), 71-75. Retrieved from https://core.ac.uk/download/pdf/229208328.pdf

Vishakha, S. & Sarangapani, R. (2020). Scholarly communication of library and information science literature on social media: An altmetrics analysis. *Library Philosophy and Practice (e-Journal)*. Retrieved from file:///C:/Users/drghane/Downloads/fulltext1.pdf

Zhang, X., Wang, X., Zhao, H., Ordóñez de Pablos, P., Sun, Y., & Xiong, H. (2019). An effectiveness analysis of altmetrics indices for different levels of artificial intelligence publications. *Scientometrics*, 119(3), 1311-1344. https://doi.org/10.1007/s11192-019-03088-x

Zhao, Y. & Wolfram, D. (2015). Assessing the popularity of the top-tier journals in the LIS field on Twitter. *Proceedings of the Association for Information Science and Technology*, 52(1), 1-4. https://doi.org/10.1002/pra2.2015.145052010092

Appendix

Table A-1
Country –Wise Tweets and Tweeters

Country name	Total tweets	Number of Unique tweeters	Country name	Total Tweets	Number of Unique tweeters	Country name	Total tweets	Number of Unique tweeters
Unknown	6563	3529	Hong Kong	19	15	Romania	3	3
United States	2425	1409	Israel	18	13	Myanmar	2	2
United Kingdom	1948	1066	Mongolia	18	1	Estonia	2	2
Spain	1383	607	Korea	18	10	Benin	2	1
Australia	647	362	Pakistan	18	7	Serbia	2	2
Canada	593	341	Taiwan	18	6	Liechtenstein	2	1
India	401	119	Greece	17	14	Mali	2	1
France	376	203	China	17	13	Kuwait	2	2
Germany	348	205	Curaçao	16	15	Uganda	2	2
Netherlands	294	164	Czechia	15	13	Samoa	2	2
Ireland	279	94	Cuba	14	5	San Marino	2	2
Switzerland	226	91	Comoros	14	11	Sao Tome and Principe	2	1
Mexico	169	105	United Arab Emirates	12	9	Djibouti	2	1
Brazil	166	81	Cameroon	11	4	Guatemala	2	2
Italy	127	80	Grenada	11	10	Algeria	2	2
Japan	114	78	Luxembourg	10	8	Honduras	2	2
Peru	114	53	El Salvador	9	5	Réunion	2	2
Austria	111	36	Iran	8	8	Korea	2	2
Belgium	110	62	Russia	8	6	Cyprus	2	2
Colombia	105	45	Panama	8	8	Fiji	1	1

Chile	83	58	Costa Rica	7	7	Maldives	1	1
Argentina	81	55	Georgia	7	7	Kyrgyzstan	1	1
New Zealand	73	47	Guinea	7	7	Tanzania	1	1
South Africa	68	37	Tunisia	7	5	Latvia	1	1
Finland	67	51	Puerto Rico	7	6	Congo	1	1
Sweden	65	44	Kenya	7	7	Lithuania	1	1
Turkey	57	36	Bangladesh	6	6	Moldova	1	1
Ukraine	52	13	Jordan	6	4	Iceland	1	1
Norway	51	29	Sri Lanka	5	3	Seychelles	1	1
Denmark	49	31	Malawi	5	3	Trinidad and Tobago	1	1
Portugal	48	28	Zimbabwe	5	3	Armenia	1	1
Venezuela	48	28	The central African Republic	5	3	Qatar	1	1
Indonesia	40	30	Slovenia	5	4	Nicaragua	1	1
Ecuador	38	22	Paraguay	4	4	Papua New Guinea	1	1
Poland	37	17	Egypt	4	4	Nepal	1	1
Saudi Arabia	35	24	Botswana	4	2	Dominican Republic	1	1
Nigeria	30	17	Bosnia and Herzegovina	4	4	Timor-Leste	1	1
Vietnam	27	6	Bolivia	4	2	Lebanon	1	1
Singapore	26	11	Mauritius	3	3	Libya	1	1
Philippines	23	18	Jamaica	3	1	Saint Barthélemy	1	1
Uruguay	22	10	Mozambique	3	1	Montenegro	1	1
Malaysia	21	8	Hungary	3	3	Monaco	1	1
Croatia	19	8	Morocco	3	3	Andorra	1	1
Ghana	19	11	Macedonia, Republic of	3	3			