
Comparison and Correlation of Altmetrics With Scientometrics Indicators of Library and Information Science Journals. Can We Have a Quartile Ranking Based on the Altmetrics Score?

Mansoureh Serati Shirazi¹, Rouhollah Khademi², Mansoor KoochiRostami³

¹Institute for Science Citation and Observatory of Science and Technology (ISC)

Research Department of Scientometric, Shiraz, Iran

0000-0002-4558-9192

Yasaman.serati@yahoo.com



²Assistant professor, Knowledge and Information Science Department

Semnan University, Semnan, Iran

r.khademi@semnan.ac.ir

³Assistant Prof., Department of Knowledge and Information Science

Shahid Chamran, University of Ahvaz, Ahvaz, Iran

m.rostami@scu.ac.ir

ABSTRACT: *This study investigated the correlation between traditional indicators of Scientometrics and altmetrics. Also, compare quartile ranking based on the journal's altmetrics scores and quartile ranking based on their JCR impact factor. The Population of this study includes the Journals of library and information science in JCR. "Altmetric Explorer" and JCR databases were used for data gathering. The results of this study showed that "Twitter mentions" ranked first among the platforms used for mentioning. Journal of Strategic Information Systems, International Journal of Geographical Information Science, Government Information Quarterly, and Journal of Knowledge Management gained the most altmetric attention score. Correlation analysis between total citations obtained by any journal with its altmetric attention score showed no correlation between the two of these indicators. Also, the analysis showed a correlation between altmetric attention score and JIF but no correlation between altmetric attention score and immediacy index. According to the findings of this study, if we sort the journals in descending order based on their Altmetric scores, we have quartiles that correlate with their quartiles in JCR. This fact indicates that qualified researches influence the academic society as well as non-academic society, although they are available much faster on social media and hence they are less waste of time. However, it also shows that good publications rank high by any measurement tool.*

Keywords: Scientometrics, Altmetrics, Library and Information Science Journal

Received: 11 July 2023, Revised 10 August 2023, Accepted 24 August 2023

DOI: <http://doi.org/10.6025/stm/2023/4/64-70>

1. Introduction

Communication is the essence of science and scientific journals are the most significant media for scientific communication among researchers (Barahmand, 2008). The traditional evaluation tools for these journals are bibliometric and Scientometrics indicators, most of them are based on the citation. For example, the Journal Impact Factor (JIF), which was introduced by Garfield (2006), founder of ISI (now known as Clarivate analysis), is accessible via the Journal Citation Report (JCR). JCR also provides other indicators such as the Immediacy Index, Quartile ranking, etc.

The fact is that citations and citation-based indicators have some negative issues; they are very time-consuming processes, depending on the disciplines and may need some years for an article to be cited. Several researchers mentioned some other

challenges, such as citation bias, inability to distinguish between affirmative and negative citations, restriction of resource coverage in citation databases, technical and human limitations of citation indexes and linguistic bias (MacRoberts & MacRoberts, 1989; Moed, 2005; Sotoudeh, 2010; Jamali, 2011).

In addition, due to the asymmetric distribution of citations in a journal, the journal scale should not be used as an indicator of article level as sometimes the relationship between citations and the impact factor is weak (Thelwall, Haustein, Larivière and Sugimoto, 2013).

On the other hand, everything has been changing rapidly in recent years. The most important sign of this development has been the emergence of the Internet and new information and communication technologies in all aspects. Journals are no exception and have been influenced by these technologies. In other words, over the past decades, technology has opened up new avenues for journals and scientific communication for researchers. Since then, a paradigm has prevailed according to need; at the time with the spread of science and information, scientometrics and bibliometrics paradigm, and at a time with the advent of the web, webometrics paradigm. Nowadays, with the widespread use of social media, these tools can be used to publish information and consequently can be used to evaluate journals as media of scientific communication. In this regard, to define the study of research evaluation by analyzing the products of online scientific tools, Jason Prim coined the term altmetrics which stands for alternative metrics (Priem et al. 2010). Alternative scales have, therefore been developed to address citation challenges (Thelwall, Haustein, Larivière and Sugimoto, 2013). Altmetrics focuses on research outputs not only in scientific activity but in social networks such as Facebook, Twitter, blogs, news outlets and reference management tools (Priem et al. 2010). So, this indicator is called a revolution in scholarly communication by Taylor (2013). After its imagination, various studies have examined the relationship between different traditional bibliometric and Scientometrics and altmetrics indices. For example, Waltman and Costas (2014) have reviewed biomedical journals and concluded that there is a clear correlation between f1000 recommendations and citations. However, this correlation is weaker than the relationship between the journal impact factor and citations.

Bornman (2015) examined the correlation between the number of altmetrics and the number of citations and concluded that the correlation between traditional citations and the number of microblogging (Twitter) is negligible. It is medium to large for the number of small blogs and the number of bookmarks of online reference managers.

