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# Exploring the Impact of Social Networking Sites on Scholarly Communication: An Analysis Based on Selected LIS Journals through Altmetric Explorer

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**ABSTRACT**

Through an altmetric analysis of publications from the top ten LIS journals, this study examines publication patterns, mentions across various SNSs, the geographical distribution of user engagement, and the distribution of AAS for open-access versus closed-access articles. Data were sourced from Altmetric.com through Altmetric Explorer as indexed between January 1, 2014, and December 31, 2023, and analysed using MS Excel and SPSS. The study found a significant increase in research output and engagement until 2017, followed by a fluctuation and decline in subsequent years. The study also reveals that X (formerly Twitter) is the primary channel for research information dissemination, with notable contributions from X handles of respective publishers and editors. The study also found that the most mentions are associated with the United States (30,791) and the United Kingdom (16,318) among 194 countries. Additionally, the analysis shows that open-access and closed-access AAS do not follow a normal distribution according to the *Kolmogorov-Smirnov* and *Shapiro-Wilk* tests. Overall findings highlight the importance of SNSs in shaping academic communication and provide valuable information for researchers and stakeholders to enhance scholarly engagement and dissemination.

**Keywords:** Social networking sites; Scholarly communication; LIS journals; Altmetrics; Altmetric explorer

## 1. INTRODUCTION

Communication, a foundational aspect of human interaction, has played a crucial role in information dissemination, knowledge sharing, and societal progress. Before the era of internet technology and Social Networking Sites (SNSs), communication primarily occurred through localised and slow traditional means. Throughout history, various methods, including smoke signals, mirrors, and fire beacons, have been used to convey a single piece of information, such as victory in a war[1-2]. Face-to-face conversation and storytelling were dominant modes of communication, where information was transmitted through spoken words and storytelling, allowing knowledge and stories to be passed down from generation to generation[3-5]. Written communication, through letters, telegrams, and carrier pigeons, was prevalent[6-8], and the invention of the printing press revolutionised the mass production and distribution of written materials[9]. The Telegraph, introduced in the 19th century, enabled rapid long-distance communication using Morse code[10]. Postal services were vital for maintaining social connections, transmitting information, and conducting business. Likewise, letter writing is a widely practiced method that facilitates the exchange of information and sentiments over long distances. The advent of telephone communication allowed more immediate conversations but faced limitations in geographic constraints and cost considerations[3]. Historically, traditional channels, including conferences, seminars, and print publications, played a pivotal role in scholarly communication and information dissemination[11]. However, this has changed due to the advent of internet technology, the World Wide Web (WWW), and SNSs, breaking down geographical barriers and enabling instantaneous global communication and collaboration more effectively in today's digital age. One of the most significant advantages of using SNSs for scholarly information dissemination in the current era is the ability to track readers' attention and users' engagement metrics of specific research papers. Emerging SNSs have become crucial in increasing the visibility of research publications and reaching a broader audience. Consequently, measuring user engagement with research articles is crucial for understanding dissemination patterns and guiding future efforts to promote scholarly work. This study aims to explore and analyse engagement metrics for ten selected LIS journals using Altmetric Explorer to improve the effectiveness of research dissemination in this field.

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### 1.1 Theoretical Framework

Social networking sites (SNSs) have emerged as powerful platforms that redefine how individuals connect, communicate, and share information in the digital era[12-13]. Every day, SNSs are used to communicate between individuals[14]. It comes in various forms, each catering to specific interests, demographics, or professional sectors, reflecting different aspects of human interaction in the digital age. Hence, it is difficult to classify because most SNSs nowadays have similar features. Based on the characteristics and uses, the types of SNSs can be broadly categorised as General (Facebook, X, Instagram, Threads), Academic (ResearchGate, academia.edu), Professional (LinkedIn, Indeed), Instant messaging (WhatsApp, Facebook Messenger, Telegram), Visual and Multimedia-centric (TikTok, YouTube, Snapchat, Tumblr, Flickr, Vimeo, Pinterest), Discussion forums (Discord, Meetup, Reddit, Quora) and Interest-based (Goodreads, Couchsurfing, Worldpackers, Travel Buddy, Strava, Houzz, Yummi)[15]. Moreover, many social networking sites have emerged that specifically concentrate on particular fields, such as Sports, Health, Business, Entertainment, Travel, Consumer Review Networks, etc. Among the general SNSs, Facebook is the first platform to surpass one billion registered accounts and currently has more than three billion monthly active users. Meta Platforms owns the four most prominent social media platforms (Facebook, WhatsApp, Messenger, and Instagram), all with one billion monthly active users each[16]. These social networking sites (SNSs) play a crucial role in disseminating research articles, effectively bridging the gap between academia and society. They facilitate extensive information sharing and engagement with scholarly content.