Costas, Zahedi and Wouter (2015) sought to answer this question, "Do "Altmetrics" Correlate with Citations?" According to the results of this study, the analysis of the relationships between altmetrics and citations confirms previous claims of positive correlations but is relatively weak.

Critchfield, T. S. et al. (2022) evaluated Behavior Analysis in Practice (BAP) journals by using altmetric data because they believe that people who are interested in this kind of journal do not publish scholarly papers with citations. They found that behavior Analysis in Practice (BAP) journal is becoming a leader in this domain among applied behavior analysis journals. Mirghaderi et al. (2022) investigated the relationship between alternative scientometric measures and some traditional measures, such as citation count and journal impact in the top 50 most-cited articles in the field of knee and hip arthroplasty. They found out that Altmetric Attention Score was highest in more recently published papers. In contrast, citation count had the opposite trend, and this indicator has a weak correlation with the journal's impact factor and citation count.

A review of the research literature shows that in recent years, altmetrics indicators have been of great interest in the evaluation of scientific productions, and in many of these studies, researchers have tried to compare these indicators with traditional indicators such as citation, to determine their effectiveness and by fixing their problems, can be used as a supplement next to citation (and not instead of citation) for research evaluations in the future. But in these studies, quartile ranking based on the Journal's altmetrics scores has not been investigated yet. So, in this study, we are going to do it.

2. Aim

This study aims to investigate the altmetric score of library and information science journals and compare quartile ranking based on Journal's altmetrics scores and quartile ranking based on their JCR impact factor. Also, investigating the relationship between some traditional Scientometrics indicators and Altmetrics of library and information journals.

3. Methods and Data

According to our study purpose, we needed some bibliometrics and altmetrics indicators. So, we used JCR as a well-known database for traditional indicators of Journals and altmetric.com for altmetrics data which Robison non-Garcia et al. (2014) consider as a transparent and accurate tool for altmetrics data and also many studies have used it. We selected the "Information Science & Library Science" category on JCR and 87 journals retrieved. In the next step, we used "Altmetric Explorer" and searched the journals retrieved in the previous step by ISSN and extracted Altmetrics indices for them. Whereas 18

journals extracted didn't have altmetrics attention score, so we eliminated them; therefore, our population study was 69 journals.

The bibliometrics indicators about journals extracted by JCR are **Total Cites** (that is the sum of the total citations received by every article of that journal), **Journal Impact Factor** (total number of citations in the current year to any items published in a journal in the previous two years, divided by the total number of items published in the journal in the same two years (Garfield, 1999)), **Immediacy Index** (the average number of times an article is cited in the year it is published). Also, JCR provides **Quartile rankings** based on rank for the Journal Impact Factor "therefore, it is derived for journals in each of their subject categories according to which quartile of the impact factor distribution the journal occupies for that subject category, where Q1 denotes the top 25% of the impact factor distribution, Q2 a middle-high position (between top 50% and top 25%), Q3 a middle-low position (top 75% to top 50%), and Q4 bottom position (bottom 25% of the impact factor distribution) (García, Rodríguez-Sánchez, Fdez-Valdivia, & Martínez-Baena, 2012).

For Altmetrics indices, we have used the "Altmetric Attention Score", which is an automatically calculated, weighted count of all the attention a research output has received. It is based on three main factors, including Volume (the score for an article rises as more people mention it), Sources (these are categorized, and each category of mention contributes differently to the final score) and Authors (here, it counts who and how often and to whom someone mentions something)¹.

After gathering data, for analyzing, statistical analysis was performed using IBM SPSS. Data was gathered on 28 June 2021; at that time, JCR2019 was accessible; therefore, we also limited altmetric score to 2019.

4. Results

According to our research aims, at first, we examined the platforms which articles of the library and information science journals mentioned by them.

Table 4.1. Altmetrics mentioned in LIS journals

Rank	Altmetrics	Mentions
1	Twitter mentions	54680289
2	Number of Mendeley readers	28353589
3	Number of Dimensions citations	11503558
4	News mentions	5678077
5	Facebook mentions	1407692
6	Blog mentions	596193
7	Google+ mentions	311438
8	Reddit mentions	117204
9	Wikipedia mentions	70133
10	Policy mentions	67555
11	Video mentions	62729
12	Patent mentions	28422
13	F1000 mentions	18223
14	Q&A mentions	3046
15	Peer review mentions	2192
16	Syllabi mentions	106
17	Weibo mentions	16
18	Pinterest mentions	16
19	LinkedIn mentions	3

¹<https://www.altmetric.com/about-our-data/the-donut-and-score/>

“Twitter mentions” ranks first with a big difference, and “Number of Mendeley readers” and “Number of Dimensions citations” follow Twitter, respectively. More details of altmetrics mentions are shown in Table 4.1.