## 2. LITERATURE REVIEW

Many previous studies highlighted that college students rely heavily on SNSs for daily communication, entertainment and information needs[17-19]. They use SNSs for various purposes, including opinion sharing, information acquisition, entertainment, self-documentation, self-expression and social interactions, among others[18,20-22]. Students also use SNSs to access course information, organise group work, receive feedback and interact with instructors[17,22-25]. Gitnux market data report 2024 shows that 59 % of university scholars use social media platforms for scholarly discourse[26].

This study examines the impact of SNSs on scholarly information dissemination in the LIS field. Many previous researchers have highlighted that social media is vital in disseminating research findings to a global audience. Basumatary, *et al.* highlighted that SNSs are crucial in disseminating library and information science research[27]. Similarly, SNSs are essential in disseminating research on mHealth[28], plastic surgery research[29], hand surgery research[30], cardiovascular research[31], etc. Platforms such as Mendeley, Twitter (now X), and Facebook are the most important social media platforms for disseminating Iranian articles in social sciences[32]. Likewise, Twitter (X) was the most frequently used social media platform for disseminating COVID-19-related research articles[33-35]. Moreover, the academic SNS ResearchGate is a popular application for sharing and discussing scientific research. It can also be used as an alternative to the traditional citation-based assessment of the impacts of scientific products and even to inform employment decisions in academia[36].

However, a comprehensive analysis of the impact of SNSs on journal articles, especially in the LIS field, is needed to understand the reach and impact of scholarly work in this field, as LIS professionals always believe that timely dissemination of information is crucial. As multidisciplinary journals, the selected journals serve as crucial platforms for exchanging innovative ideas, theoretical frameworks, and empirical findings within the LIS community and allied disciplines (Table 1). Investigating the dissemination patterns provides a valuable understanding of how research information is shared, discussed, and utilised by scholars, practitioners, and the wider public. It allows for identifying trends, influential articles, emerging topics, and future research directions. Moreover, analysis using platforms like Altmetric helps measure the societal impact of research by assessing its visibility on SNSs and mainstream media, contributing to the ongoing conversation on the relevance and accessibility of scholarly knowledge.

## 3. OBJECTIVES OF THE STUDY

- To examine the publishing patterns of articles over a period of 10 years and their effects (citations, Mendeley reading, mentions, and Altmetric Attention Score) in a chosen set of journals using Altmetric Explorer;
- To analyse the geographical distribution of article mentions and identify which social media handles are most frequently associated with these mentions;
- To assess whether the distribution of Altmetric Attention Scores for both open-access and closed-access articles follows a normal distribution, using the *Kolmogorov-Smirnova* and *Shapiro-Wilk* test;
- To assess the geographic distribution of citations from various social media accounts and identify which ones are most frequently linked to article references

## 4. METHODOLOGY

This study examines the altmetrics of scientific publications in the top ten journals within the field of Library and Information Science (LIS). These journals were identified through a search conducted in the Scopus database on February 22, 2024. The search results were ranked by CiteScore (2022), and the top ten journals were selected for analysis (Table 1). Moreover, Altmetrics data of articles published in these journals between 2014 and 2023 were gathered from Altmetric.com (Fig. 1).

The concept of altmetric was coined by Jason Priem and his associates in 2010[37]. Altmetric, the company,

was founded by Euan Adie and served the research community since 2011[38-39]. The first standalone version of the Altmetric Explorer, a tool for search articles, was released in February 2012[38]. The past decade has seen significant growth and adoption of altmetrics as many service provider publishers, institutions, and funders have increasingly adopted the altmetrics[28].

Data was searched in the Altmetric Explorer based on the title of the journals on February 22, 2024. However, one of the top journals, "*International Journal of Information Management Data Insights*", was not found in the Altmetric Explorer on the data extraction date. Hence, this journal was excluded from the study. The search results were exported to the Comma-separated values (CSV) file for further analysis. Exported data was processed and analysed using M.S. Excel. Further, the normality test of the distribution of AAS was tested through the *Kolmogorov-Smirnov* test and the *Shapiro-Wilk* test using SPSS. A total of 3,000 articles with the highest AAS were selected as samples for the test.

## 5. ANALYSIS AND RESULTS

### 5.1 Publishing Patterns of Articles Over Time and their Effects

Table 2 presents the publication patterns and impact of articles published in the ten selected LIS journals, as analysed using Altmetric Explorer. The analysis was based on five key indicators, including the number of articles, Altmetric Attention Score (AAS), mentions of articles on social networking sites (SNS), Mendeley reading metrics, and Dimensions.ai citations. These indicators offer a comprehensive view of an article's visibility, reach, engagement, and impact in both academic and public spheres.

The results show a sharp increase in the number of articles published from 2014 to 2017, followed by a slight decrease in 2018. Publication numbers then grew positively from 2019 to 2020, but experienced a downturn in 2021. From 2022, publications accelerated significantly, peaking at 2,003 articles in 2023. This suggests that the field experienced substantial growth and expansion in research output despite slight declines in 2018 and 2021.

Additionally, the AAS increased in parallel with the number of articles from 2014 to 2020, reaching a highest of 25,895 in 2020. This indicates that the number of articles published in this field has increased not only in quantity but also in quality and relevance as they have attracted more attention and engagement from various audiences and stakeholders. However, AAS dropped significantly in 2021 and exhibited fluctuating growth through 2023. Similarly, the total mentions, which count the number of times the articles are mentioned in different SNSs, grew exponentially until 2020. However, from 2021 onward, this growth has shown fluctuations.

Another metric that follows a similar pattern is Mendeley readership, which tracks how often researchers save or read articles on the Mendeley platform. The result shows that Mendeley readings peaked in 2017 and then fluctuated until 2021. However, this metric dropped significantly in 2022 and 2023.

Moreover, Dimensions.ai citations increased steadily from 2014 to 2017 but then showed fluctuations and a significant decline by 2023. This trend indicates that while articles in this field had substantial academic impact and influence in the earlier years, they gradually lost momentum over time.

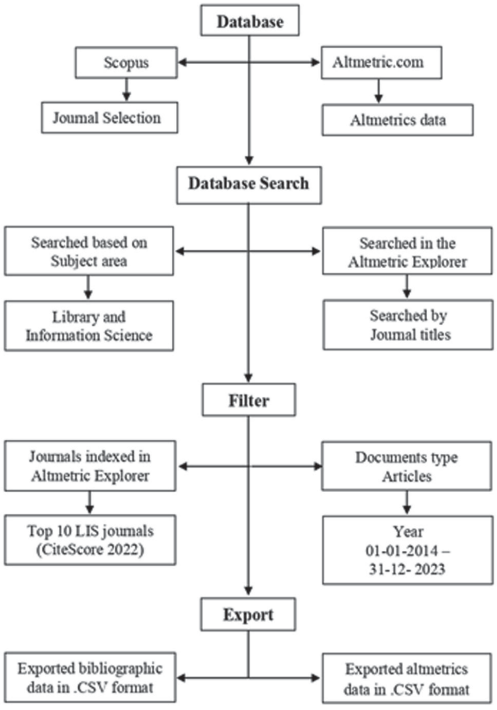


**Figure 1. Workflow process of data collection from both scopus and altmetric.com**

**Table 1. Details of selected journals with total indexed articles and total mentions in altmetric explorer as of February 22, 2024**