Also, analyzing the data showed that JOURNAL OF STRATEGIC INFORMATION SYSTEMS, INTERNATIONAL JOURNAL OF GEOGRAPHICAL INFORMATION SCIENCE, GOVERNMENT INFORMATION QUARTERLY, JOURNAL OF KNOWLEDGE MANAGEMENT gained the most altmetric attention score. Scores of these four journals are a long way from those in the next rankings. Table 4.2 shows the Altmetric attention score of the LIS journals.

Table 4.2. Top 10 Altmetric attention score of the LIS journals

Rank	Full Journal Title	Altmetric Attention Score	AltmetricAttention ScorePer article
1	JOURNAL OF STRATEGIC INFORMATION SYSTEMS	17918369	746598.7083
2	INTERNATIONAL JOURNAL OF GEOGRAPHICAL INFORMATION SCIENCE	17620391	158742.2613
3	GOVERNMENT INFORMATION QUARTERLY	17502873	246519.338
4	JOURNAL OF KNOWLEDGE MANAGEMENT	17153654	182485.6809
5	JOURNAL OF THE AMERICAN MEDICAL INFORMATICS ASSOCIATION	7211	38.7688172
6	SCIENTOMETRICS	6070	21.7562724
7	Journal of Informetrics	2870	38.26666667
8	LEARNED PUBLISHING	2504	62.6
9	Journal of the Association for Information Science and Technology	2143	20.40952381
10	QUALITATIVE HEALTH RESEARCH	2101	12.73333333

In order to examine the correlation between altmetric attention score and some bibliometrics indicators such as Total Cites, Journal Impact Factor and Immediacy Index, Pearson Correlation was used. For the first analyzis, the correlation between total citations obtained by any journal with its altmetric attention score was investigated, which showed in Table4.3. According to the results obtained from the correlation matrix table, it can be said that with a confidence level of 0.99 and an error level of less than 0.01, there is no correlation between the altmetric attention score and total citation.

Table 4.3. Correlation between altmetric attention score and total citations

Correlations			
		Cites	Altmetric Attention Score
Cites	Pearson Correlation	1	.141
	Sig. (2-tailed)		.246
	N	69	69
Altmetric Attention Score	Pearson Correlation	.141	1
	Sig. (2-tailed)	.246	
	N	69	69

Since the traditional indicators under investigation, i.e., the impact factor and consequently the Q and the Immediacy Index, are based on the number of citations per article, we also considered the altmetric attention score per article, as shown in Table 4.2. The result of these correlations is shown in table 4.4.

Table 4.4. Correlation between altmetric attention score and JIF and Immediacy Index

Correlations				
		Altmetric attention score per article	JIF	Immediacy Index
Altmetric attention score per article	Pearson Correlation	1	.322**	.138
	Sig. (2-tailed)		.007	.260
	N	69	69	69
JIF	Pearson Correlation	.322**	1	.721**
	Sig. (2-tailed)	.007		.000
	N	69	69	69
Immediacy Index	Pearson Correlation	.138	.721**	1
	Sig. (2-tailed)	.260	.000	
	N	69	69	69
	Sig. (2-tailed)	.917	.000	.000
	N	69	69	69

According to the results obtained from the correlation matrix table, it can be said that with a confidence level of 0.99 and an error level of less than 0.01, there is a correlation between altmetric attention score and JIF but no correlation between altmetric attention score and immediacy index.

Another aim of this study was to answer whether, like the Q, which is formed based on the impact factor on JCR, journals can be divided into quartiles based on their altmetric attention score (we call it AltQ in this study). Is there a correlation between these two indicators? For this aim, we conducted Spearman's rho correlation. Table 4.5 shows the result of this analysis. This result shows a statistically significant correlation between the two calculated Q's with 0.99% confidence and an error level less than 0.01.

Table 4.5. Correlation between JCRQ and AltQ

Correlations				
		JCRQ	AltQ	
Spearman's rho	JCRQ	Correlation Coefficient	1.000	.346**
		Sig. (2-tailed)	.	.004
		N	69	69
	AltQ	Correlation Coefficient	.346**	1.000
		Sig. (2-tailed)	.004	.
		N	69	69
**. Correlation is significant at the 0.01 level (2-tailed).				