| S. No. | Journal | Frequency | CiteScore (2022) | Publisher | ISSN | Total articles in altmetric.com | Total no. of articles on SNSs in 10 selected journals | Total no. of mentions of articles on SNS |
|---|---|---|---|---|---|---|---|---|
| 1 | International Journal of Information Management | Bio-monthly | 41.9 | Elsevier | 0268-4012 | 768 | 635 | 5,703 |
| 2 | Government Information Quarterly | Quarterly | 17.3 | Elsevier | 0740-624X | 377 | 341 | 3,847 |
| 3 | European Journal of Information Systems | Bio-monthly | 17.0 | Taylor & Francis | 0960-085X/1476-9344 | 772 | 355 | 1,488 |
| 4 | Information Processing and Management | Bio-monthly | 14.8 | Elsevier | 0306-4573/1873-5371 | 493 | 387 | 2,339 |
| 5 | Journal of Cheminformatics* | Continuous publication | 12.4 | Chemistry Central | 1758-2946 | 781 | 769 | 10,150 |
| 6 | Scientific Data* | Continuous publication | 11.2 | Springer Nature | 2052-4463 | 3,299 | 3,183 | 90,254 |
| 7 | Information and Organization | Quarterly | 10.7 | Elsevier | 1471-7727 | 116 | 93 | 458 |
| 8 | Information Communication and Society | 16 Issues/ Year | 10.7 | Taylor & Francis | 1369-118X | 1,344 | 1,267 | 22,926 |
| 9 | International Journal of Geographical Information Science | Monthly | 10.2 | Taylor & Francis | 1365-8816/1365-8824 | 551 | 473 | 3,128 |
| 10 | Journal of Chemical Information and Modeling | 24 Issues/ Year | 9.8 | American Chemical Society | 1549-9596/1549-960X | 3,346 | 3,297 | 44,531 |

**Asterisk mark (*) = Open-access journals**

**Table 2. Publishing patterns of articles over time and their effects**

| Year | Number of articles | Altmetric attention score | Total mentions | Mendeley reading | Dimensions citation |
|---|---|---|---|---|---|
| 2014 | 258 | 3,913 | 3,671 | 40,412 | 19,902 |
| 2015 | 324 | 6,111 | 5,475 | 60,461 | 28,918 |
| 2016 | 415 | 11,178 | 9,332 | 73,046 | 39,711 |
| 2017 | 1,362 | 12,945 | 14,854 | 2,06,623 | 86,087 |
| 2018 | 1,039 | 15,991 | 18,566 | 1,24,621 | 55,889 |
| 2019 | 1,421 | 16,721 | 22,578 | 1,50,704 | 59,724 |
| 2020 | 1,691 | 25,895 | 33,146 | 1,94,437 | 69,576 |
| 2021 | 1,515 | 16,993 | 22,348 | 1,08,527 | 36,445 |
| 2022 | 1,819 | 25,842 | 31,064 | 62,731 | 18,079 |
| 2023 | 2,003 | 17,861 | 23,793 | 34,910 | 6,137 |

The results show that the period from 2014 to 2017 was the most productive and influential for articles published in the selected journals. Additionally, the findings suggest that it generally takes at least two to three years for articles to attract significant attention and be cited by other researchers.

### 5.2 Distribution and Frequency of Article Mentions Across Different SNSs

Table 3 illustrates the distribution and frequency of article mentions across different SNSs. The articles were mentioned or referenced on various online contents, i.e., blog posts and stories posted on 15 different SNSs,

**Table 3. Distribution and frequency of article mentions across different SNSs**

| Year | News mentions | Blog mentions | Policy mentions | Patent mentions | X mentions | Peer review mentions | Weibo mentions | Facebook mentions | Wikipedia mentions | Google+ mentions | LinkedIn mentions | Reddit mentions | Pinterest mentions | F1000 mentions | Q&A mentions | Video mentions | Syllabi mentions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2014 | 173 | 154 | 37 | 16 | 3,002 | 5 | 5 | 142 | 80 | 37 | 0 | 4 | 0 | 0 | 9 | 7 | 0 |
| 2015 | 338 | 147 | 75 | 30 | 4,567 | 1 | 0 | 164 | 61 | 62 | 0 | 10 | 0 | 2 | 7 | 11 | 0 |
| 2016 | 833 | 354 | 202 | 18 | 7,576 | 3 | 0 | 138 | 101 | 63 | 0 | 19 | 0 | 4 | 7 | 14 | 0 |
| 2017 | 527 | 248 | 115 | 82 | 13,304 | 5 | 0 | 246 | 134 | 111 | 0 | 24 | 0 | 10 | 6 | 6 | 0 |
| 2018 | 747 | 320 | 100 | 85 | 16,819 | 1 | 0 | 156 | 255 | 44 | 0 | 21 | 0 | 10 | 4 | 4 | 0 |
| 2019 | 421 | 307 | 155 | 87 | 21,277 | 3 | 0 | 172 | 105 | 0 | 0 | 31 | 0 | 11 | 3 | 6 | 0 |
| 2020 | 1,138 | 460 | 155 | 70 | 30,980 | 3 | 0 | 142 | 130 | 0 | 0 | 46 | 0 | 7 | 6 | 9 | 0 |
| 2021 | 591 | 183 | 68 | 33 | 21,281 | 1 | 0 | 76 | 65 | 0 | 0 | 43 | 0 | 2 | 1 | 4 | 0 |
| 2022 | 1,324 | 204 | 36 | 6 | 29,265 | 0 | 0 | 112 | 44 | 0 | 0 | 65 | 0 | 3 | 0 | 5 | 0 |
| 2023 | 602 | 138 | 14 | 2 | 22,835 | 0 | 0 | 93 | 32 | 0 | 0 | 76 | 0 | 1 | 0 | 0 | 0 |

including the reference management platform Mendeley. In 2014, the data showed a modest number of news mentions (173), blog mentions (154), and Facebook mentions (142), with a relatively higher count of X mentions (3,002). However, there were minimal mentions on other platforms like Peer review sites, Weibo, Q&A platforms, etc. Over the next few years, there was a noticeable surge in mentions across all platforms, especially on X, which witnessed a substantial increase from 3,002 in 2014 to 30,980 in 2020. Later, attention growth in X slightly declined with fluctuation. Meanwhile, news, blogs, patents, and Facebook mention experience fluctuations. Policy mentions exhibit peaks in 2016, 2019 and 2020, indicating potential policy-related discussions during those years. However, there was a similar growth trend of attention on Wikipedia, Google+ and Reddit till 2018. Later, it also declined slightly, fluctuating. The articles were not mentioned even a single time on the platforms, such as LinkedIn, Pinterest, and Syllabi, potentially due to the nature of these platforms.

### 5.3 Geographical Location (Countries) of the Mentions

The social media users affiliated with 194 countries that mentioned 11,847 articles have been tracked. The result shows that the geographical location of 39.88 % of users is unknown. The United States emerges as the predominant contributor, constituting 17.39 % of the total posts, showcasing a strong presence in the library science subject area (Table 4). Following closely, the United Kingdom, with 9.22 %, and Germany, with 2.83 %, represent significant contributions. Notably, these three countries together contribute nearly 30 % of the total mentions, indicating their substantial influence in shaping discussions and research within library science. Countries like Japan, Australia, Spain, Canada, and France also play noteworthy roles, each contributing over 2 % to the overall posts. The result further highlights a global engagement, with contributions from diverse regions, including European countries like France, Spain, Sweden, and the Netherlands, as well as Asian countries such as Japan, India, Bangladesh, Pakistan, China, etc. In addition, there are several countries with only one mention of each. These countries include Eritrea, Faroe Islands, Kiribati, Monaco, Mozambique, Saint Barthélemy, Saint Helena, Ascension and Tristan da Cunha, South Sudan, Suriname, Virgin Islands (U.S.), Afghanistan, Antigua and Barbuda, and Vanuatu. The lack of mentions indicates they are underrepresented or relatively unnoticeable internationally, based on limited global discourse or media coverage.

### 5.4 Prominent Sources of Mentions

Table 5 shows the top 20 most prominent social media handles with the highest mentions. Among the top channels, the X was the primary channel where articles have been mentioned. The X handle, “Journal of Chemical Information and Modeling (JCIM) and “Journal of Chemical Theory and Computation (JCTC)”, based in the United States, garnered a substantial amount of attention with 5,663 mentions, despite having a relatively modest follower count of 8,733. Similarly, X handle of the journal “Scientific Data” from the United Kingdom also enjoyed significant traction with 2,533 mentions, leveraging its substantial follower base of 25,759. This indicates a strong presence and influence within the scientific community. In contrast, accounts like “CompChemBioBot” from Sweden, despite having a smaller follower count of 2,973, received 1,462 mentions. The presence of various professional accounts with relatively lower follower counts but notable mention numbers, such