5. Conclusion and discussion

Two main approaches can be considered in evaluating the impact of research. On one side, traditional metrics such as impact factor and so on are based on the citations and examine publication impact through slowly accumulating academic citations and on the other side, "Altmetrics are a new way to describe early publication influence in nonacademic media/ community spheres (news, tweets, and blogs). Articles with significant altmetric attention make a big splash of immediate impact, whereas papers with high rates of academic citation reflect ripple effects of influence over time" (Llewellyn & Nehl (2022)). But these two aspects can be related. In this study, we studied library and information science journals to explore these relations. The results of this study showed that "Twitter mentions" ranked first among the platforms used for mentioning. Journal of Strategic Information Systems, International Journal of Geographical Information Science, Government Information Quarterly, and Journal of Knowledge Management gained the most altmetric attention score. The altmetric attention score of these four journals has a significant difference from the next journals. Correlation Analysis between total citations obtained by any journal with its altmetric attention score showed that there is no correlation between these two indicators. Also, analyzing showed a correlation between altmetric attention score and JIF but no correlation between altmetric attention score and immediacy index. A look at the research literature in this field shows that the correlation between traditional indicators and altmetrics has been confirmed in some fields and rejected in others.

According to the findings of this study, if we sort the journals in descending order based on their Altmetric scores, we have quartiles that correlate with their quartiles in JCR. This fact indicates that qualified researchers influence the academic society as well as non-academic society, although they are available much faster on social media and hence they are less waste of time. However, it also shows that good publications rank high by any measurement tool.

All in all, by finding this research, we can have a new indicator for journals called the "ALT Q" based on the Journal's altmetrics score, just as the same one we have in JCR for journals' impact factor.

6. Acknowledgment

The authors wish to thank Altmetric for providing this study's data free of charge for research purposes.

References

- [1] Barahmand, N. (2008). Electronic journals and scientific communication. *Librarianship and Information Organization Studies*, 18(4), 201-212.
- [2] Bornmann, L. (2015). Alternative metrics in scientometrics: A meta-analysis of research into three altmetrics. *Scientometrics*, 103(3), 1123-1144.
- [3] Costas, R., Zahedi, Z., Wouters, P. (2015). Do "altmetrics" correlate with citations? Extensive comparison of altmetric indicators with citations from a multidisciplinary perspective. *Journal of the Association for Information Science and Technology*, 66(10), 2003-2019.
- [4] Critchfield, T. S., Heward, W. L., Lerman, D. C. (2022). Fifteen Years and Counting: The Dissemination Impact of Behavior Analysis in Practice. *Behavior Analysis in Practice*, 15, 1-8. <https://doi.org/10.1007/s40617-022-00744-2>
- [5] García, J. A., Rodríguez-Sánchez, R., Fdez-Valdivia, J., Martínez-Baena, J. (2012). On first quartile journals which are not of highest impact. *Scientometrics*, 90(3), 925-943.
- [6] Garfield, E. (1999). Journal impact factor: a brief review. *CMAJ*, 161(8), 979-980.
- [7] Garfield, E. (2006). The history and meaning of the journal impact factor. *Jama*, 295(1), 90-93.
- [8] Jamali, H. (2011). Research Evaluation: Approaches, Techniques and Challenges. *Rahyaft*, 21(49), 39-51.
- [9] Llewellyn, N. M., Nehl, E. J. (2022). Predicting citation impact from altmetric attention in clinical and translational research: Do big splashes lead to ripple effects? *Clinical and Translational Science*, 15, 1387-1392.
- [10] MacRoberts, M. H., MacRoberts, B. R. (1989). Problems of citation analysis: A critical review. *Journal of the American Society for Information Science*, 40(5), 342-349.
- [11] Mirghaderi, S. P., Baghdadi, S., Salimi, M., Shafiei, S. H. (2022). Scientometric analysis of the top 50 most-cited joint

arthroplasty papers: traditional vs altmetric measures. *Arthroplastytoday*, 15, 81-92.

[12] Moed, H. F. (2005). Citation analysis of scientific journals and journal impact measures. *Current Science*, 89 (12) 1990-1996.

[13] Priem, J., Taraborelli, D., Groth, P., & Neylon, C. (2010). Altmetrics: A manifesto. Available online at: <http://www.altmetrics.org>
Robinson-García, N., Torres-Salinas, D., Zahedi, Z., Costas, R. (2014). New data, new possibilities: Exploring the insides of Altmetric.com. *Profesional De La información*, 23 (4) 359–366. <https://doi.org/10.3145/epi.2014.jul.03>.

[14] Sotoudeh, H. (2010). The effect of magazines on the impact of research on different fields of research and its inefficiencies. *Rahyaf*, 20 (47) 33-43.

[15] Taylor, M. (2013). Exploring the boundaries: How altmetrics can expand our vision of scholarly communication and social impact. *Information Standards Quarterly*, 25 (2) 27-32.

[16] Thelwall, M., Haustein, S., Larivière, V., Sugimoto, C. R. (2013). Do altmetrics work? Twitter and ten other social web services. *PloS One*, 8 (5) e64841.

[17] Waltman, L., Costas, R. (2014). F 1000 Recommendations as a potential new data source for research evaluation: A comparison with citations. *Journal of the Association for Information Science and Technology*, 65 (3) 433-445.