**Table 4. Top 20 countries with the highest number of mentions**

| S. No. | Country | Number of mentions | Number of profiles | Shared mentions |
|---|---|---|---|---|
| 0 | Unknown | 70,599 | 30,625 | 39.88% |
| 1 | United States | 30,791 | 11,527 | 17.39% |
| 2 | United Kingdom | 16,318 | 5,882 | 9.22% |
| 3 | Germany | 5,008 | 2,356 | 2.83% |
| 4 | Japan | 4,574 | 1,172 | 2.58% |
| 5 | Australia | 4,205 | 1,839 | 2.38% |
| 6 | Spain | 3,828 | 1,945 | 2.16% |
| 7 | Canada | 3,812 | 1,841 | 2.15% |
| 8 | France | 3,745 | 1,705 | 2.12% |
| 9 | Netherlands | 3,010 | 1,213 | 1.70% |
| 10 | Sweden | 2,822 | 503 | 1.59% |
| 11 | India | 2,254 | 962 | 1.27% |
| 12 | Italy | 1,856 | 882 | 1.05% |
| 13 | Switzerland | 1,735 | 760 | 0.98% |
| 14 | Brazil | 1,670 | 726 | 0.94% |
| 15 | Mexico | 1,602 | 622 | 0.90% |
| 16 | Denmark | 954 | 358 | 0.54% |
| 17 | Chile | 915 | 364 | 0.52% |
| 18 | Finland | 902 | 441 | 0.51% |
| 19 | Norway | 902 | 397 | 0.51% |
| 20 | Belgium | 814 | 448 | 0.46% |

**Table 5. Top 20 social media handles with the highest number of mentions**

| S. No. | Account Name | Country | SNS | Total Mentions | Total Followers |
|---|---|---|---|---|---|
| 1 | JCIM_JCTC | United States | X | 5,663 | 8,733 |
| 2 | ScientificData | United Kingdom | X | 2,533 | 25,759 |
| 3 | CompChemBioBot | Sweden | X | 1,462 | 2,973 |
| 4 | rkakamilan | Unknown | X | 1,376 | 1,404 |
| 5 | chemphy123 | Unknown | X | 1,007 | 77 |
| 6 | Ceist8 | Australia | X | 801 | 1922 |
| 7 | 1105seungju | Unknown | X | 668 | 35 |
| 8 | Computational Chemistry Daily | Unknown | Blog | 642 | - |
| 9 | jcheminf | Unknown | X | 637 | 2668 |
| 10 | icsjournal | Unknown | X | 627 | 4,782 |
| 11 | AtomsksSanakan | United States | X | 553 | 3,483 |
| 12 | jcim_papers | Unknown | X | 507 | 59 |
| 13 | eduardoarmienta | Mexico | X | 461 | 1,230 |
| 14 | YogiD15 | Unknown | X | 432 | 2,170 |
| 15 | hirokaneko226 | Japan | X | 393 | 5,394 |
| 16 | ijgis | Unknown | X | 390 | 1,741 |
| 17 | ponkamepon | Japan | X | 385 | 342 |
| 18 | BinfoTrends | Unknown | X | 377 | 7,725 |
| 19 | CDADeathStar | Unknown | X | 360 | 118 |
| 20 | leninwtigger | Unknown | X | 341 | 638 |

**SNS=Social Networking Sites**

as "rkakamilan", "chemphy123", and "Ceist8", suggests that smaller communities or specialized interests are also active and vocal on social media platforms. Interestingly, accounts like "1105seungju" and "YogiD15", with very low follower counts, managed to attract a notable amount of attention, indicating the possibility of content virality or specific topics sparking discussions despite limited audience reach. Furthermore, accounts like "eduardoarmienta" from Mexico and "hirokaneko226" from Japan highlight the global nature of scientific discourse on social media, with contributions from diverse geographic locations. Similarly, including accounts associated with journals and blogs alongside individual professional accounts illustrates the multidimensional nature of social media engagement within the scientific community, encompassing institutional and personal perspectives.

### 5.5 Normality Test of the Distribution of AAS

Table 6 demonstrates the normality test of the distribution of AAS for 3000 samples of both open-access and closed-access articles. The results indicate that the AAS significantly deviate from a normal distribution for both open-access (KS statistic = 0.371, $p < 0.001$; Shapiro-Wilk statistic = 0.246, $p < 0.001$) and closed-access (KS statistic = 0.382, $p < 0.001$; Shapiro-Wilk statistic = 0.213, $p < 0.001$). Given the significance levels obtained, it is clear that the assumption of normality is not met. This means that both the open-access altmetric and closed-access altmetric attention scores do not follow a normal distribution according to the *Kolmogorov-Smirnov* and *Shapiro-Wilk* tests. The Lilliefors Significance Correction is a correction to the *Kolmogorov-Smirnov* test for cases where parameters are estimated from the data. This correction has been applied in this analysis, further supporting the conclusion that the data does not follow a normal distribution.

## 6. DISCUSSION

This study comprehensively explored the impact of SNSs on scholarly articles published in ten selected LIS journals. The publication pattern of articles shows substantial growth and increased activity within the field from 2014 to 2023, reflecting a significant rise in research output and engagement over time. However, there was a slight negative growth in the number of articles between 2018 and 2021, but publications accelerated again from 2022. At the same time, the rise in Altmetric attention scores, alongside the increased number of articles, suggests quantitative expansion and qualitative enhancement, as evidenced by increased attention and engagement[40]. The decreases in metrics such as AAS, total mentions, and Mendeley readings may be due to evolving research priorities, changing audience interests, or lack of academic promotion within the field. Hence, promoting articles through various social networking sites is essential to reach a wider audience and bridge the gap between academia and society[41-43]. Previous researchers argued that publishing a high-quality article in journals does not guarantee a high citation, while promoting and broadly disseminating the publications are essential[42,44-45].

Moreover, analysing mentions across various SNSs provides a valuable understanding of disseminating scholarly work within digital platforms. Platforms like X have witnessed significant growth in mentions over the years. Others exhibit fluctuating patterns, suggesting varying engagement and interest across different channels. X is the primary channel for disseminating research information in various fields[34,42,46-49]. X experienced a 23 % increase in daily use compared to the previous period during the COVID-19 pandemic[28,50,51]. As of January 2024, there were 619 million monthly active users on X, making it an effective tool for reflecting and predicting public opinion on different topics.[52] Hence, X is an effective platform for sharing research highlights to a broad audience. As a result, this study found that X users play an essential role in scholarly communication and facilitating engagement and dissemination with accounts ranging from institutional handles to individual professionals.

Additionally, the geographical distribution of mentions reveals a diverse global engagement with contributions from various countries. It highlights the growing interconnectedness of scholarly communities across borders, showing that research and academic discussions are no longer confined to specific regions but are increasingly part of a global, international conversation. Countries such as the United States, the United Kingdom, and Germany are significant contributors. Additionally, nations with fewer mentions emphasise the need for greater inclusivity and representation within scholarly communication.

On the other hand, the AAS was found to have a non-normal distribution. It is essential to note that AAS often follows a skewed distribution, with a small number of publications receiving a large amount of attention and a large number of publications receiving a small amount of attention. Some articles, due to their topic, quality, or timing, go viral and gain significant attention on social media and other platforms. This could be one of the reasons why the AAS in these journals does not follow a normal distribution. It also aligns

**Table 6. Normality test of the distribution of AAS for 3000 sample of both open-access and closed-access articles**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Open-access | 0.371 | 3000 | 0.000 | 0.246 | 3000 | 0.000 |
| Closed-access | 0.382 | 3000 | 0.000 | 0.213 | 3000 | 0.000 |

with the general understanding of social media's impact on scholarly communication, where a few publications achieve substantial visibility while the majority remains less noticed.

## 7. CONCLUSION

Overall, the analysis provides a general understanding of publication patterns, social media impacts, geographic differences, and how metrics are distributed in the scholarly field. It provides valuable insights that can help researchers, policymakers, and other stakeholders understand these dynamics better. Continued monitoring and analysis of these trends are essential for creating a vibrant and inclusive scholarly ecosystem conducive to knowledge dissemination and innovation.

However, this study primarily examined how social networking sites (SNSs) impact the dissemination of research information. There is still much to explore in this area. Future research could investigate the factors driving changes in scholarly communication, such as changing research interests and the influence of emerging platforms on academic discussions. Additionally, it would be valuable to study how different publication models, such as open-access and closed-access, affect the distribution of AAS. The role of specific social media platforms and their algorithms in monitoring social engagement can be examined.

Furthermore, research could investigate methods to improve the visibility and sharing of research across various regions and social media platforms. It could also evaluate the influence of collaborative networks and interdisciplinary studies on altmetric attention using databases such as Dimensions, PlumX, Impactstory, and Kudos. Understanding these dynamics could enhance global engagement and collaboration within the scholarly community.

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